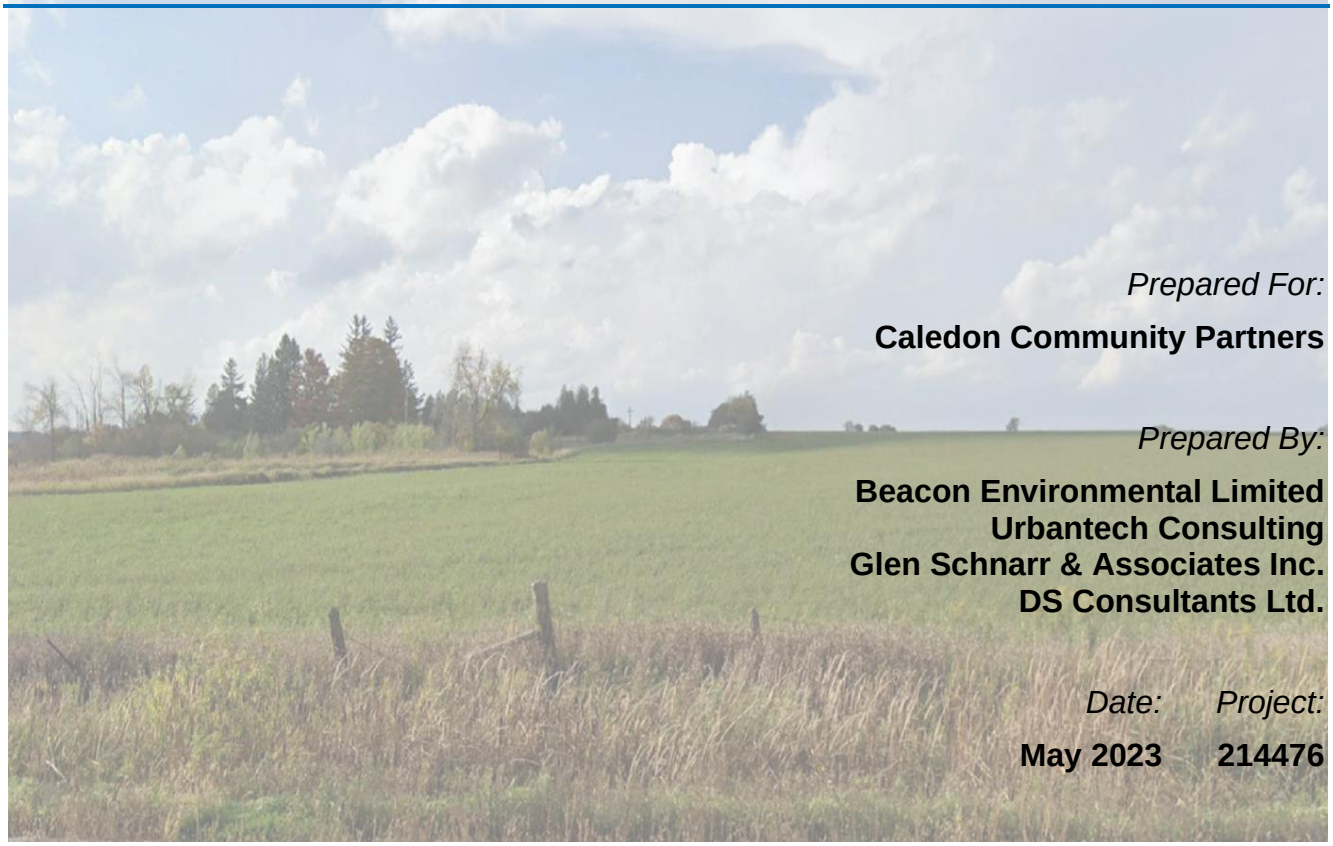
Comprehensive Environmental Impact Study and Management Plan

Caledon Station Secondary Plan



Prepared For:

Caledon Community Partners

Prepared By:

Beacon Environmental Limited
Urbantech Consulting
Glen Schnarr & Associates Inc.
DS Consultants Ltd.

Date: **May 2023**

Project: **214476**

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1. Introduction

Beacon Environmental Limited (Beacon), in collaboration with Glen Schnarr & Associates Inc., Urbantech Consulting and DS Consultants Ltd. were retained by the Caledon Community Partners to prepare a Comprehensive Environmental Impact Study and Management Plan (CEISMP) in support of a Secondary Plan for Caledon Station in Bolton, Ontario.

The Caledon Station Secondary Plan lands (herein referred to as the "Subject Lands") include approximately 182 hectares (450 acres) of land generally located north of King Street, east of The Gore Road and west of the CP Railway tracks (**Figure 1**). The Subject Lands are predominantly agricultural with natural heritage features limited to headwater drainage features and non-provincially significant wetlands that are concentrated in the southwestern portion of the Subject Lands.

The Subject Lands are entirely within the Region of Peel's Urban Area (ROP, Nov 2022) with the eastern portion of the Subject Lands being within the Region's Major Transit Station Area (MTSA). As well, the Subject Lands are currently part of the Caledon Station Secondary Plan process (POPA-2021-0002). The effect of the Secondary Plan will be to apply land use designations to the Subject Lands, including Low Density Residential, Medium Density Residential, Mixed Use, Institutional, Open Space Policy Area. The subject Draft Plan of Subdivision and Zoning By-Law Amendment for the Subject Lands will ensure the creation of a compact, pedestrian and transit-oriented development through implementation of the Secondary Plan policies.

It is also important to note that on March 5, 2021, the Province of Ontario issued a Ministerial Zoning Order ('MZO') under Ontario Regulation 171 / 21 ('O. Reg. 171 / 21') for the eastern portion of the Subject Lands. This MZO established zoning for the eastern portion of the Subject Lands as a 'Mixed Use Residential Zone'. This Zone permits a range of detached, semi-detached and townhouse dwellings as well as a range of mid-rise residential and commercial uses.

The Caledon Station Secondary Plan and associated Land Use Plan, once approved through a Local Official Plan Amendment (LOPA), will serve as a framework for future development of the Subject Lands for the purposes of accommodating residential and mixed-use development with related complimentary uses, such as open spaces, parks, trails, commercial uses, the Bolton GO Station, the Natural Heritage System (NHS), and stormwater management facilities.

This CEISMP summarizes the findings of detailed biophysical investigations and analyses that have been undertaken for the Subject Lands to characterize the environment, identify constraints and opportunities to future development, as well as the environmental management systems that will be required to support future development while enhancing the environment and local natural heritage system. The information presented is this CEISMP was used to guide the development of a Land Use Plan for the Caledon Station Secondary Plan as well as a Framework Plan (Block Plan).

It should be noted that in 2012 the Town of Caledon initiated the Bolton Residential Expansion Study (BRES) to identify and prioritize areas for future residential expansion and through this process had identified the BRES Option 3 Lands, or Subject Lands, as the preferred future residential expansion area, which was subsequently approved through ROPA 30.

Consistent with Section 5.7.3.7.6 of the Town of Caledon, a CEISMP or Subwatershed Study is required to support applications for settlement area expansions, official plan amendments and large-scale development proposals within or adjacent to Environmental Protection Areas (EPA).

In 2013, the Town of Caledon had retained a consultant team to initiate preparation of a CEISMP for the BRES Option 3 Lands or Subject Lands. Terms of Reference (TOR) for that CEISMP were prepared and approved by the Region of Peel and Toronto and Region Conservation Authority (TRCA) in April 2013. These TOR were used by the Town's consultant team to guide the environmental studies and analyses required to prepare the CEISMP. A copy of these TOR is presented in **Appendix A**.

Between 2013 and 2015, the Town had prepared the baseline characterization and constraint identification parts of the CEISMP, including confirmation of natural features and identification of a natural heritage system for the Subject Lands. In 2016, work on the CEISMP was suspended as the Region completed its Municipal Comprehensive Review Process.

During this period, the Option 3 Landowners Group (now Caledon Community Partners) had retained a consultant team to complete a CEISMP in support of a Local Official Plan Amendment (LOPA) in relation to a Secondary Plan for Subject Lands as per Section 5.4.3.2.9.1.j of ROPA 30. In preparing the CEISMP, the study team had adopted the Town's previously approved BRES CEISMP TOR. The CEISMP integrated and built upon the Town's previous work to ensure consistency and continuity. The CEISMP report was also restructured to consolidate the three parts (Part A – Existing Conditions and Characterization, Part B – Impact Assessment and Detailed Studies, and Part C – Implementation) into one single comprehensive report.

In February 2021, a CEISMP in support of the Macville LOPA application was submitted to the Town, Region and TRCA. Comments on the CEISMP were received between June and December 2021 and the study team had prepared preliminary responses to address many of the comments. Additionally, between 2022 and 2023, Caledon Community Partners held a series of workshops with Town staff to develop a revised Land Use Plan.

The current CEISMP has been updated with the revised Land Use Plan and revised Framework Plan to respond to Town, Region and TRCA comments on the previously submitted February 2021 CEISMP.

1.1 Planning Context

The Growth Plan (2020) sets population and employment targets for Peel to achieve to 2051. The Region undertook their Municipal Comprehensive Review to update their Official Plan and in November 2022 the Province approved the Region's new 2051 Official Plan.

The Subject Lands are entirely within the Region of Peel's Urban Area (ROP, Nov 2022) with the eastern portion of the Subject Lands being within the Region's Major Transit Station Area (MTSA). As well, the Subject Lands are currently part of the Caledon Station Secondary Plan process (POPA-2021-0002). The effect of the Secondary Plan will be to apply land use designations to the Subject Lands, including Low Density Residential, Medium Density Residential, Mixed Use, Institutional, Open Space Policy Area. The subject Draft Plan of Subdivision and Zoning By-Law Amendment for the Subject Lands will ensure the creation of a compact, pedestrian and transit-oriented development through implementation of the Secondary Plan policies.

LEGEND

- SUBJECT LANDS
- STUDY AREA (120m)

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FIGURE 1

SITE LOCATION

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May 2023 Scale 1:12,000

It is also important to note that on March 5, 2021, the Province of Ontario issued a Ministerial Zoning Order ('MZO') under Ontario Regulation 171 / 21 ('O. Reg. 171 / 21') for the eastern portion of the Subject Lands. This MZO established zoning for the eastern portion of the Subject Lands as a 'Mixed Use Residential Zone'. This Zone permits a range of detached, semi-detached and townhouse dwellings as well as a range of mid-rise residential and commercial uses.

1.2 CEISMP Study Process

1.2.1 Study Purpose

The purpose of the CEISMP or subwatershed study is to support applications for proposed amendments to the official plan, secondary plans and large-scale development applications in areas that contain or are adjacent to EPA by assessing potential impacts of the proposal on the ecosystem.

A CEISMP comprehensively characterizes the biophysical environment and identifies constraints and opportunities to future development to help guide land use planning and community design to ensure ecosystems are protected, maintained, restored and where possible enhanced by demonstrating that proposed land use changes conform to applicable environmental protection legislation, regulations, and policies at the federal, provincial, regional and local levels.

A CEISMP includes environmental management plans designed to protect, maintain, and enhance ecosystems and minimize environmental impacts and a monitoring framework and adaptive management plan for assessing their performance.

Depending on the level of study detail a CEISMP can be used to support land use changes at the subwatershed scale or site-specific scale. Depending on the level of study and detail provided in a CEISMP, additional study and reporting may be required to support subsequent draft plan or site plan applications. The CEISMP identifies the level of study necessary to demonstrated compliance with the Framework Plan and the associated environmental management plans.

1.2.2 Study Area

This CEISMP has adopted an integrated subwatershed based study approach. As such, the Study Area limits are variable and are defined by each discipline and scale of investigation. For example, when characterizing groundwater and surface water resources, the Study Area boundaries extend to the limits of the drainage catchment areas, and when characterizing natural heritage resources, the limits are generally based on application of the 120 m adjacent lands standard as depicted on **Figure 1**, although, the CIESMP does give consideration to the Subject Lands within the context of the broader landscape and ecological setting, including the provincial, regional and local natural heritage systems.

1.2.3 Study Goals

The goal of the Caledon Station Secondary Plan is to develop the Subject Lands into a complete community that is compact, pedestrian and cyclist-friendly, and transit-oriented while also protecting and enhancing significant and sensitive natural heritage features by implementing best management practices as it relates to managing water resources.

As per the CEISMP TOR, the objective of the study is to "conduct an impact assessment and develop a management plan for the natural environment potentially affected by urban development associated with the expansion of the Bolton Rural Service Centre to accommodate future residential growth to 2031." Also, the goal CEISMP is to provide a sufficient level of detail and clear direction for the development in accordance with the PPS, Regional Official Plan and Municipal Plan.

The goals of this CEISMP are in line with Section 3.2.4.15 of the Town of Caledon's Official Plan, which lists ways in which the Town assist's in implementing ecosystem principle, goal and objectives, such as identifying groundwater resources and participating in environmental studies. Similarly, the goals and objectives of the CEISMP are also in line with the New Urban Areas policies of the ROP requiring that secondary plans be supported by subwatershed studies or equivalent studies.

1.2.4 Study Team

This CEISMP was prepared using an integrated approach with input from a multi-disciplinary project team. The project team is comprised of experts in the fields of land use planning, ecology, hydrology, hydrogeology and fluvial geomorphology.

A list of Study Team members, their qualifications, and role in the project is provided in **Table 1**.

Table 1. Composition of Study Team, Key Roles and Reports Provided

Firm	Individuals	Title - Qualifications	Key Role and Reporting
Beacon Environmental Ltd.	Ken Ursic	M.Sc. / Senior Ecologist	Project Management *CEISMP Report – Primary Author*
	Shelley Gorenc	M.Sc. P.Geo. / Senior Geomorphologist	Geomorphic Assessment/ Headwater Drainage Feature Assessment *CEISMP Report - Author*
	Dan Westerhof	B.Sc. MES / Terrestrial Ecologist, Certified Arborist	Vegetation Survey *CEISMP Report - Author*
	James Seery	B.Sc. (Hons.), Terrestrial Ecologist, Certified Arborist	*CEISMP Report - Author*
	Sarah Zicca	GIS Analyst / Environmental Scientist	Figure Production
Urbantech Consulting	Steven A. Hader	P.Eng. /Senior Project Manager	Functional Servicing Report *CEISMP Report - Author*
	Janna Ormond	E.I.T / Water Resources Designer	Functional Servicing Report *CEISMP Report - Author*
	Adham Bakr	P.Eng/ Senior Water Resources Engineer	Functional Servicing Report *CEISMP Report - Author*
DS Consultants Ltd.	Martin Gedeon	M.Sc, P.Geo. / Vice President	Hydrogeological Report
	Scott Watson	B.A.T / Manager	Hydrogeological Report *CEISMP Report - Author*
Gerrard Designs	Ryan Kearns	Designer	Input to Figure Production

Firm	Individuals	Title - Qualifications	Key Role and Reporting
Glen Schnarr & Associates Inc. (GSAI)	Glen Schnarr	MCIP, RPP, Partner	Project management of planning process to establish Secondary Plan
	Karen Bennett	MCIP, RPP, Senior Associate	

2. Regulatory Framework for Environmental Protection

To ensure that the proposed Land Use Plan for the Caledon Station Secondary Plan and its associated environmental management systems (NHS, Stormwater Management Strategy, etc.) are consistent with requirements outlined in the applicable environmental legislations, regulations and policies related to protection and management of natural resources, the following regulatory framework has been developed to summarize the various legislation, regulations and policies that need to be considered through this land use planning process. Refer to **Figure 2** for the location of existing environmentally designated protection areas that are proximal to the Subject Lands.

The regulatory framework presented below in **Table 2** provides a summary of key statutory requirements and policy tests that need to be satisfied. The purpose of including this framework in this CEISMP is to inform the constraint analysis presented in **Section 4** which was used to guide the design of the Caledon Station Secondary Plan Land Use Plan and Framework Plan to ensure these plans are consistent with the various regulatory requirements relating to environmental protection and enhancement. Compliance with applicable environmental legislations, regulations and policies regulations is addressed in **Section 10** of the CEISMP.

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LEGEND

- SUBJECT LANDS
- STUDY AREA (120m)
- GREENBELT
- OAK RIDGES MORAINE
- REGION OF PEEL GREENLANDS SYSTEM
- CALEDON ENVIRONMENTAL POLICY AREA
- PROVINCIALLY SIGNIFICANT WETLANDS
- ANSI, LIFE SCIENCES
- BOLTON RESOURCE MANAGEMENT TRACT

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FIGURE 2

DESIGNATED ENVIRONMENTAL AREAS

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Table 2. Regulatory Framework for Environmental Protection

Level of Government	Act/Regulation/ Policy/Guideline	Type	Purpose	Relevance to the Caledon Station Secondary Plan Application
Federal	*Fisheries Act* (1985)	Act	To ensure the conservation and protection of fish and fish habitat.	Fish habitat is present on the Subject Lands. Development activities taking place in or near water may affect fisheries by adversely affecting fish or fish habitat. DFO recommends that proponents of these activities should undergo the following: • Understand the types of impacts their projects are likely to cause; • Take measures to avoid and mitigate impacts to the extent possible; and • Request authorization from the Minister and abide by the conditions of any such authorization, when it is not possible to avoid and mitigate impacts of projects that are likely to cause serious harm to fish. While not relevant at this stage of the land use planning process, compliance the Act will need to be demonstrated as a Condition of Draft Plan approval and prior to commencing site preparation, earthworks and construction.
	Migratory Birds Convention Act (1994)	Act	To protect listed migratory bird species and their nests.	Breeding habitat for listed migratory birds is present of on the Subject Lands. To comply with this legislation, activities that can potentially impact breeding birds must be avoided. While not relevant at this stage of the land use planning process, compliance the Act will need to be demonstrated as a Condition of Draft Plan approval and prior to commencing site preparation, earthworks and construction.
	Species at Risk Act (2002)	Act	To protect the habitats of federally listed species at risk.	Habitat for federally listed Species at Risk is present on the Subject Lands. However, the *Species at Risk Act* applies primarily to lands under federal jurisdiction. Outside of federal lands, the *Species at Risk Act* prohibitions apply only to aquatic species and migratory birds that are also listed in the Migratory Birds Convention Act. This is applicable to the Subject Lands as fish habitat and nesting birds are present.
Provincial	*Conservation Authorities Act* (1990)	Act	The Conservation Authorities Act and provides the legislative, operational jurisdictional and regulatory framework for Conservation Authorities.	Under the Act, Conservation Authorities have the authority to regulate activities in areas under their jurisdiction through issuance of permits.
	Fish and Wildlife Conservation Act (1997)	Act	The *Fish and Wildlife Conservation Act* enables the Ministry of Natural Resources (MNR) to provide sound management of the province's fish and wildlife.	The *Fish and Wildlife Conservation Act* protects the nest or eggs of bird not already protected on the *Migratory Birds Convention Act* with some exceptions.
	Endangered Species Act (2007)	Act	This Act provides protection to the habitats of endangered and threatened species in Ontario.	Habitat for provincially listed Species at Risk is present on the Subject Lands. Where habitat exists for threatened or endangered species, such habitats are to be protected in accordance with the provisions of the Act and its regulations (Ontario Regulation 242/08). If a proposed activity has the potential to impact the habitats of threatened or endangered species, then the activity must be authorized by Ministry of Environment, Conservation and Parks (MECP). In some cases, a permit may be required to undertake an activity, while in other cases a Notice of Activity may be registered with the MECP. The Regulation provides exemptions for some species and certain types of activities.
	A Place to Grow: Growth Plan for the Greater Golden Horseshoe 2019 (and Amendment No. 1 2020) (The Growth Plan for the Greater Golden Horseshoe 2019 was prepared and approved under the Places to Grow Act, 2005.)	Provincial Plan	The *Places to Grow Act* was implemented to promote growth plans which reflect the needs, strengths and opportunities of the communities involved, and promotes growth that balances the needs of the economy with the environment. *A Place To Grow: Growth Plan for the Greater Golden Horseshoe* is a long-term plan intended to manage growth through building complete communities, curbing sprawl and protecting the natural environment.	The Growth Plan policies relate to managing growth, housing, designated growth areas, moving people, water/wastewater, natural heritage system and public open space.
	Provincial Policy Statement (2020)	Policy	The Provincial Policy Statement (PPS) provides policy direction to municipalities on matters of provincial interest as they relate to land use planning and development. The PPS provides for appropriate land use planning and development while protecting Ontario's natural heritage and water resources and managing impacts of natural hazards.	All land use planning in Ontario is required to be consistent with the policies of the PPS. These are outlined in • Section 2.1 - Natural Heritage (Policies 2.1.1 - 2.1.9); • Section 2.2 – Water (Policies 2.2.1-2.2.3); and • Section 3.1 - Natural Hazards (Policies 3.1.1-3.1.8).
	Ontario Regulation 166/06 (2013)	Regulation	This Regulation allows TRCA to regulate development activities in and adjacent to wetlands, watercourses and valleylands.	Drainage features and wetlands are found on the Subject Lands. A permit must be obtained from TRCA prior to development or site alteration within these regulated areas.

Level of Government	Act/Regulation/ Policy/Guideline	Type	Purpose	Relevance to the Caledon Station Secondary Plan Application
	Living City Policies (TRCA 2014a)	Policy	These policies relate to how TRCA manages its watersheds and regulates activities within areas under its jurisdiction as well as land use planning.	The Study Area supports features and areas that are regulated by TRCA (i.e. drainage features, wetlands and floodplains). The Living City Policies provide direction to land use planning within regulated areas to ensure that land use planning and development are consistent with their regulations.
	Natural Heritage Reference Manual (2010)	Guideline	This manual provides guidance for implementing the natural heritage policies of the Provincial Policy Statement.	Natural heritage features as described under section 2.1 of the PPS are located within the Subject Lands and Study Area. The protection of significant features within an NHS will need to be considered in the land use plan.
	Significant Wildlife Habitat Criteria for Ecoregion 6E (2015)	Guideline	Provides the recommended criteria for identifying Significant Wildlife Habitat (SWH) within Ecoregion 6E.	SWH has been identified as one of the natural heritage feature areas under the Provincial Policy Statement. Tables 1.1 through 1.4 within the Schedules provide guidance for SWH designation for the four categories of SWH outlined in the Significant Wildlife Habitat Technical Guide and its Appendices, while Table 1.5 contains and provides descriptions for exceptions criteria for ecoregional SWH which will be identified at an ecodistrict scale. The CEISMP will assess the Subject Lands for SWH.
	Significant Wildlife Habitat Technical Guide (2000)	Guideline	This guide supports the Natural Heritage Reference Manual. It provides detailed information on the identification, description, and prioritization of significant wildlife habitat.	Planning authorities require proponents to use the guide when completing an ecological site assessment for significant wildlife habitat. This resource will be used to assess SWH on the Subject Lands as part of the CEISMP.
	Redside Dace Development Guidance (2016)	Guideline	The purpose of this document is to provide guidance to persons interested in developing areas in southern Ontario that have Redside Dace (*Clinostomus elongatus*) habitat.	One of the drainage features associated with the Subject Lands demonstrates attributes that may be considered consistent with contributing habitat for Redside Dace. As such, the design of the environmental management systems required to support the land use plan, preliminary framework plan and subsequent draft plans must provide consideration for the protection and enhancement of habitat for this species.
Regional	Region of Peel Official Plan (2022)	Policy	The Peel Region Official Plan contains policies aimed at protecting, maintaining, and restoring a Regional Greenlands System consisting of “Core Areas”, “Natural Areas and Corridors (NACs)”, and “Potential Natural Areas and Corridors (PNACs)”.	The Region of Peel Greenlands System consists of Core Areas, Natural Areas and Corridors (NAC) and Potential Natural Areas and Corridors (PNACs). Currently, Schedule A of the Regional Official Plan does not identify any components of its Greenlands System on the Subject Lands. One of the objectives of the CEISMP is to evaluate features that may qualify are components of the Regional Greenlands System and to identify which of these are to be included within the future NHS and to demonstrate how the land use plan and preliminary framework plans accommodate the NHS.
		Policy	In addition, the ROP has New Urban Area policies that outline studies required in support of official plan amendments.	The CEISMP is considered the equivalent of a subwatershed study and satisfies these New Urban Area environmental policies
Municipal	Town of Caledon Official Plan (2018)	Policy	The Town of Caledon Official Plan (2018) provides direction as to the land use within the Town.	Like the Region of Peel Greenlands System, the Town of Caledon has an Ecosystem Framework that consists of four ecosystem components: Natural Core Areas, Natural Corridors, Supportive Natural Systems, and Natural Linkages. Natural Core Areas and Natural Corridors are designated Environmental Policy Area (EPA). Currently, Schedule A of the Town’s Official Plan does not map any EPA on the subject lands. One of the objectives of the CEISMP is to evaluate features that may qualify are components of the Regional Greenlands System and to identify which of these are to be included within the future NHS and to demonstrate how the land use plan and preliminary framework plans accommodate the NHS.
Conservation Authority	Regulation for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (2006)	Policy	This document outlines the procedures and guiding policies of the TRCA in administering Ontario Regulation 166/06, as well as providing legislative background.	Regulated areas occur within the Subject Lands. These relate to floodplain, wetlands and drainage features. Some of these features are considered constraints to development, however others are not and can be eliminated or their functions replicated elsewhere. A permit must be obtained from TRCA prior to development or site alteration within these regulated areas.
	The Living City Policies for Planning and Development in the Watershed (2014a)	Policy	This document contains TRCA’s policies for how to define, protect, enhance, and secure a Natural Heritage System.	The LCP defines the “Natural System” as a combination of 1) water resources, 2) natural features and areas, 3) natural hazards, and 4) any associated potential “natural cover” and/or buffers. Development and site alteration are not permitted in the Natural System, except in accordance with the policies provided in the LCP. Section 7.3 contains TRCA’s policies for how to define, protect, enhance, and secure a Natural Heritage System. The policies described in Section 7.3.1.4 have been identified with the goal of protecting lands that have the potential to be restored in order to enhance existing natural cover and manage natural hazards. The LCP does not permit new development (including lot creation) within hazard lands (i.e., within the floodplain) where no development previously existed. As per Section 7.3.1.4 of the LCP, the TRCA prescribes buffers to natural features and hazards as it may relate to the Subject Lands.
	TRCA’s Humber River Watershed Plan (2008b)	Guideline	Describes current conditions of the Humber River Watershed and provides strategies to protect and enhance.	The Subject Lands is found within the Humber River Watershed. Chapter 5 of this plan provides management strategies for the environment (including water, air quality and climate change, the aquatic system and the terrestrial system)

3. Existing Conditions

Characterization of existing biophysical conditions in the Study Area is a requirement of the approved CEISMP TOR. Existing biophysical conditions characterized through this CEISMP include:

- Bedrock and Surficial Geology;
- Topography, Slopes and Soils;
- Groundwater Resources;
- Surface Water Resources;
- Terrestrial Resources; and
- Aquatic Resources.

While this CEISMP provide a detailed characterization of biophysical resources in the Study Area, the reader should also consult the Hydrogeological Investigation (DS Consultants Ltd. 2021) and Functional Servicing Report (FSR; Urbantech Consulting 2023).

3.1 Background

To develop an understanding of past and current conditions, all available background information related to the natural heritage resources in the Study Area were obtained and reviewed as required by the CEISMP TOR. This included the following:

- Ministry of Natural Resources' Natural Heritage Information Centre (NHIC) rare species database (accessed August 2020);
- Ontario Breeding Bird Atlas (Cadman *et al*. 2007);
- Ontario Herpetofauna Summary Atlas (Ontario Nature 2020);
- Ontario Butterfly Atlas (MacNaughton *et al.* 2016);
- Fisheries and Oceans Canada Aquatic Species at Risk Distribution Mapping (DFO 2020);
- Historical and current aerial photography (1956 – 2018); and
- 2023 drone inspection of Headwater Drainage Feature (HDF) WHT6.

In addition to the above, the CEISMP has also relied on background information prepared on behalf of the Town of Caledon and Region of Peel. This includes, but is not limited to the following:

- Bolton Residential Expansion Study: Background Environmental Study in Support of a Regional Official Plan Amendment, Dougan & Associates, Aquafor Beech Limited, Cam Portt & Associates, BluePlan Engineering Consultants Ltd. and Meridian Planning (October 2014b);
- Bolton Residential Expansion Study – Phase 3: Technical Memorandum- Development of a Preliminary Natural Heritage System, Dougan & Associates, Aquafor Beech Limited, Cam Portt & Associates, BluePlan Engineering Consultants Ltd. and Meridian Planning (Revised June 16, 2014a);
- Headwater Drainage Features Assessment Aquafor Beech Limited (June 16, 2013);
- Bolton Residential Expansion Study: Phase 2 Technical Memorandum – Natural Heritage, Dougan & Associates (June 19, 2013);

- Scoped Subwatershed Study, Part A: Existing Conditions and Characterization (Final Report) – Peel Settlement Area Boundary Expansion. Wood Environment & Infrastructure Solutions – January 2022;
- Scoped Subwatershed Study, Part B: Detailed Studies and Impact Assessment (Final Report) – Peel Settlement Area Boundary Expansion. Wood Environment & Infrastructure Solutions – January 2022; and
- Scoped Subwatershed Study, Part C: Implementation Plan (Final Report) – Peel Settlement Area Boundary Expansion. Wood Environment & Infrastructure Solutions – January 2022.

3.2 Physical Resources

This section characterizes the physical resources of the Subject Lands and Study Area. To understand the physical setting, topographic maps, environmental, geotechnical, and hydrogeological reports were used. Additionally, the borehole logs from site specific investigations and Water Well Records (MECP WWRs) from the MECP were used to interpret the geological and hydrogeological conditions.

3.2.1 Bedrock Geology

Available published mapping indicates that bedrock in the area is predominantly comprised of shales and minor limestone part of the Queenston Formation (MNDM Map 2544 Bedrock Geology of Ontario). As part of the borehole drilling program for the Subject Lands, bedrock was not encountered to 11.3 meters below ground surface (mbgs) (Elev. 250.4 meters above sea level [masl]), which was the maximum depth of investigation. Based on the MECP water well records, there are ten (10) water well records which were reportedly completed into bedrock. The thickness of the overburden generally ranged from 29.9 mbgs to 76.2 mbgs, based on nine (9) well records (MECP WWR No. 4908193, 1908194, 1907399, 1906470, 4905615, 7275497, 4903854, 7267796 and 4904216). There is one (1) well record (MECP WWR No. 4905839) located approximately 490 m northeast of the Subject Lands with a reported depth to bedrock of 11.6 mbgs. This well record is located within the valley lands of the Humber River, and for this reason the ground surface elevation of the well is likely significantly lower than of the Subject Lands.

It is understood that the detailed design of the proposed plans for development have not been finalized at this stage. These specific details include, among other items, the maximum depth of excavation/trenching required in support of the proposed development, servicing and storm water management ponds. At this time, it is assumed that the deepest excavation required during the construction phase will extend into the overburden and will not intersect the bedrock surface. For this reason, bedrock in the area does not present a constraint to the proposed plans for development. It should be noted that this assessment will be revisited at the detailed design stage to confirm the depth of proposed excavations.

3.2.2 Physiography and Surficial Geology

Much of the land surface topography and geology in southern Ontario was formed during the most recent glaciation period, known as the Wisconsin Glaciation, which was accompanied by various meltwater lakes and channels. The Pleistocene deposits present in the Caledon and Brampton area were associated with the advancing and retreating of this ice sheet. This glaciation had begun 27,000

years ago and reached its furthest point of advancement approximately 20,000 years ago. During this time, the entirety of southern Ontario was covered by glacial ice until 14,000 years ago when the glacial ice began to retreat.

The Study Area is located within a physiographic region of southern Ontario known as the South Slope and within a physiographic landform feature known as the Drumlinized Till Plain (Chapman and Putnam, 1984). The South Slope physiographic region lies between the Oak Ridges Moraine in the north and the Peel Plain in the south. The South Slope consists of low-lying till plains, with undulating to gently rolling terrain and incised valleys around larger creeks and rivers. The South Slope has a gently, but steady slope to the southeast towards Lake Ontario, which results in overall good drainage.
Surficial geology mapping made available by the Ontario Geological Survey (2010) indicates that the study area is covered entirely by Halton till. There are some glacial deposits of sand and gravel to the west of the Subject Lands and modern alluvial deposits of silt, sand, and gravel to the east along tributaries to the Humber River. The overburden in the vicinity of the Study Area is clayey silt to sandy silt till deposits (Halton till). An illustration of surficial geology for the Study Area is provided in Figure 3 with the Hydrogeological Investigation (DS Consultants Ltd. 2023).

The Halton Till surficial deposits on the Subject Lands consist of tight soils that would have low resulting soil percolation rates. For this reason, it is expected that there will be a higher volume of surface water runoff following precipitation events which needs to be factored into the overall water balance and feature based water balance. This is discussed further in **Section 4.1.3** of this report.

3.2.3 Topography, Slopes & Soils

The CEISMP TOR requires that a geotechnical investigation within the Study Area be completed to identify areas in which potential slope instability exists. Based on field review as part of the geotechnical investigation completed by DS Consultants Ltd. (2021), there are no slopes on the Subject Lands that would require further investigation regarding potential slope instability. The investigation completed includes the following findings:

The Study Area is characterized by gently rolling topography and the ground slopes generally to the south across the Subject Lands. Relief across the Subject Lands ranges from approximately 281 masl at the highest point in the northwest corner, to 262 masl in the southwest corner.

Soil conditions were first investigated in 2014 by SPL Consultants Ltd. (SPL). The consultant completed geotechnical studies on the Cook and Henry properties located on the north half of the study area. These are two of the largest properties within the Subject Lands. The investigations included completion of twenty-one (21) boreholes. Eleven (11) boreholes on the Henry property and ten (10) boreholes on the Cook property. Figure 1 within the Geotechnical Investigation (DS Consultants Ltd. 2021) illustrates borehole locations from SPL, 2014. A summary of the findings is provided below:

- Based on all twenty-one (21) boreholes, SPL (2014) encountered a topsoil/organic layer with a thickness ranging from 200 to 300 mm throughout the site. The topsoil is underlain with a shallow layer of disturbed/reworked till extending 0.7 to 1.4 mbgs. Localised fill was encountered in BH14-07 on the Henry property, extending 2.1 mbgs;
- SPL (2014) encountered a surficial layer of clayey silt till to silty clay till in all but one borehole throughout the two investigations. This layer extended to depths ranging from 1.1 to 4.0 mbgs on the Henry property and 7.1 to 11.1 below ground surface (bgs) on the Cook

property. The consistency of this material was stiff to hard with N values ranging from 11 to 60 and moisture contents ranging from 9% to 19%;

- Sandy silt till was encountered in boreholes BH14-03, BH14-05, BH14-09, and BH14-11 on the Henry property and BH14-03, BH14-09, and BH14-11 on the Cook property. This layer extended 4.0 to 9.1 mbgs throughout and reached the limit of exploration at some locations. N values ranged from 23 to greater than 100 blows per 300mm penetration and moisture contents ranged from 6% to 11%; and
- Native cohesionless sandy silt to silty sand was encountered in all boreholes but BH14-05 and BH14-11 on the Henry property and extended to the depth of termination in all locations. On the Cook property, only BH14-04 and BH14-10 contained this material and it extended to depth of termination in BH14-04 but only to 2.1 mbgs in BH14-10. N values ranged from 3 to greater than 100 blows per 300mm penetration indicating a very loose to very dense state. Natural water contents ranged from 14% to 25%.

As part of current investigations, on-site subsurface soils were interpreted from the boreholes/monitoring wells (BHs/MWs) drilled by DS. The locations of the BHs/MWs are shown in Figure 4A within the Hydrogeological Investigation (DS Consultants Ltd. 2023) and detailed subsurface conditions are presented on the borehole logs.

In summary, the Subject Lands are underlain by a surficial layer of topsoil / fill / disturbed native material, which in turn was underlain by native soil deposits extending to the full depth of investigation. The native soil deposits on the Subject Lands comprised of clayey silt till to silty clay till (Halton Till), which in turn was underlain by silt to sandy silt/sandy silt deposits. Sand and gravel alluvium deposits were encountered in the southeast corner of the Subject Lands (BH20-16). Bedrock was not encountered during the subsurface investigation.

Geological Cross-Sections A-A' to F-F', which depict the stratigraphic setting at the Subject Lands are provided in Figure 6A to 6F within the Hydrogeological Investigation (DS Consultants Ltd. 2023).

The stratigraphic conditions encountered in the boreholes are further summarized below.

Topsoil/Fill/Disturbed Native

At all borehole locations but BH20-04, topsoil was encountered at the surface. Topsoil depths vary from 200 mm to 550 mm with an average thickness of 340 mm. It should be noted that the thickness of the topsoil explored at the borehole locations may not be representative of the Study Area and should not be relied on to calculate the amount of topsoil at the site.

Fill or weathered/disturbed native material (possible fill in BH22-9) consisting of clayey silt to silty clay and sandy silt to silty sand soils were detected in all the boreholes below the topsoil layer and extended to approximate depths ranging from 0.4 to 2.3 m below the existing ground surface. In the area of Borehole BH20-4, the fill layer was overlain by a concrete slab, approximately 300 mm in thickness. In the area of Borehole BH22-9, the weathered/disturbed clayey silt to silty clay with inclusions of gravel, organic staining, and no readily apparent structure. Hence, this layer may be possible fill. The fill and weathered/disturbed native materials were generally brown to dark brown in color and contained trace of organics, gravel, and rootlets. SPT 'N' values measured in fill and weathered/disturbed native materials ranged from 3 to 15 blows per 300mm penetration, indicating a soft to stiff consistency or loose to compact state.

Halton Till Deposits (Clayey Silt Till to Silty Clay Till)

Glacial till deposit of clayey silt till to silty clay was encountered below the weathered/disturbed soil layer in Boreholes BH22-1 to BH22-5, BH22-8, BH22-10, BH22-11, BH22-14 to BH22-35, BH22-37 to BH22-40 and BH22-42, below a thin sandy silt to silty sand deposit in BH22-36 and BH22-41, below the fill layer in BH20-1 to BH20-3 and BH20-5 to BH20-16, and extended to approximate depths ranging from 1.5 to 12.8 m below existing ground surface, i.e., the maximum explored depth of Boreholes BH22-14, BH22-16, BH22-17, BH22-19, BH22-20, BH22-21, BH22-24, BH22-34, BH22-36, BH22-37 to BH22-41, BH20-6, BH20-7, BH20-10, BH20-14 and BH20-15. The clayey silt till was interrupted by a cohesionless silt deposit between 4.6 and 6.1 m depth in BH22-24 and by a gravelly sand deposit between 1.8 and 10.7 m depths in BH22-34. This, in general, moist to very moist clayey to silty clay till deposit was brown to grey in color and contained some sand too sandy and trace to some gravel. SPT 'N' values measured in the clayey silt to silty clay till ranged from 8 to more than 50 blows per 300 mm of penetration, indicating a stiff to hard consistency (generally very stiff to hard).

Clayey Silt

A thin layer of clayey silt with trace sand was encountered below the clayey silt/silty clay till deposit in BH22-18 and extended to a depth of 7.6 m below existing ground surface. SPT 'N' value measured in the clayey silty was in the order of 29 blows per 300 mm of penetration, indicating a very stiff consistency.

Newmarket Till (Sandy Silt Till)

A cohesionless sandy silt till deposit was encountered below the clayey silt to silty clay till deposit in Boreholes BH22-1, BH22-3, BH22-10, BH22-11, BH22-15, BH22-22, BH22-23, BH22-28, and BH22-33, below a sand deposit in BH22-2 and 22-42, and below the clayey silt layer in BH22-18. The sandy silt till deposit extended to depths ranging from 3.1 to 12.8 m below existing ground surface, i.e., the maximum depth explored in BH22-2, BH22-15, BH22-18, BH22-23, and BH22-42. SPT 'N' values measured within this sandy silt till deposit ranged from 21 to more than 50 blows per 300 mm of penetration, indicating compact to very dense relative density.

Modern Alluvium (Silt, Sandy Silt to Silty Sand, Sand, Sand and Gravel, and Sandy Gravel/Gravelly Sand)

Cohesionless deposits of silt, sandy silt to silty sand, sand, sand and gravel and sandy gravel/gravelly sand soils with inclusions of clay and varying amounts of gravel was encountered underlying or embedded in the clayey silt to silty clay till and/or sandy silt till deposits in Boreholes BH22-1, BH22-2, BH22-3, BH22-4, BH22-5, BH22-8, BH22-10, BH22-11, BH22-24, BH22-25, BH22-26, BH22-27, BH22-28, BH22-29 to BH22-35, BH22-42, BH20-1 to BH20- 3, BH20-5, BH20-8, BH20-9, BH20-11 to BH20-13 and BH20-16, below the weathered/disturbed soils in BH22-6, BH22-7, BH22-9, BH22-12, BH22-13, BH22-36 and BH22-41, and below the fill in BH20-4. These cohesionless deposits extended to depths ranging from 0.8 to 13.6 m below existing ground surface, i.e., the maximum depths explored in BH22-1, BH22-3, BH22-4, BH22-5, BH22-6, BH22-7, BH22-8, BH22-9, BH22-10, BH22-11, BH22-12, BH22-13, BH22-25 to BH22-33, BH22-35, BH20-1 to BH20- 3, BH20-5, BH20-8, BH20-9, BH20-11 to BH20-13 and BH20-16. SPT 'N' values measured within these sandy, silty deposits ranged from 7 to

more than 50 blows per 300 mm of penetration, indicating loose to very dense relative density. Disturbance of the split spoon samples noted at depth in BH22-27 and BH22-30 is likely attributable to heaving of the water bearing silty sand/sand. This moist to wet deposit was brown to grey in color and layers of sand and gravel and/or sandy gravel/gravelly sand materials were encountered in the area of Borehole BH22-33 between depths of 6.1 and 9.1 m, BH22-34 between depths of 1.8 and 10.7 m, and BH20-16, between depths of 1.5 and 3.3 m and between depths of 4.5 and 6.2 m. SPT 'N' values measured within this sand and gravel and sandy gravel/gravelly sand layers ranged from 24 to 66 blows per 300mm of penetration, indicating compact to very dense relative density.

3.2.4 Groundwater Resources

The CEISMP TOR requires that a hydrogeological investigation within the Study Area be completed to identify and responsibly manage groundwater resources as it relates to private groundwater users, wetlands, watercourses, fishery resources and other features that are potentially sensitive to changes in groundwater availability. The following sections provide an overview of the general hydrogeological characteristics of the Subject Lands. The hydrogeological conditions were evaluated using the data collected from the MECP water well records, on-site monitoring wells installed as part of this investigation, and existing reports for the area.

As part of the hydrogeological study, DS Consultants Ltd. completed a search of the MECP WWR database. Based on the MECP water well records search, there are seventy-three (73) water wells within 500 meters of the Subject Lands. Forty-seven (47) water wells are noted as domestic supply wells and six (6) wells are noted as commercial or industrial supply wells. Eight (8) wells are noted as test holes or monitoring wells. The remaining twenty-three (12) wells are either abandoned or unknown use. Private domestic and commercial water supply wells are drilled into sandy aquifers confined under clay till. The depths of these wells range from 5.5 to 65.2 mbgs. Domestic water supply records exist for wells drilled between the dates of January 15th, 1957 to June 13th, 2016. The water well record summary is included in the Hydrogeological Investigation (DS Consultants Ltd. 2023). Figure 3 within the Hydrogeological Investigation (DS Consultants Ltd. 2021) shows the MECP water well location plan.

There are no records of permits to take water (PTTW) within 500 m of the Subject Lands.

3.2.4.1 Hydrostratigraphy

The major regionally extensive hydrostratigraphic units in the general area are comprised of the following, from shallowest to deepest (TRCA 2007):

- Surficial Aquifer (incl. weathered Halton Till);
- Halton Till (Aquitard);
- Oak Ridges Aquifer / Mackinaw Interstadial (ORAC);
- Newmarket Till (Aquitard);
- Thorncliffe Aquifer (incl. tunnel channels);
- Sunnybrook Aquitard;
- Scarborough Aquifer; and
- Weathered Bedrock.

The regionally extensive surficial aquifer consists of a sequence of glaciolacustrine deposits which cover the underlying tills (Halton and Newmarket). These deposits generally consist of near shore sands and gravel beach deposit within the shoreline of the ancient glacial Lake Iroquois in the southern portion of the watershed and glaciolacustrine fine sands, silt and clay deposits north of the ancestral lake footprint. These also include the upper weathered portion of the underlying Halton Till deposits. Generally, these deposits form a thin veneer over the underlying deposits, however, may be several meters thick locally.

The Halton Till underlies the surficial aquifer and is predominantly comprised of sandy silt to clayey silt till interbedded with silt, clay, sand and gravel. The Halton Till becomes rich in clay content in areas where the glacial ice has overridden glaciolacustrine deposits. This unit is considered a regionally extensive aquitard layer, which generally confines the underlying Oak Ridges Aquifer.

The Oak Ridges Aquifer is a stratified sediment complex that is related to the Oak Ridges Moraine physiographic feature. This stratigraphic unit is 160 km long and varies from 5 km to 20 km in width. The Oak Ridges Aquifer overlies the Newmarket Till and older sediments. The Oak Ridges Aquifer deposits are understood to have been deposited in a glacial lake that formed between the two retreating glacial ice lobes (Lake Ontario and Simcoe) and the Niagara Escarpment in the west approximately 12,000 to 13,000 years ago. The aquifer generally comprises of glaciofluvial, transitional to glaciolacustrine subaqueous fan and delta sediments.

The Newmarket Till was deposited 18,000 to 20,000 years ago by the Laurentide ice sheet. The till predominantly comprises of calcite-cemented sandy silt to silty sand with limestone clasts and represents a dividing aquitard between the overlying shallow aquifer system (Oak Ridges) and the underlying deep aquifer systems (Thorncliffe Aquifer and the Scarborough Aquifer). Breaches in the till have been formed through meltwater erosion activity and is referred to as Tunnel Channels. The Tunnel channels are associated with subglacial floods and predominantly consist of sandy sediments under confined conditions within the Newmarket Till. These tunnel channels also breach into underlying deeper aquifer systems and can yield high volumes of groundwater.

The Thorncliffe Aquifer underlies the Newmarket Till and was deposited approximately 45,000 years ago. This aquifer comprises of glaciofluvial deposits consisting of sand and silty sand in the lower lying areas of the underlying deposits. In the southern portion, the formation consists of silt, sand and pebbly silt and clay deposits originating from glacial meltwater entering into ancient Lake Iroquois. Breaches of the tunnel channels also reach into the Thorncliffe Aquifer and are a strong source of groundwater yield.

The Sunnybrook Drift Aquitard was deposited approximately 45,000 years ago and are comprised of silt and clay material. The Sunnybrook Drift aquitard formed were deposited at the base of a glacially dammed lake, which was reportedly 100 m deeper than modern day Lake Ontario (TRCA 2009). The Sunnybrook Drift acts as an aquitard divide between the upper Thorncliffe Aquifer and the underlying Scarborough Aquifer.

The Scarborough Aquifer is the deepest overburden hydrostratigraphic unit in the Humber River watershed and marks the commencement of the Wisconsin glaciation approximately 70,000 to 90,000 years ago. The aquifer deposits comprise organic rich sand deposits overlying silts and clays. The deposits originated from a fluvial-deltaic system, which was fed by braided meltwater rivers draining from an ice sheet. Weathered bedrock underlies the Scarborough Aquifer system.

The direction of groundwater flow in the shallow and deep flow systems generally follows the regional topography from the Oak Ridges Moraine in the north towards Lake Ontario in the south. The influence of the surface topography on the direction of groundwater flow is greatest in the shallower flow systems with wanning influence towards the deeper flow systems. There are deviations in the regional groundwater flow patterns towards local streams and/or watercourses in the watershed. The predicts there are inter-watershed flows into the Humber River in the East Caledon area from the Credit River into the Oak Ridges Aquifer and the Thorncliffe Aquifer.

Based on the borehole drilling investigation carried out by DS Consultants Ltd. within the Caledon Station boundary, the subsurface conditions on the Subject Lands comprised of native deposits inferred to be part of the Halton Till (silty clay) overlying the Newmarket Tills (silty sand / silt). Recent sand and gravel alluvium deposits associated with the tributaries of the Humber River were noted in the southeast corner of the Subject Lands.

It is understood that the detailed design of the proposed plans for development have not been finalized at this stage. These specific details include, among other items, the maximum depth of excavation/trenching required in support of the proposed development, servicing and storm water management ponds. At this stage, it is assumed that the deepest excavation required during the construction phase will be limited to 4 m below the existing ground surface. For this reason, the depth of excavation in support of the proposed plans for construction will likely be advanced into the inferred Newmarket Till, which does not provide any significant constraints to the construction works. It should be noted that if at the detailed design stage, the above assumptions do not hold true, then this assessment will need to be revisited based on the correct design details.

3.2.4.2 Groundwater Levels

To assess groundwater levels across the Study Area, DS Consultants Ltd. (2023) implemented a manual groundwater monitoring program starting in August 2020 and continuing on a monthly basis to assess long-term groundwater fluctuations. Within the Hydrogeological Investigation (DS Consultants Ltd. 2023), Figure 4A shows the monitoring well locations and Table 1 presents a summary of the measured groundwater level elevations in all monitoring wells and piezometers for August 2020 through March 2023. At this time, groundwater levels were found to range between 255.2 masl (BH20-7) and 276.40 masl (BH22-1). Based on measured water levels, the localized groundwater flow in the vicinity of the Study Area is interpreted to be in a general southeasterly direction. More specifically, there is a groundwater divide in northwest sections of the Subject Lands corresponding to changes in topography. Groundwater is observed as moving east and south from high to low areas of the Subject Lands.

Continuous water level monitoring was conducted on four monitoring wells at BH20-1, BH20-5, BH20-7, BH20-9, BH20-11, ,BH20-16, BH22-13, BH22-22, BH22-29, BH22-36 and BH22-42. Continuous monitoring was completed using a fixed interval pressure and temperature data recording device which was corrected for atmospheric pressure from a central location on the site. The data is displayed in hydrographs which can be found in Appendix F of the Hydrogeological Investigation (DS Consultants Ltd. 2023). Generally, water levels declined during the late summer to the fall monitoring period, increasing throughout the winter, peaking in mid spring. Groundwater levels in MWs increased following precipitation events. Season variation ranged from 0.43 m (BH20-3) to 3.7 m (BH20-11) during the monitoring period.

3.2.4.3 Horizontal and Vertical Gradients

As determined through the groundwater monitoring program, groundwater is observed as moving east and south from high to low areas of the site. The average horizontal gradient is about 0.009 metre/metre from west to east across the north half of the site. From north to south the average horizontal groundwater gradient is around 0.001 m/m in the north half to 0.008 in the south half of the Site. The vertical hydraulic gradient on the Subject Lands is generally downward, except for an upward gradient observed in the nested piezometers (W8-PZS and W8-PZD) at the location of Wetland 8. The vertical hydraulic gradient at Wetland 8 is estimated during the current monitoring period to be 0.036 m/m. Groundwater discharges to surface streams at the southwest and southeast limits of the site. A groundwater flow direction map is provided in Figure 6 within the Hydrogeological Investigation (DS Consultants Ltd. 2023).

3.2.4.4 Recharge/Discharge Areas

Presence of any groundwater recharge/discharge areas on the Subject Lands under the pre-development conditions is currently being characterized as part of the current ongoing study in support of the Caledon Station Secondary Plan. Any groundwater recharge/discharge that is currently present on the Subject Lands will need to be assessed to determine whether it provides for contributions to natural wetland features at the Site.

A 3-year pre-construction surface water and groundwater monitoring program of the Subject Lands is currently underway, and this report includes the findings from the data collected to-date during the August 2020 to March 2023 monitoring period. All staff gauges installed within the wetlands and monitoring wells BH20-1, BH20-5, BH20-7, BH20-9, BH20-11, BH20-16, BH22-13, BH22-22, BH22-29, BH22-36 and BH22-42. on the Subject Lands have been instrumented with a Levelogger^{TM} to allow for continuous monitoring at every 15-minute intervals. The monitoring program includes a site visit on an every 1-month basis to retrieve the water level data from the Levelogger^{TM} and to collect manual readings within all surface stations and monitoring wells. Observations for any evidence of groundwater seepage and/or springs throughout the Study Area is obtained during the bimonthly monitoring events.

Based on the monitoring of groundwater levels in the nested piezometers screened within the shallow soils, shallow vertical hydraulic gradient was generally observed upward at Wetlands 1 through 3, and Wetland 8, and a downward vertical hydraulic gradient was generally observed at Wetlands 4 through 7. The groundwater elevations in the monitoring wells are noted to be lower than the levels measured in the piezometers. On this basis, based on the minimum outflow from most wetlands and the water levels at the Site, surface water has generally been a likely source of shallow groundwater recharge in the majority of the Study Area during the current monitoring period. Groundwater seepage on the Subject Lands is expected to occur at areas where the shallow groundwater in the upper permeable soils discharge/exit along slopes and/or wetland/stream banks. During the current monitoring period, upward groundwater gradients on the Subject Lands were noted at the location of Wetlands 1 through 3 and Wetland 8. Groundwater levels in Monitoring Wells BH20-6,BH20-12, BH22-17, BH22-32 and BH22-39 indicate near surface potentiometric levels and have the potential to provide for groundwater seepage at the ground surface during periods of higher groundwater tables. The groundwater elevation at these monitoring wells and surface water monitoring stations are currently below the existing ground surface, however it is noted that during the spring period, the elevations rise and provide for groundwater discharge to the wetlands or seepage along the ground surface.

3.2.4.5 Hydraulic Conductivity

Single Well Response Tests (SWRTs) were completed in nine (9) select monitoring wells on August 6th and 7th, 2020, and in eighteen (18) monitoring wells between November 1st and November 3rd, 2022 to estimate hydraulic conductivity (K) for the representative geological units in which the wells are screened. SWRTs were completed by performing a rising head test (slug test) using a bailer to extract a known volume of water from the well. A Levelogger™ was placed at the bottom of the wells to monitor recovery. Hydraulic conductivity values were calculated using the Bouwer and Rice method. A summary of the hydraulic conductivity testing results is provided in **Table 3** below.

Table 3. Summary of Hydraulic Conductivity (K) Test Results

Well ID	Screen Interval (masl)	Screened Formation	K- Value(m/s)
BH20-1	272.2 m to 273.7	Silt	7.3×10^{-7}
BH20-5	264.0 m to 275.5	Silty sand	5.3×10^{-7}
BH20-6	262.5 m to 264.0	Clayey silt till, sand seams	1.4×10^{-7}
BH20-9	266.5 m to 268.0	Silty clay till, some sand	3.2×10^{-6}
BH20-11	261.0 m to 262.5	Silt, some sand	5.2×10^{-8}
BH20-12	257.3 m to 258.8	Silt	7.3×10^{-7}
BH20-14	257.1 m to 258.6	Silty clay till, some sand	6.0×10^{-7}
BH20-15	255.0 m to 256.5	Clayey silt till, some sand	7.4×10^{-9}
BH20-16	251.8 m to 259.4	Silty sand, some clay	1.5×10^{-8}
BH22-1	271.4 m to 274.5	Silty Clay to Clayey Silt Till & Sandy Silt	3.0×10^{-6}
BH22-3	268.6 m to 271.6	Sandy Silt Till	2.8×10^{-7}
BH22-5	272.2 m to 275.2	Sandy Silt & Silt	4.3×10^{-8}
BH22-10	260.8 m to 263.8	Sandy Silt to Silty Sand	3.0×10^{-7}
BH22-13	264.1 m to 267.1 m	Sandy Silt	1.6×10^{-6}
BH22-14	259.4 m to 262.4 m	Silty Clay to Clayey Silt Till	2.9×10^{-10}
BH22-17	261.5 m to 264.5 m	Silty Clay to Clayey Silt Till	1.2×10^{-8}
BH22-20	258.8 m to 261.8 m	Silty Clay to Clayey Silt Till	1.0×10^{-8}
BH22-22	260.2 m to 263.2 m	Silty Clay to Clayey Silt Till	1.8×10^{-8}
BH22-25	260.3 m to 263.3 m	Silty Sand	3.6×10^{-7}
BH22-27	259.0 m to 262.0 m	Sandy Silt	1.9×10^{-6}
BH22-28	260.3 m to 263.3 m	Sandy Silt	3.4×10^{-6}
BH22-29	259.8 m to 262.8 m	Sand	6.7×10^{-6}
BH22-32	253.1 m to 256.1 m	Sandy Silt	5.4×10^{-6}
BH22-33	257.5 m to 260.5 m	Sandy Gravel & Silty Sand to Sandy Silt	4.6×10^{-6}
BH22-36	257.8 m to 260.8 m	Native, Sandy Silt and Silty Clay Till	5.3×10^{-9}

Well ID	Screen Interval (masl)	Screened Formation	K- Value(m/s)
BH22-40	256.4 m to 259.4 m	Silty Clay Till	1.1×10^{-9}
BH22-42	259.1 m to 262.1 m	Silty Clay Till & Sand	2.5×10^{-9}

Based on the results of the single well response testing, the hydraulic conductivity values of the screened clayey silt till and sandy silt till units underlying the Subject Lands ranged from 2.9×10^{-10} m/sec to $\times 10^{-6}$ m/sec. The hydraulic conductivity testing results are provided in the Hydrogeological Investigation (DS Consultants Ltd. 2023).

3.2.4.6 Groundwater Chemistry

The Provincial Groundwater Quality Monitoring Network (PGMN) was approved in April 2000 by the Ontario Cabinet in response to the observed low water conditions noted during 1999 in many parts of southern Ontario. The PGMN is a partnership program that comprise of all 36 conservation authorities and 10 municipalities in the province of Ontario. The mandate of the PGMN is to collect and manage ambient/baseline groundwater levels and quality data from major aquifers in the province to ensure the groundwater resources are not being impacted from activities and development on land and/or from exploitation of water resources. The PGMN consists over 400 groundwater monitoring wells across Ontario, of which there are currently twenty-one (21) wells in the Humber River Watershed (TRCA 2013).

The initial round of groundwater sampling in the PGMN wells was undertaken by the MECP and the samples were analyzed against the Provincial Water Quality Objectives (PWQO) for a wide variety of parameters including anions, cations, heavy metals, nutrients, bacteria, chlorinated solvents, volatile organic compounds (VOCs), herbicides and pesticides (TRCA 2008a). The results of the analytical testing completed by the MECP indicated that the groundwater quality met the permissible limit of all analyzed parameters against their respective PWQO criteria.

The subsequent round of groundwater sampling was conducted by the TRCA in 2004 and 2005 and the monitoring program included a reduction in the original list of analyzed parameters by the MECP. The sampling of the PGMN monitoring wells by the TRCA included analysis of groundwater quality for anions, cations and heavy metals. The results of the sampling by the TRCA were compared against the Ontario Drinking Water Quality Objectives (ODWQS) and the PWQO, where applicable. The PGMN monitoring wells located in the Bolton and Caledon East area which were sampled as part of this monitoring program are reportedly screened within the Thorncliffe (Intermediate) Aquifer. The results of the analytical testing completed by the TRCA in the watershed indicated that the groundwater quality generally met the permissible limit of all analyzed parameters against the most stringent criteria between the ODWQS and PWQO. The TRCA (2008a) reported exceedance of some analyzed parameters against the ODWQS in the Bolton and Caledon East PGMN wells during the Fall 2004 sampling period, as per the following:

- There was an exceedance in the Bolton PGMN well (W327) for total manganese;
- There was an exceedance in the Caledon East PGMN well (W330) for total dissolved solids (TDS); and
- There was an exceedance in both the Bolton (W327) and Caledon East (W330) PGMN wells for iron and total hardness.

The exceedance for iron, total manganese, and total hardness are reportedly not unusual in groundwater and are generally naturally occurring.

As per the TRCA (2013), the overall quality of groundwater in the watersheds of the TRCA is classified as “Good” with the optimal quality of groundwater to be found in the Thorncliffe (Intermediate) Aquifer on the Oak Ridges Moraine. Most wells in the watershed indicate concentrations for nitrates and nitrites are within acceptable levels and display minimal impacts from agricultural practices or leaky septic systems. There are exceedances in the chloride levels above the Canadian drinking water standards in several monitoring wells located in the urbanized areas of the watershed. These exceedances are likely as a result of road salt application for de-icing purposes during the winter period and/or background concentrations in the deep aquifers overlying the shale bedrock which contain naturally elevated concentrations of chloride (TRCA 2013).

Three (3) non filtered groundwater samples were collected from select monitoring well locations (BH22-13, BH22-17 and BH22-32), on November 3rd, 2023, to assess the groundwater quality. The collected samples were submitted to SGS Laboratory in Lakefield, Ontario. SGS Laboratory is a Canadian Association of Laboratory Accreditation Inc. (CALA) and Canadian Standard Association (CSA) certified. Groundwater quality results were compared to parameters listed in the Provincial Water Quality Objectives (PWQO) for surface water to assess the suitability of discharge to nearby surface water features. **Table 4** below presents a summary of exceeded parameters, and the certificate of analysis is provided in Appendix E within the Hydrogeological Investigation (DS Consultants Ltd. 2023**)**.

Table 4. Parameters in Groundwater Exceeding MECP Guidelines

Parameter Exceeded	Guideline	Unit	Borehole #	Guideline limit	Concentration
Cobalt	MECP O.Reg. 153/04	mg/L	22-17	**0.0009**	**0.00106**
Copper	MECP O.Reg. 153/04	mg/L	22-17	**0.0005**	**0.0025**
	MECP O.Reg. 153/04	mg/L	22-32	**0.0005**	**0.0011**
Phosphorus	MECP O.Reg. 153/04	mg/L	22-13	**0.01**	**0.011**
	MECP O.Reg. 153/04	mg/L	22-17	**0.01**	**0.098**
	MECP O.Reg. 153/04	mg/L	22-32	**0.01**	**0.073**
4AAP- Phenolics	MECP O.Reg. 153/04	mg/L	22-13	**0.001**	**0.003**
	MECP O.Reg. 153/04	mg/L	22-17	**0.001**	**0.002**
	MECP O.Reg. 153/04	mg/L	22-32	**0.001**	**<0.002**

Based on the results of the analytical testing, the quality of groundwater from the monitoring wells at on the Subject Lands met the permissible limit of all analyzed parameters with the exception of Total Cobalt, Total Copper, Total Phosphorus and 4AAP Phenolics which exceeded its respective PWQO criteria.

3.2.5 Surface Water Resources

3.2.5.1 Subwatershed Catchment Areas

The drainage features on the Subject Lands are within the West Humber River and Main Humber River watershed.

The Subject Lands are situated at the approximate drainage divide between the West Humber River and Main Humber River watersheds. Within the FSR (Urbantech Consulting 2023), Drawing 201 illustrates existing drainage patterns and subcatchments within the Subject Lands and immediate surrounding area. It is noted that the pre-development conditions provided by TRCA, including the subcatchment drainage boundaries within the West Humber and Main Humber watersheds intersected by the Subject Lands, have been refined on Drawing 201 (Urbantech Consulting 2023) from recent topographic surveys carried out locally to clarify flow paths, drainage boundaries and outlets.

The majority of the Subject Lands consisting of the west, central and southeast portions is within the West Humber River watershed. These portions consist mainly of some minor headwater features that convey runoff from various West Humber subcatchments that intersect the study area toward culverts along King Street and Humber Station Road. A group of non-significant wetlands is located just northeast of the intersection of King Street West and The Gore Road. These wetlands are called the ”Macville Area Wetlands” and were evaluated through a joint effort between MNRF and Beacon, which is presented in **Appendix B.**

The northeast portion of the Subject Lands is located within the Main Humber River watershed. This portion consists mainly of some minor headwater features that convey runoff from the intersected Main Humber headwater subcatchments toward the Canadian Pacific Railway (“CPR") line.

CEISMP **Figures 3.2.5.2a/b** illustrate the drainage features and CEISMP.

The land use with the Subject Lands limits is predominantly agricultural, which has led to modification of the headwater features by farming activities. In general, the headwater features are poorly defined with ephemeral or intermittent flow.

Table 5 identifies the existing drainage outlets for the Study Area represented on Drawing 201 within the FSR (Urbantech Consulting 2023) and the respective contributing drainage areas.

Table 5. Existing Study Area Drainage Outlets

Outlet	Existing Drainage Area [ha]
West Humber River Outlet / Flow Node	
Node E4, 3.50m Wide Concrete Box Culvert at The Gore Road	571.36
Total West Humber River Drainage Area at The Gore Road Crossing	**571.36**
Main Humber River Outlets	
Node 6, 800mm Concrete Box Culvert Across CPR	18.80
Node 7, Culvert Across CPR	2.78
Node 8, 700mm Concrete Box Culvert Across CPR	19.00
Total Main Humber Drainage Area Within MVSP	**40.58**

Under proposed conditions, southeasterly drainage within the Subject Lands, west of Humber Station Road, will be consolidated to a single outlet at the existing Humber Station Road crossing at Node 5. The consolidation to Node 5 includes drainage that contributes to Node 4 under existing conditions, from private property within the Subject Lands. Consolidation is not proposed for three (3) King Street crossings at the southwest of the Subject Lands (i.e., Nodes 1, 2 and 3), in order to maintain drainage conditions for the Macville Area Wetlands.

There are three (3) minor headwater reaches within the Main Humber River consisting of three (3) culverts across the CPR line. The existing and proposed conditions to each culvert have been evaluated in Section 6 of the FSR (Urbantech Consulting 2023).

Refer to Section 5 of the FSR (Urbantech Consulting 2023) for the discussion regarding existing versus proposed drainage outlets.

External Drainage

In terms of external drainage, a ~79-ha area within the West Humber River watershed north of the Subject Lands drains from northwest to southeast via an ephemeral swale into the Subject Lands as shown on Drawing 201 within the FSR (Urbantech Consulting 2023). This external area is represented by Catchments 37.12A, 37.12B, 37.12C and 37.12D draining to Node 9. This includes drainage beginning from west of The Gore Road.

3.2.5.2 Headwater Drainage Features

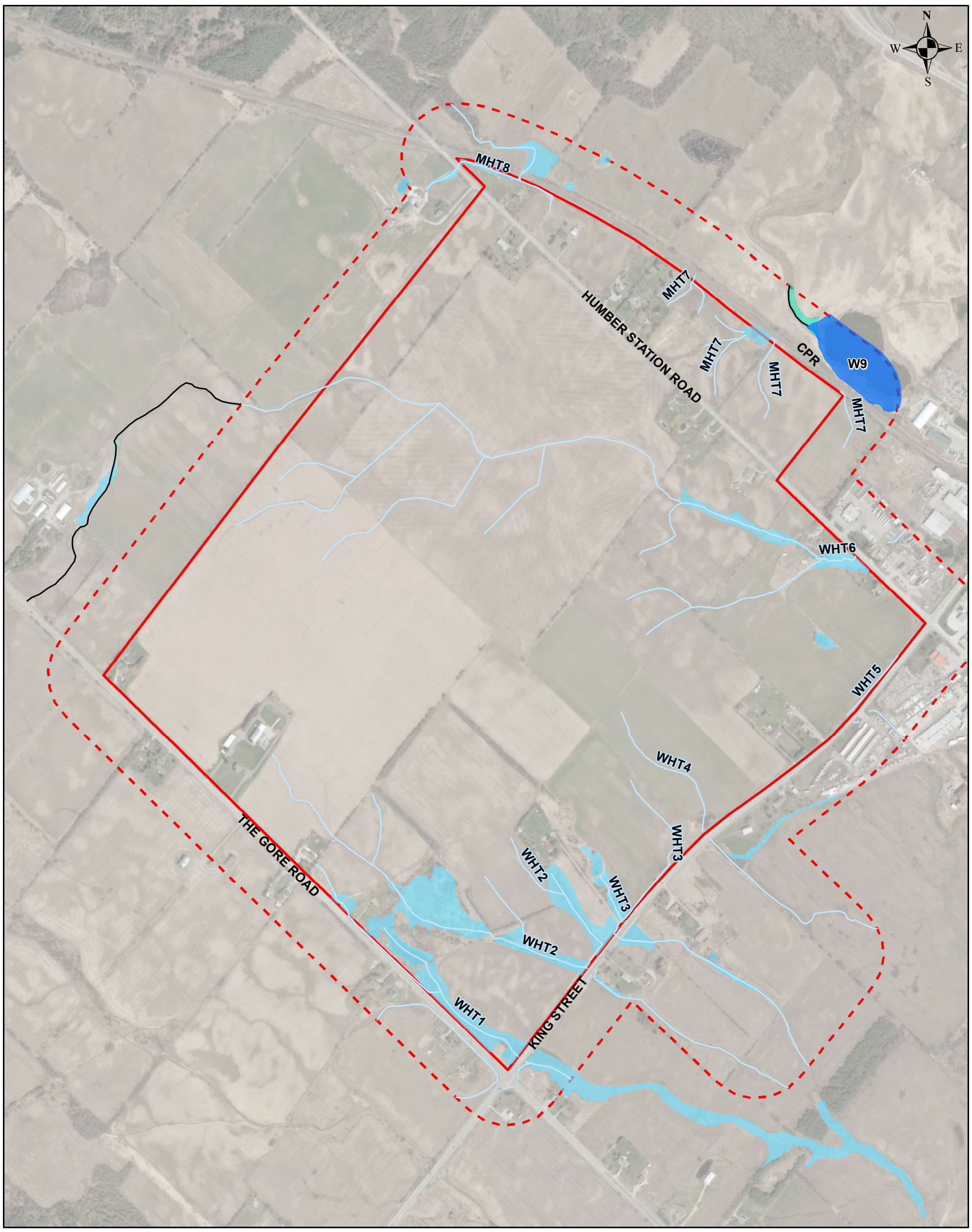
The Study Area is situated in the headwaters of the West Humber River and the Main Humber River and supports a number of surface drainage features **(Figure 3.2.5.2a)**.

TRCA policies require that headwater drainage features (HDFs) be identified and managed in accordance with their *Evaluation, Classification, and Management of Headwater Drainage Features Guideline (*TRCA 2014b*)*. The TRCA guideline defines headwaters as follows:

> *Non-permanently flowing drainage features that may not have defined bed or banks; they are first-order and zero-order intermittent and ephemeral channels, swales and connected headwater wetlands*, but do not include rills or furrows*. **wetlands that are connected downstream through surface flow are considered to be headwater drainage features for the purposes of this guideline.*

Consideration of HDFs through the land use planning process is relevant because alteration or removal of these features through land development can affect ecohydrological functions that are important for sustaining natural features and ecosystems.

HDFs in the Study Area were previously assessed by Aquafor Beech Limited in 2013 in support of the Town of Caledon's Bolton Residential Expansion Study to evaluate their relative importance and to determine how each HDF is to be managed in the future. The Aquafor Beech Limited (2013) Headwater Drainage Feature Assessment (HDFA) was completed in accordance with TRCA's 2009 Interim Guidelines. While the Aquafor Beech Limited HDFA was comprehensive, it was completed more than five years ago, and it is possible that site conditions may have changed. Furthermore, TRCA has



LEGEND

- SUBJECT LANDS
- STUDY AREA (120m)
- PROVINCIALLY SIGNIFICANT WETLANDS
- NON-PSW WETLANDS
- UNEVALUATED WETLANDS
- DRAINAGE FEATURES
- W1 — UNASSESSED DRAINAGE FEATURES
- WETLAND NUMBER
- WHT1/MHT1 — TRIBUTARY NAME AND NUMBER (i.e. WEST HUMBER TRIBUTARY; MAIN HUMBER TRIBUTARY)

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FIGURE 3.2.5.2a

HEADWATER FEATURES

May 2023 Scale 1:8,000

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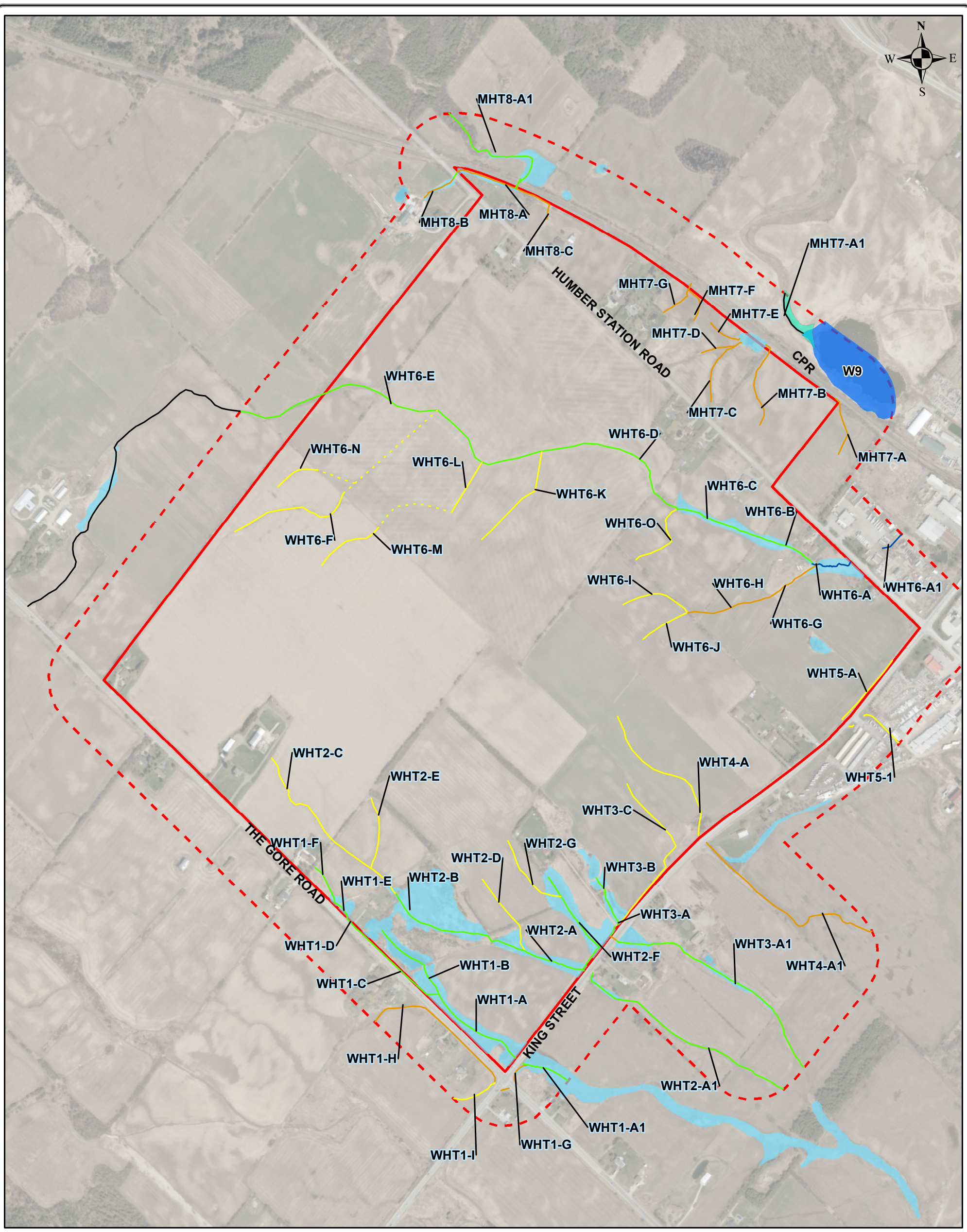

LEGEND

- SUBJECT LANDS
- STUDY AREA (120m)
- PROVINCIALLY SIGNIFICANT WETLANDS
- NON-PSW WETLANDS
- UNEVALUATED WETLANDS
- W1 — WETLAND NUMBER
- WHT1/MHT1 — TRIBUTARY NAME AND NUMBER (i.e. WEST HUMBER TRIBUTARY; MAIN HUMBER TRIBUTARY)

HEADWATER FEATURE MANAGEMENT RECOMMENDATIONS

- PROTECTION
- CONSERVATION
- MITIGATION
- NO MANAGEMENT REQUIRED
- NO MANAGEMENT REQUIRED - ENCLOSED
- UNASSESSED DRAINAGE

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FIGURE 3.2.5.2b

HEADWATER FEATURE MANAGEMENT

May 2023 Scale 1:8,000

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subsequently adopted new guidelines for undertaking HDFA's which could affect the assessment findings. For these reasons, it was determined that the HDFA should be reviewed and updated as part of this CEISMP.

In 2020, Beacon completed a field review all HDFs on the Subject Lands for the purposes of validating the mapping of HDFs and findings of the original HDFA prepared by Aquafor Beech Limited in 2013. As part of the validation exercise, the following task were completed:

- The original HDFA was reviewed;
- Tile drainage mapping was reviewed to identify HDFs affected;
- All HDFs on the Subject Lands were walked on June 8, 2020;
- Mapping of HDFs was updated to reflect the 2020 field conditions;
- Photographs of select HDF were taken to supplement the original HDFA (**Appendix C**);
- HDF Classifications were reviewed to confirm consistency with 2020 field observations and adjusted where necessary;
- HDF Management Recommendations were reviewed and adjusted where necessary; and
- Findings were summarized.

The validation exercise resulted in several refinements to the HDF mapping. The changes are based on the field review and confirmation of existing tile drain networks and culvert locations. All HDFs and reaches were also assigned new names/number to be consistent with the tributary nomenclature utilized in the CEISMP.

In reviewing the HDF classifications, Beacon relied upon field observations as well as biophysical information collected in 2020 as part of the CEISMP, including updated ecological community classifications, wildlife data, hydrological data, and hydrogeological.

A summary of functional classifications and management recommendations for all HDF reaches is provided in **Table 6** below.

In general, findings of the 2020 validation exercise are relatively consistent with the Aquafor Beech Limited (2013) HDFA, with the following exceptions:

- Field observations resulted in the addition of a number of additional HDF reaches, particularly in the portion of the Study Area east of Humber Station Road;
- HDF reach mapping along Tributary WHT6 was updated to reflect portions of the drainage feature that are enclosed within tile drains and portions of the drainage feature upstream of the Study Area that were not previously mapped by Aquafor Beech Limited;
- Results of the culvert assessment provided by Urbantech Consulting resulted in the delineation of WHT4 (previously mapped as part of WHT3);
- Management classifications associated with the downstream reaches of WHT1, WHT2, and WHT3 were revised to 'Conservation' based on the presence of wetland riparian vegetation; and
- Management classifications associated with reaches of WHT6-D and WHT6-E were revised to 'Conservation' based on the presence of wetland riparian vegetation within reaches upstream of the Study Area. Note that this wetland has been subjected to a mapping update and is confirmed to be outside of the Study Area, as described in **Appendix B**.

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Table 6. Headwater Drainage Feature Assessment Summary

HDF Reach	HDF Reach (Aquafor Beech Limited 2013)	Step 1		Step 2	Step 3	Step 4	Management Recommendation[i]	Governing Factor
		Hydrology[ii]	Modifiers	Riparian[iii]	Fish Habitat[iv]	Terrestrial Habitat[v]		
WHT6-A1	N/A	Not Assessed					Protection	Management recommendation governed by precautionary principle (upstream management recommendation).
WHT6-A	1a	Important Functions	Historically channelized	Important Functions	Important Functions	Important Functions	Protection	Management recommendation governed by hydrology, riparian vegetation and presence of breeding amphibians
WHT6-B	1b	Valued Functions	Historically channelized	Important Functions	Valued Functions	Valued Functions	Conservation	Management recommendation governed by riparian vegetation
WHT6-C	1c	Valued Functions	Historically channelized	Important Functions	Valued Functions	Valued Functions	Conservation	Management recommendation governed by riparian vegetation
WHT6-D	1d	Valued Functions	Agriculture, Tile Drain	Limited Functions	Contributing Functions	Limited Functions	Conservation	Management recommendation governed by precautionary principle (presence of upstream wetland riparian vegetation).
WHT6-E	1e	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	Conservation	Management recommendation governed by precautionary principle (presence of upstream wetland riparian vegetation).
WHT6-F	1f	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT6-G	1g	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	Mitigation	Management recommendation based on Aquafor Beech Limited (2013) report and potential for tile drainage.
WHT6-H	1h	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	Mitigation	Management recommendation based on Aquafor Beech Limited (2013) report and potential for tile drainage.
WHT6-I	1i	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT6-J	1j	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT6-K	1k	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT6-L	1l	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT6-M	1m	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT6-N	1n	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT6-O	N/A	Not Assessed					No Management Required	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by reference reach WHT6-I.
WHT4-A1	N/A	Not Assessed					Mitigation	Management recommendation governed by precautionary principle (presence of meadow riparian vegetation).
WHT4-A	N/A	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT5-A1	N/A	Not Assessed					No Management Required	n./a
WHT5-A	1o	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
MHT7-A1	N/A	Not Assessed					Protection	Management recommendation governed by precautionary principle (presence of upstream wetland riparian vegetation).
MHT7-A	N/A	Not Assessed					Mitigation	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by reference reach MHT7-C.
MHT7-B	N/A	Not Assessed					Mitigation	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by reference reach MHT7-C.
MHT7-C	2a	Limited Functions	Anthropogenic	Contributing Functions	Contributing Functions	Limited Functions	Mitigation	n/a

HDF Reach	HDF Reach (Aquafor Beech Limited 2013)	Step 1		Step 2	Step 3	Step 4	Management Recommendation[i]	Governing Factor
		Hydrology[ii]	Modifiers	Riparian[iii]	Fish Habitat[iv]	Terrestrial Habitat[v]		
MHT7-D	N/A	Limited Functions	Anthropogenic	Contributing Functions	Contributing Functions	Limited Functions	Mitigation	n/a
MHT7-E	N/A	Not Assessed					Mitigation	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by reference reach MHT7-C.
MHT7-F	N/A	Not Assessed					Mitigation	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by reference reach MHT7-C.
MHT7-G	N/A	Not Assessed					Mitigation	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by reference reach MHT7-C.
MHT8-A	2b	Limited Functions	Anthropogenic	Contributing Functions	Contributing Functions	*Valued Functions	Conservation	Heavily modified ditch along existing rail line. Management recommendation is governed by presence of upstream wetland vegetation.
MHT8-B	N/A	Not Assessed					Conservation	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by reference reach MHT8-A and presence of wetland vegetation.
MHT8-C	N/A	Not Assessed					Mitigation	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by precautionary principle (meadow vegetation).
WHT2-A1	N/A	Not Assessed					Conservation	Management recommendation governed by presence of wetland riparian vegetation.
WHT2-A	3a	Valued Functions	Wetland	Important Functions	Contributing Functions	Important Functions	Conservation	Management recommendation is governed by riparian vegetation (meadow marsh) and the presence of breeding amphibians
WHT2-B	3b	Valued Functions	Wetland	Important Functions	Contributing Functions	**Valued Functions	Conservation	Management recommendation governed by riparian vegetation
WHT2-C	3c	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT2-D	N/A	Not Assessed					No Management Required	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by riparian vegetation.
WHT2-E	3e	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT2-F	N/A	Not Assessed					No Management Required	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by wetland unit.
WHT2-G	3d	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT3-A1	N/A	Not Assessed					Conservation	Management recommendation governed by presence of wetland riparian vegetation.
WHT3-A	3g	Valued Functions	Wetland	Important Functions	Contributing Functions	**Valued Functions	Conservation	n/a
WHT3-B	3f	Valued Functions	Wetland	Important Functions	Contributing Functions	**Valued Functions	Conservation	n/a
WHT3-C	3h	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
WHT1-A1	N/A	Not Assessed					Conservation	Management recommendation governed by presence of wetland riparian vegetation.
WHT1-A	4a	Valued Functions	Wetland	Important Functions	Contributing Functions	**Valued Functions	Conservation	Management recommendation governed by riparian vegetation
WHT1-B	4b	Valued Functions	On-line pond	On-line pond	On-line pond	On-line pond	Conservation	Amphibians calling
WHT1-C	N/A	Not Assessed					Conservation	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by riparian vegetation.
WHT1-D	N/A	Not Assessed					Conservation	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by riparian vegetation.
WHT1-E	N/A	Not Assessed					Conservation	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by riparian vegetation.

HDF Reach	HDF Reach (Aquafor Beech Limited 2013)	Step 1		Step 2	Step 3	Step 4	Management Recommendation[i]	Governing Factor
		Hydrology[ii]	Modifiers	Riparian[iii]	Fish Habitat[iv]	Terrestrial Habitat[v]		
WHT1-F	N/A	Not Assessed					Conservation	Feature was not identified in HDFA ArcHydro mapping. Management recommendation is governed by riparian vegetation.
WHT1-G	N/A	Not Assessed					Mitigation	Management recommendation governed by precautionary principle (presence of upstream meadow riparian vegetation).
WHT1-H	N/A	Not Assessed					Mitigation	Management recommendation governed by precautionary principle (presence of meadow riparian vegetation).
WHT1-I	N/A	Not Assessed					No Management Required	n/a

[i] **Protection – Important Functions:**
Protect and/or enhance the existing feature and its riparian zone corridor, and groundwater discharge or wetland in-situ;
Maintain hydroperiod;
Incorporate shallow groundwater and base flow protection techniques such as infiltration treatment;
Use natural channel design techniques or wetland design to restore and enhance existing habitat features, if necessary; realignment not generally permitted;
Design and locate the stormwater management system (e.g. extended detention outfalls) are to be designed and located to avoid impacts (i.e. sediment, temperature) to the feature.

Conservation – Valued Functions:
Maintain, relocate, and/or enhance drainage feature and its riparian zone corridor;
If catchment drainage has been previously removed or will be removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e. restore original catchment using clean roof drainage), as feasible;
Maintain or replace on-site flows using mitigation measures and/or wetland creation, if necessary;
Maintain or replace external flows,
Use natural channel design techniques to maintain or enhance overall productivity of the reach;
Drainage feature must connect to downstream.

Mitigation – Contributing Functions:
Replicate or enhance functions through enhanced lot level conveyance measures, such as well-vegetated swales (herbaceous, shrub and tree material) to mimic online wet vegetation pockets, or replicate through constructed wetland features connected to downstream;
Replicate on-site flow and outlet flows at the top end of system to maintain feature functions with vegetated swales, bioswales, etc. If catchment drainage has been previously removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e. restore original catchment using clean roof drainage);
Replicate functions by lot level conveyance measures (e.g. vegetated swales) connected to the natural heritage system, as feasible and/or Low Impact Development (LID) stormwater options (refer to Conservation Authority Water Management Guidelines for details);

Recharge Protection – Recharge Functions:
Maintain overall water balance by providing mitigation measures to infiltrate clean stormwater, unless the area qualifies as an Area of High Aquifer Vulnerability under the Oak Ridges Moraine Conservation Plan (ORMCP) or Significant Recharge Areas under the Source Water Protection Act. These areas will be subject to specific policies under their respective legislation.
Terrestrial features may need to be assessed separately through an Environmental Impact Study to determine whether there are other terrestrial functions associated with them.

Maintain or Replicate Terrestrial Linkage – Terrestrial Functions:
Maintain the corridor between the other features through in-situ protection or if the other features require protection, replicate and enhance the corridor elsewhere
If the feature is wider than 20 m, it may need to be assessed separately through an Environmental Impact Study to determine whether there are other terrestrial functions associated with it.

No Management Required – Limited Functions:
The feature that was identified during desktop pre-screening has been field verified to confirm that no feature and/or functions associated with headwater drainage features are present on the ground and/or there is no connection downstream. These features are generally characterized by lack of flow, evidence of cultivation, furrowing, presence of a seasonal crop, and lack of natural vegetation. No management recommendations required.

[ii] **Hydrology**
Important Functions: Perennial, standing surface water in wetlands
Valued Functions: Intermittent; water is present in the spring as a result of seasonally high groundwater discharge or seasonally extended contributions from wetlands or other areas that support intermittent flow or water storage conditions
Limited Functions: Dry or Standing Water; characterized by no definition or flow, no groundwater seepage or wetland functions, evidence of cultivation, furrowing, presence of a seasonal crop, lack of natural vegetation, fine textured soils

[iii] **Riparian**
Important Functions: Feature type is wetland and/or any of the riparian corridor categories on either side of the feature is dominated by forest or thicket/scrubland communities or wetland
Limited Functions: Riparian corridor is dominated by cropped land or no vegetation, and there are no important, valued or contributing riparian functions
Contributing Functions: the riparian corridor is dominated by lawn

[iv] **Fish Habitat**

Important Functions: Any fish species present in spring and mid-summer; suitable spawning habitat for any fish species; species-at-risk present at any time; or feature provides critical habit to downstream species-at -risk
Valued Functions: Fish present in spring only or suitable habitat identified for feeding, cover, refuge, migration; or contributing habitat for species at risk
Contributing Functions: Allochthonous transport through feature to downstream habitat

[v] **Terrestrial Habitat**
Important Functions: Wetlands with breeding amphibians
Valued Functions: Wetland; considering wetland pockets associated with the HDF that are within 400 m of other wetlands upstream and downstream is recommended for assessing stepping stone habitat function; no breeding amphibians present
*Valued Functions: no wetland vegetation present but amphibian calls recorded
**Valued Functions Wetland habitat occurs within the corridor but no breeding amphibians present
Limited Functions: No terrestrial habitat present

The following sections summarize the CEISMP HDF reaches by management classification. **Figure 3.2.5.2b** illustrates HDFA reaches and associated management recommendations.

No Management Required

The majority of the HDF reaches assessed within the Subject Lands were characterized as actively farmed, poorly defined features. These reaches provide limited hydrologic functions and do not provide aquatic or terrestrial habitat. In accordance with the TRCA (2014b) Guidelines, these reaches have been identified as 'No Management Required'.

Mitigation

Within the Subject Lands, all assessed HDF reaches east of Humber Station Road (draining to the main Humber River) were classified as mitigation. These features were characterized as providing surface drainage to downstream fish habitat, with meadow vegetation within riparian communities. While amphibian calls were documented for Reach MHT8-A, this feature was characterized as a heavily modified (channelized) ditch along the rail line embankment. As the vegetation community was classified as Anthropogenic (no wetland present), terrestrial habitat for this reach was classified as 'Valued' (i.e., potential steppingstone habitat), refer to **Appendix C** (**Photograph 17**).

HDFA results for WHT6-G and WHT6-H were presumed to have been subject to historical tile drainage and provide surface drainage (valued hydrology) to downstream reaches. In accordance with the TRCA (2014b) Guidelines, these reaches have been identified as 'Mitigation".

Conservation

Reaches WHT1-A through WHT1-F, WHT2-A, WHT2-B and WHT2-F, WHT3-A and WHT3-B, WHT6-B and WHT6-C all had valued or contributing hydrology with wetland riparian vegetation. Breeding amphibians were recorded in the WHT2-A meadow marsh. A management classification of "Conservation" is recommended for these reaches.

Reaches WHT6-D and WHT6-E were presumed to have been subject to historical tile drainage and provide surface drainage (valued hydrology) to downstream reaches, however, due to the presence of riparian wetland vegetation within reaches upstream of the Study Area, the TRCA (2014b) *Precautionary Principle* stipulates that the more conservative management classification of "Conservation" be recommended for these reaches. Similarly, several HDF reaches within the Study Area that could not be assessed because of limited accessed were assigned a management recommendation of "Conservation" based on the presence of wetland vegetation.

Protection

Reaches WHT6-A, WHT6-A1 and WHT7-A1 were identified as "Protection". For WHT6-A, this recommendation was based on the presence of flow during the June 8, 2020 sample event (important hydrology), presence of breeding amphibian habitat and wetland riparian vegetation (**Appendix C - Photograph 1**). For remaining reaches, tjhe *Precautionary Principle* was applied.

3.2.5.3 Fluvial Geomorphology

Fluvial geomorphology is the study of the physical form and function of surface water features. Typically, it is a consideration when undertaking subwatershed studies and land use planning studies because it informs how the watercourses are managed.

Geomorphic Assessment

The CEISMP TOR recommend that a fluvial geomorphic assessment of watercourses be undertaken to:

- Characterize hydrologic features within the Study Area including sensitive reaches, areas of erosion and aggradation, channel migration, etc.;
- Determine the relationship between hydrology of the stream and geomorphology, aquatic resources and water quality, using a continuous simulation modeling approach;
- Meander belt width analysis and delineation of the 100-year erosion limit; and
- Assessment of stream bank erosion and the potential for such erosion within the 100-year timeframe, with consideration for potential impacts on the morphology of the valley or stream corridor.

As was discussed in **Section 3.2.5.2**, Beacon has confirmed that all the hydrologic features within the Study Area are HDFs and generally lack a defined channel. The few HDFs that do exhibit evidence of channel form lack consistent flow conditions that could result in lateral channel migration. Consequently, it is our opinion that a fluvial geomorphic assessment of stream bank erosion, aggradation and channel migration is not warranted and that the HDFA validation exercises effectively characterized the relationship between hydrology, geomorphology and aquatic resources for the purposes of this study.

Meander Belt Analysis

The meander belt of a watercourse is generally defined as the lateral extent that a meandering channel has historically occupied and will likely occupy in the future. In general, watercourses with drainage areas less than one square kilometer (100 ha) and do not generate sufficient hydraulic energy to initiate migration and the associated risk of potential erosion for property and infrastructure (TRCA 2015). Typically, these watercourses are vegetation controlled. Due to the poorly defined, vegetated nature of the HDFs within the Study Area, and overall lack of evidence of active geomorphic processes (i.e., erosion, aggradation or migration), it is our opinion that the regulatory floodline represents a more appropriate tool for delineating the watercourse hazard limit for applicable hydrologic features within the Study Area.

Stormwater Erosion Control Analysis

The Urbantech Consulting (2023) FSR identifies that stormwater erosion control requirements for SWMF 1, 2A and 2B will be met by providing a minimum 48-hour (maximum 72-hour) drawdown time for the 25mm storm event. Target release rates for the SWMFs were determined based on an average release rate of 0.72 L/s/ha in accordance with the Town of Caledon Bolton Residential Expansion Study and the associated contributing drainage area to each SWMF. A minimum extended detention orifice

dimension of 75 mm will be used as indicated by Urbantech Consulting (2023) to achieve the required drawdown time (i.e., minimum 48 hours). The target extended detention release rates of 0.050 m^3/s for SWMF 1, 0.02 m^3/s for SWMF 2A and 0.026 m^3/s for SWMF 2B, will mitigate potential impacts to downstream receiving reaches due to post-development stormwater release. SWMF outlets have also been designed based on the unit flow rates identified by TRCA (2018) for the West Humber River watershed.

3.2.5.4 Surface Water Quality

As the drainage features on the Subject Lands are primarily ephemeral and intermittent, there is no water quality data available. According to the TRCA's Watershed Report Card (2018), the West Humber received a surface water quality grading as "poor" whereas the Main Humber was graded as "fair". This grade is based off of phosphorous and *Escherichia coli* (*E.coli*) concentrations.

3.2.5.5 Hydraulics

The existing HEC-RAS model geometry for the West Humber and Main Humber Rivers was established in the Humber River Hydrology Update prepared by TRCA and Civica Infrastructure (April 2018). The model geometry for the existing conditions was updated with detailed LIDAR / site survey information in several locations, with a focus on the more significant crossings of Humber Station Road, the CPR line and King Street. The HEC-RAS model was also refined using the updated flows from the existing hydrologic model created based on the pre-development drainage plan. Refer to FSR Drawing 202 for the existing Regional flood mapping drawing and FSR Appendix 2 for the hydraulic and hydrologic model results (Urbantech Consulting 2023).

The majority of drainage features within the Subject Lands are considered to be headwater features and do not require flood mapping due to their small corresponding drainage areas (less than 50 ha), with the exception of West Humber River Tributary (WHT) 6, which is proposed to be realigned, all headwater features will be removed during development.

3.2.6 Existing Water Balance

3.2.6.1 Existing Site Water Balance

To understand and compare existing hydrologic conditions over the Study Area, a Thornthwaite site water balance was completed. The Thornthwaite water balance (Thornthwaite, 1948; Mather, 1978; 1979) is an accounting type method used to analyze the allocation of water among various components of the hydrologic cycle. Inputs to the model are monthly temperature, site latitude, precipitation, and stormwater run-on. Outputs include monthly potential and actual evapotranspiration, evaporation, water surplus, total infiltration, and total runoff. For ease of calculation, a spreadsheet model was used for the computation.

When precipitation (P) occurs, it can either runoff (R) through the surface water system, infiltrate (I) to the water table, or evaporate/evapotranspiration (ET) from the earth's surface and vegetation. The sum of R and I is termed as the water surplus (S). When long-term averages of P, R, I and ET are used,

there is no net change in groundwater storage (ST). Annually, however, there is a potential for small changes in ST. The annual water budget can be stated as:

P = ET + R + I + ST

As provided below,

Precipitation (P)

Based on the 30-year average for the Toronto Lester B. Pearson Climate Station in Ontario, the average precipitation for the area is about 786 mm/year for the period between 1981 and 2010. Also, the average monthly temperature from this station has been used. The monthly distribution of precipitation is presented in Table 1, Appendix G within the Hydrogeological Investigation (DS Consultants Ltd. 2023).

Storage (St)

Groundwater storage (ST) of native soils for the existing Subject Lands was estimated using values of Water Holding Capacity (mm) of respective land use and soil types identified in Table 3.1 of the Storm Water Management (SWM) Planning & Design Manual (MOE March 2003). The land uses, soil types and respective water holding capacities chosen to represent existing conditions on the Subject Lands include combinations of pasture/shrub, moderately rooted crop and urban lawn with a silty clay soil. Respective water holding capacities (200 mm, 150 mm and 75 mm) were applied to March for monthly calculations. Using the procedures outlined in the SWM Planning & Design Manual for the above land use and soil type, the annual change in storage is zero (0).

Evapotranspiration (Et)

Monthly Potential Evapotranspiration (PET) is estimated using monthly temperature data and is defined as a water loss from a homogeneous vegetation-covered area that never lacks water (Thornthwaite,1948; Mather, 1978). In the Thornthwaite water balance model, PET is calculated using the Hamon equation (Hamon, 1061);

PET Hamon = 13.97 * d * D2 * Wt
Where:
d = the number of days in the month
D = the mean monthly hours of daylight in units of 12 hours
Wt = a saturated water vapour density term = 4.95 * e0.627/100
T = the monthly mean temperature in degrees Celsius

The calculated Actual Evapotranspiration (AET) is based on PET and changes in ST (Δ ST). Where there is not enough P to satisfy PET, a reduction in ST occurs. As a result, volumes of AET are less than PET. Also, it is assumed that evaporation will occur and will amount to approximately 15% of the total precipitation for an impervious cover.

Precipitation Surplus (S)

Precipitation surplus is calculated as P–ET. For pervious areas, ET is considered AET and for impervious areas, ET is evaporation.

Infiltration (I) and Runoff (R)

For pervious areas, precipitation surplus has two components in the Thornthwaite model: a runoff component (overland flow that occurs when soil moisture capacity is exceeded) and an infiltration component. The accumulation of infiltration factors for topography, soil types and cover as prescribed in Table 3.1 of the SWM Planning & Design Manual (CVC and TRCA 2010) give infiltration factors for existing conditions on the Subject Lands as shown below in **Table 7**. The runoff component calculated in the pre-development model is the remaining volume of precipitation surplus following AET, ET, and infiltration.

Table 7. Existing Conditions – Infiltration Factor

Land Uses / Soil Types	Topography	Soil	Cover	Total Infiltration Factor
Urban Lawn - Pervious Development	0.10	0.15	0.05	0.30
Moderately rooted crops/ Clay Loam	0.10	0.15	0.10	0.35
Tile Drained Moderately Rooted Crop / Clay Loam	0.05	0.05	0.05	0.15
Pasture and Shrub/ Clay Loam	0.10	0.15	0.15	0.40

The Subject Lands have a total area of about 181.7 ha and is primarily agricultural (148.8 ha) with some natural areas consisting of NHS lands, hedgerows and swales (19.8 ha). There are also some existing rural development consisting of pervious landscaped areas (9.9 ha) and impervious buildings and asphalt/paved area (3.2 ha). Figure 7 within the Hydrogeological Investigation (DS Consultants Ltd. 2023) shows the pre-development conceptual model considered for establishing current hydrologic conditions. To predict outputs of the pre-development site water balance, various inputs were entered into the Thornthwaite model including monthly precipitation and temperature, site latitude, water holding capacity values for native soils and factors of infiltration.

Based on the above analysis, the resulting annual evapotranspiration, infiltration and runoff volumes for each hydrological land use of the Subject Lands during the pre-development period is summarized in **Table 8** below.

Table 8. Summary of Pre-Development Water Balance

Land Uses / Soil Types	ET Volume (m^3/year)	AET Volume (m^3/year)	Infiltration Volume (m^3/year)	Runoff Volume (m^3/year)
Urban Lawn - Pervious Development	0	49,562	8,422	19,650
Moderately rooted crops/ Clay Loam	0	586,891	97,015	180,170
Tile Drained Moderately Rooted Crop / Clay Loam	0	207,421	14,695	83,269
Pasture and Shrub/ Clay Loam	0	109,347	18,586	27,879
Impervious Areas	3,734	0	0	21,162
Total	**3,734**	**953,221**	**138,717**	**332,131**

Within the Hydrogeological Investigation (DS Consultants Ltd. 2023), the detailed calculations are presented in Table 1 and 2 of Appendix G, while various outputs of the model are summarised in Section 6 of this report.

3.2.6.2 Existing Feature Based Water Balance

A feature-based water balance is currently being completed to evaluate hydrologic inputs to retained wetlands W1 through W6 within the Subject Lands. Surface water and shallow groundwater level monitoring in select areas of the wetlands began in August 2020 and have continued through to February 2023. The monitoring data is being used to define wetland hydroperiods and assess groundwater and surface water interaction. The data will be used in conjunction with a catchment specific water balance model to assess the effects of proposed changes to wetland catchments. The assessment should determine the magnitude of hydrologic change because of the proposed conditions. The results of the model will be used to define a LID plan which ensures that the retained features maintain wetland form and function.

3.3 Natural Heritage Resources

The CEISMP TOR requires that natural heritage features in the Study Area be characterized and that their functional relationships in the broader natural heritage system be described. This section of the report characterizes natural heritage resources using available background information and supplementary data gathered through recent field investigations completed by Beacon in 2020.

Natural heritage resources in the Study Area were previously characterized during the BRES process and are documented in the various studies prepared for the Town of Caledon by Dougan & Associates, Cam Portt & Associates, Aquafor Beech Ltd., BluePlan Engineering Consultants Ltd., and Meridian Planning (2014a and 2014b). Information from these background studies was reviewed and the findings have been integrated within the supplemental work completed by Beacon in 2020. The subsections below provide a comprehensive characterization of the natural heritage resources in the Study Area.

3.3.1 Landscape Scale Natural Heritage Systems

The Study Area is located on the farmed till plains of the South Slope physiographic region several kilometres south of where the Oak Ridges Moraine converges with the Niagara Escarpment. The Niagara Escarpment which is located 4 km to the west and the Oak Ridges Moraine, which is located 2 km to the west and north, form part of the provincial Greenbelt which supports protected natural areas and linkages. Along with the Humber River valleylands, which are located 0.5 km to the northeast of the Study Area, these natural features and areas form part of a broader provincial and regional Natural Heritage System (NHS) identified in the Growth Plan NHS and Region of Peel Greenlands System (refer to **Figure 3.3.1**).

The Oak Ridges Moraine is an irregular ridge approximately 3-12 km wide and 170 km in length that extends from the Niagara Escarpment in the west to the Trent River in the east. The Niagara Escarpment is a bedrock escarpment and cuesta that extends 1,200 km from Rochester, NY to Green Bay, WI., and traverses southern Ontario from Niagara Falls to Manitoulin Island. The Humber River valleylands connects its headwaters in Caledon to Lake Ontario, some 40 km downstream and represents a significant landscape north-south linkage corridor. The Humber River valleylands to the east of the Study Area are contained within the Bolton Resource Management Tract (BRMT). The BRMT is a 973-ha area comprised of a mix of valleylands, forests, and wetlands owned by TRCA that connects the Humber Rover to the Oak Ridges Moraine.

The lands in the Study Area are primarily agricultural. Natural features are limited to drainage features that represent the headwaters of the west and main branches of the Humber River. Associated with some of these drainage features are some small wetland features, which were evaluated as Other Wetlands (not Provincially significant). These drainage features and wetlands connect to similar features immediately downstream of the Study Area and function to provide some local scale connectivity, however connections to the broader regional and provincial NHS described above is limited due to lack of natural features and barriers to connectivity such as the CP rail line which effectively separates the Study Area from the Humber River valleylands.

Treed features on the Subject Lands are generally limited to hedgerows, most of which are short and fragmented and offer little connectivity due to poor cover.

At the present time, there are no designated natural heritage areas or systems identified on the Subject Lands. The Region Official Plan (ROP) does not identify any core area of its Greenlands System on the Subject Lands. Similarly, the Town of Caledon Official Plan does not map any of the features on the Subject Lands as Environmental Policy Area. There are however several wetland features located east of the CP rail line that have been identified as part of the Provincially Significant Bolton Wetland Complex.

As there are few natural features associated with the Subject Lands, it is not unusual that the features present have not yet been mapped on the Region and Town's environmental schedules. One of the objectives of the CEISMP is to determine whether the natural heritage features associated with the Subject Lands satisfy the various evaluation criteria for inclusion within the Regional Greenlands System and Environmental Policy Area and if so to develop an NHS to protect and enhance their functions.

Natural heritage features associated with the Subject Lands are concentrated near the southern boundary. From a natural heritage system perspective, the drainage features and wetlands on the

Subject Lands are most functionally connected to downstream areas and the tributaries of the west branch of the Humber River directly to the south. Due to the locations of these features and barriers in the landscape (rail lines and roads), their functional relationship with the broader provincial and regional scale NHS to the west, north and east is limited.

3.3.2 Ecological Land Classification

Ecological communities within the Study Area were classified and mapped in accordance with the Ecological Land Classification (ELC) System for southern Ontario (Lee *et al*. 1998). The ELC System classifies ecological communities based on their vegetation composition and structure, site history, substrate type, moisture regime, drainage class, and other attributes. Under the ELC System, ecological communities are classified to the ecosite or ecoelement level depending on scale and specific application. Ecological communities within the Study Area were mapped and described to the ecosite level, and where possible to the ecoelement level, using ELC protocols.

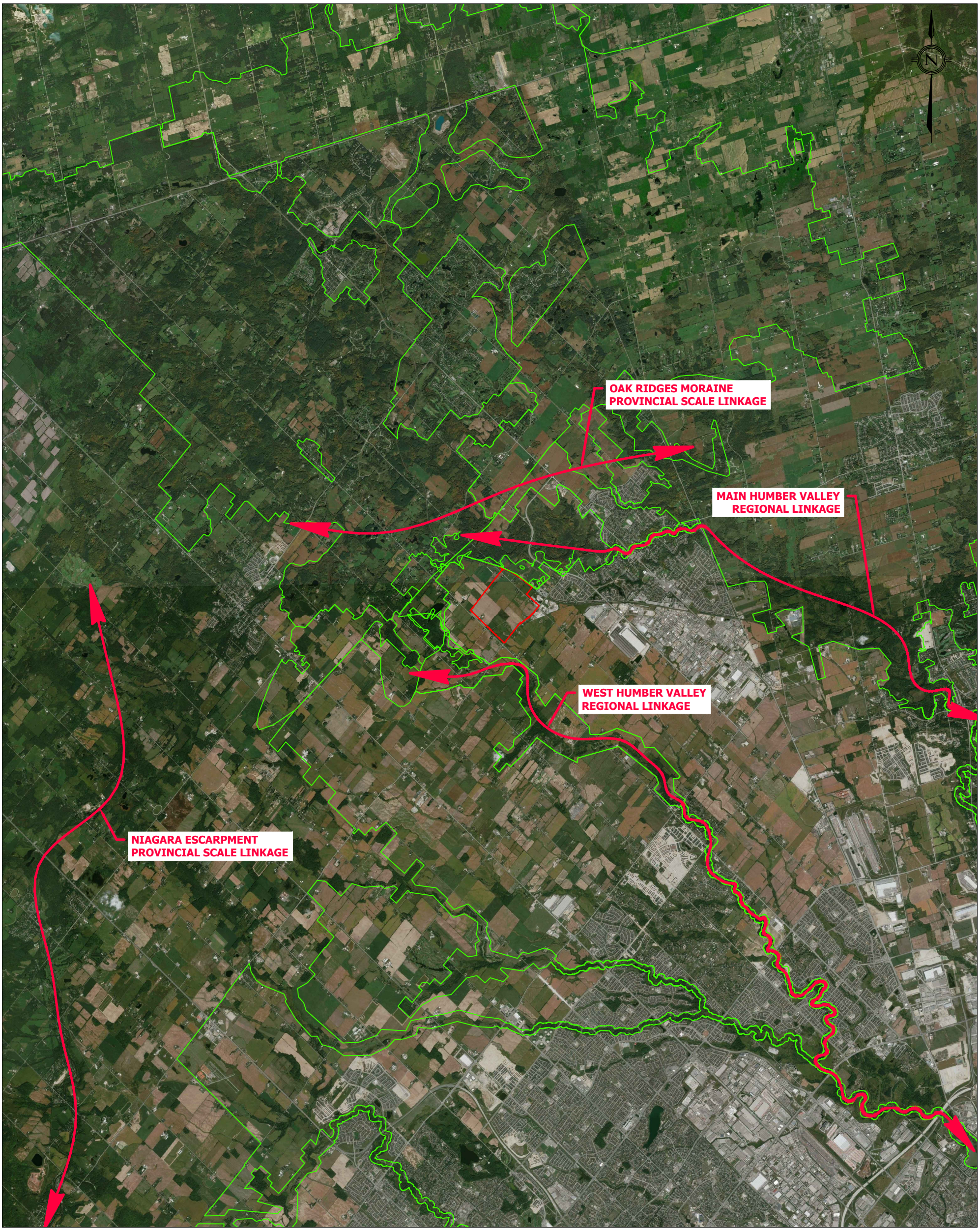
Ecological communities within the Study Area were initially mapped in 2013 and 2014 by Dougan & Associates *et al.* (2014b) as part of the BRES process. In 2020, Beacon conducted field investigations to confirm the previous findings. Through this work, feature classifications and feature boundaries were confirmed and refined where necessary to reflect current conditions. The boundaries of wetland communities were also adjusted to align the wetland limits that were staked by MNRF staff on June 1, 2016.

The ELC classification are based on vegetation and soils information gathered from representative communities. Floristic surveys were conducted to document vegetation composition and structure for each representative community, including recording species relative abundance and ranking dominant species according to vegetation strata (canopy, subcanopy, understory, and ground layers).

A total of 18 ecological community types were identified in the Study Area, including communities corresponding with anthropogenic and agricultural lands. A description of the various ecological communities observed in the Study Area is provided below in **Table 9**. The locations of the communities and their corresponding polygon or unit identifiers are mapped in **Figure 3.3.2**.

Table 9. Ecological Community Descriptions

Unit	Type	Description
1	Anthropogenic	Existing rural residential properties containing residential and commercial development.
2	Agriculture - Annual Row crops	Corn, wheat, and soybean fields.
3	Agriculture - Hay	Alfalfa fields.
4	Hedgerow (H)	Hedgerows in the Study Area are largely dominated by Common Buckthorn, hawthorns (*Crataegus* sp.), Domestic Apple (*Malus pumila*), and Manitoba Maple (*Acer negundo*), with occasional White Elm (*Ulmus americana*) and Basswood (*Tilia americana*), and Ash (*Fraxinus* spp.).
5	Willow Mineral Deciduous Swamp (SWD4-1)	Small treed area surrounding a dug pond comprised of Crack Willow (Salix fragilis), Siberian Elm (*Ulmus pumila*), Trembling Aspen (*Populus tremuloides*) with a dense community of Reed Canary Grass (*Phalaris arundinacea*) and some Red-osier Dogwood (*Cornus sericea*).



LEGEND:

- SUBJECT LANDS
- PROVINCIAL AND REGIONAL SCALE NATURAL HERITAGE SYSTEM
- LINKAGES

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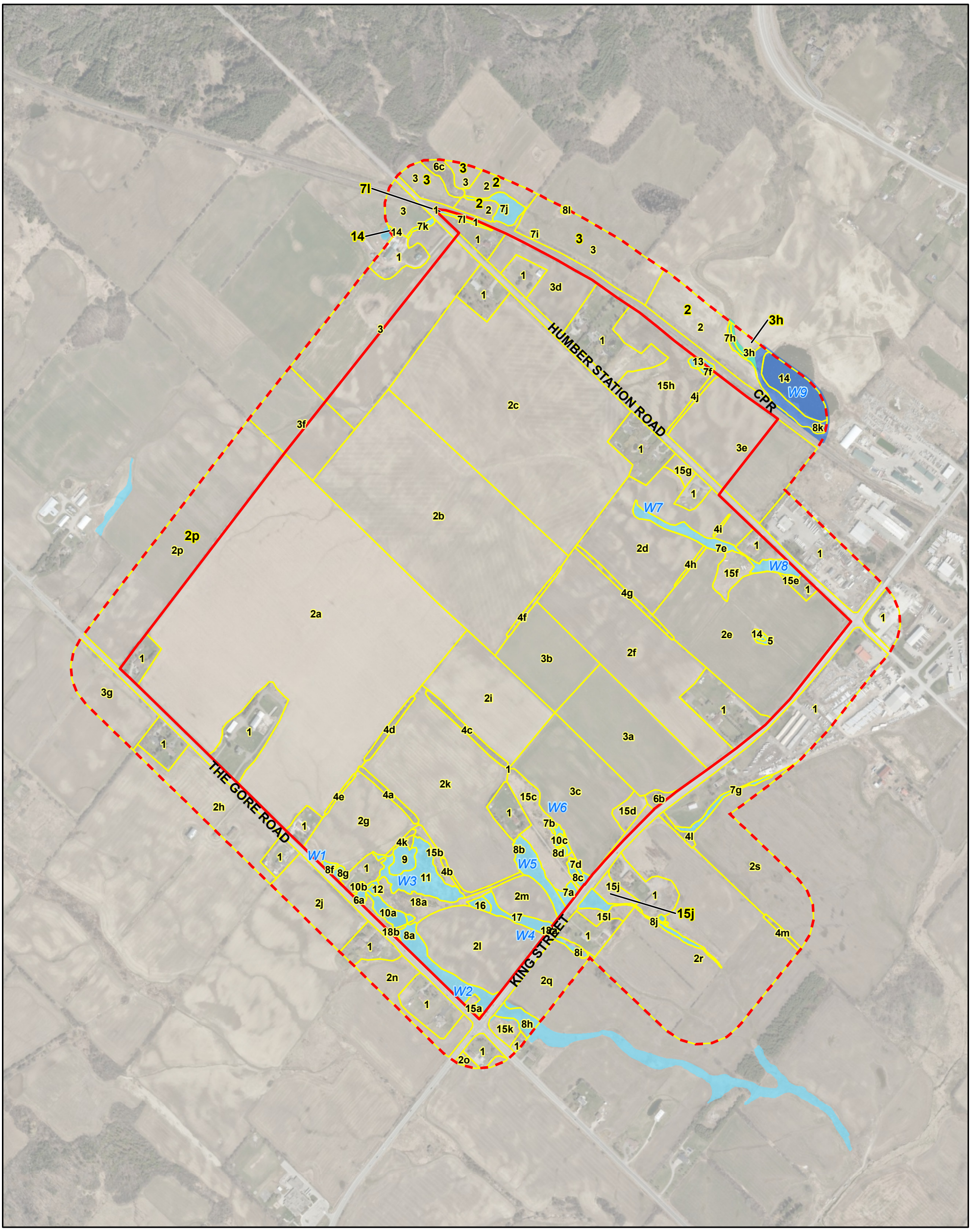
Caledon Station Community-Comprehensive Environmental Impact Study and Management Plan

PROJECT No.

FIGURE 3.3.1

LANDSCAPE LEVEL NATURAL HERITAGE SYSTEM

May 2023 SCALE: 1:12000



Legend

- SUBJECT LANDS
- STUDY AREA (120m)
- ECOLOGICAL COMMUNITIES
- NON-PSW WETLANDS
- UNEVALUATED WETLANDS
- PROVINCIALLY SIGNIFICANT WETLANDS (NOT STAKED BY MNRF)

Unit	Vegetation Type
1	Anthropogenic
2	Agriculture - Row Crops
3	Agiculture - Hay
4	Hedgerow (H)
5	Willow Mineral Deciduous Swamp (SWD4-1)
6	Cultural Thicket (CUT1)
7	Reed Canary Grass Mineral Meadow Marsh (MAM2-2)
8	Cattail Mineral Shallow Marsh (MAS2-1)
9	Cattail Organic Shallow Marsh (MAS3-1)
10	Stonewort Submerged Shallow Aquatic (SAS1-3)
11	Forb Mineral Meadow Marsh (MAM2-2)
12	Organic Deciduous Swamp (SWD3)
13	Pondweed Submerged Shallow Aquatic
14	Open aquatic
15	Dry-Moist Old Field Meadow (CUM1-1)
16	Willow Mineral Thicket Swamp (SWT2-2)
17	Mineral Meadow Marsh (MAM2)
18	Cultural Plantation (CUP)

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FIGURE 3.3.2

ECOLOGICAL COMMUNITIES

May 2023 Scale 1:9,000

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Unit	Type	Description
6	Cultural Thicket (CUT1)	This community is dominated by Common Buckthorn with lesser amounts of hawthorn (*Crataegus* sp.). Ground covers include Thicket Creeper (*Parthenocissus vitacea*), Enchanter's Nightshade (*Circaea lutetiana*), grasses, Tall Goldenrod, Wild Strawberry (*Fragaria virginiana*), and Zig Zag Goldenrod (*Solidago flexicaulis*).
7	Reed Canary Grass Mineral Meadow Marsh (MAM2-2)	Meadow marsh communities dominated by Reed Canary Grass in association with other wetland forbs and graminoids such as Panicled Aster (*Symphyotrichum lanceolatum*), Purple-stemmed Aster (*Symphyotrichum puniceum*), Field Horsetail (*Equisetum arvense*), Purple Loosestrife (*Lythrum salicaria*), Fowl Bluegrass (*Poa palustris*), and sedges (*Carex* spp.).
8	Cattail Mineral Shallow Marsh (MAS2-1)	Marsh communities on mineral soil dominated by Narrow-leaved Cattail (*Typha angustifolia*) with lesser amounts of Broad-leaved Cattail (*Typha latifolia*) and other wetland forbs and graminoids such as Panicled Aster, Spotted Jewelweed (*Impatiens capensis*), Purple-stemmed Aster, bulrushes (*Scirpus atrovirens, S. microcarpus*), sedges, and Joe-Pye Weed (*Eutrochium maculatum*).
9	Cattail Organic Shallow Marsh (MAS3-1)	Marsh communities on organic soil dominated by Narrow-leaved Cattail (*Typha angustifolia*) with lesser amounts of Broad-leaved Cattail (*Typha latifolia*) and other wetland forbs and graminoids such as Reed Canary Grass, Panicled Aster, Spotted Jewelweel, Purple-stemmed Aster, bulrushes (*Scirpus atrovirens, S. microcarpus*), sedges, and Joe-Pye Weed (*Eutrochium maculatum*).
10	Stonewort Submerged Shallow Aquatic (SAS1-3)	Dug ponds with thick layer of Stonewort (*Chara* spp.) and sparse amounts of Lesser Duckweed (*Lemna minor*).
11	Forb Mineral Meadow Marsh (MAM2-10)	Meadow marsh dominated by Panicled Aster, Reed Canary Grass, sedges, and willowherbs *(Epilobium* spp.)
12	Organic Deciduous Swamp (SWD3)	Small swamp on organic soils with a canopy of dead hardwood (ash), White Elm (*Ulmus ameriana*), Yellow Birch (*Betula allegheniensis*), and White Birch (*Betula papyrifera*). The understory consists of Red-osier Dogwood, Black Current (*Ribes americana*), and White Cedar. Dominant ground covers are Spotted Jewelweed, Marsh Marigold (Caltha palustris), horestails (*E. arvensis, E. sylvaticum*), and ferns (*Onoclea sensibilis, Matteucia struthiopteris*).
13	Pondweed Submerged Shallow Aquatic (SAS1-1)	Small shallow aquatic feature dominated by pondweeds (*Potomogeton* spp.), with a small amount of Lesser Duckweed and Reed Canary Grass
14	Open Aquatic (OAO)	Small, dug pond.
15	Dry-Moist Old Field Meadow (CUM1-1)	Meadows dominated by old field forbs and graminoids including Smooth Brome Grass (*Bromus inermis*), Reed Canary Grass, Orchard Grass (*Dactylis glomerata*), Tall Goldenrod (*Solidago altissima*), Tufted Vetch (*Vicia cracca*). Woody regeneration is generally sparse but includes Common Buckthorn (*Rhamnus cathartica*) and Manitoba Maple (Acer negundo), Tatarian Honeysuckle (*Lonicera tatarica*), hawthorns, and Red-osier Dogwood. Through restoration efforts, some of the old fields (3d, 3e) have been planted with various trees and shrubs including White Cedar (*Thuja occidentalis*), White Spruce (*Picea glauca*), Freeman's Maple (*Acer x freemanii*), Nannyberry (*Viburnum lentago*), and Basswood (*Tilia americana*).
16	Willow Mineral Thicket Swamp (SWT2-2)	Small thicket swamp dominated by Pussy Willow (*Salix discolor*), Reed Canary Grass, Purple Loosestrife, Panicled Aster, and Tall Goldenrod.

Unit	Type	Description
17	Mineral Meadow Marsh (MAM2)	Wetland disturbed by agricultural activity dominated by Barnyard Grass (*Echinocloa crus-galli*), Creeping Bent Grass (*Agrosits stolonifera*), Foxtail grasses (*Setaria* spp.), and smartweeds (*Persicaria* sp.)
18	Cultural Plantation (CUP)	Former meadows with well-established planted native trees and shrubs including Eastern Cottonwood (*Populus deltoides*), White Cedar, White Spruces, Freeman's Maple, Gray dogwood, Red-osier Dogwood, Nannyberry, and Speckled Alder. Ground covers include grasses, Tall Goldenrod, Wild Carrot, and Creeping Thistle.

3.3.3 Wetland Boundary Delineation

Wetlands W1 through W8 on the Subject Lands were staked with the Ministry of Natural and Forestry (MNRF) on June 1, 2016. The staked limits were surveyed by an OLS and geodetic data were used to prepare the ELC mapping (refer to **Figure 3.3.2**).

The wetland community downstream of W6, on 7675 King Street, was staked by a Beacon wetland evaluator[1] on April 25, 2023. These staked limits were surveyed to a precision of approximately 20 cm and used in mapping.

The very small wetland features (ELC Units 5, 7e, 7f, 7h, 7i, 7j, 7l, 8l, 13, 14a, and 14b) within the Study Area and downstream wetland features (ELC Units 8h and 8i) were delineated by Beacon based on field studies, drone photography, and aerial orthophotography.

All wetland mapping updates are provided in **Appendix B** and will be submitted to MNRF for use in their database.

3.3.4 Floristics

A total 171 vascular plant species were documented in the Study Area between 2016 and 2020. A plant list is included in **Appendix D.** Of these, 78 (46%) are non-native to Ontario, which is reflective of the agricultural land use history of the Study Area. Most of the species (161) are considered provincially and regionally common/secure (ranked S5 or S4 provincially by NHIC and L5 or L4 regionally by TRCA). Ten (10) of the species recorded are of regional conservation concern (ranked L3 by TRCA). These species are listed in **Table 10**. Of these species, four (4) species, Balsam Fir (*Abies balsamea*), Tamarack (*Larix larcina*), White Spruce (*Picea glauca*), and Speckled Alder (*Alnus incana* ssp. *rugosa*) have been introduced through plantings.

Table 10. Vegetation Species of Regional Conservation Concern

Species	Common Name	S-Rank[1]	L-Rank[2]	Location
*Abies balsamea**	Balsam Fir	S5	L3	ELC Unit 5
*Alnus incana ssp. rugosa**	Speckled Alder	S5	L3	ELC Units 18a, 18b
Carex laevivaginata	Smooth-sheathed Sedge	S4	L3	ELC Unit 12
Epilobium leptophyllum	Narrow-leaved Willowherb	S5	L3	ELC Unit 8a

[1] *Wetland evaluators are recognized by the MNRF and have completed an MNRF-approved training course.*

Species	Common Name	S-Rank[1]	L-Rank[2]	Location
Equisetum sylvaticum	Woodland Horsetail	S5	L3	ELC Unit 12
*Larix laricina**	Tamarack	S5	L3	ELC Unit 11, 16, 18a, 18b
Lemna trisulca	Star Duckweed	S5	L3	ELC Unit 10c
*Picea glauca**	White Spruce	S5	L3	ELC Unit 11, 16
Ribes triste	Swamp Red Currant	S5	L3	ELC Unit 12
Triosteum aurantiacum	Orange-fruit Horse-gentian	S4S5	L3	ELC Unit 6a

*planted

[1]Provincial Rank (NHIC): S4=Apparently Secure, S5=Secure

[2]Local Rank (TRCA): L3=Regional conservation concern

3.3.5 Tree Resources

Beacon has characterized the treed resources in the Study Area. An inventory and evaluation of the existing individual trees and tree groupings in the Study Area was conducted on June 12, June 18, and August 20, 2020 by an Arborist certified by the International Society of Arboriculture.

Individual trees ≥10 cm DBH (diameter at breast height, measured 1.4 m above grade) were tagged with numbered with aluminum forestry tags and their locations were recorded with GPS. For each tree, the following information was recorded:

- Species;
- Trunk DBH (diameter at breast height, measured 1.4 m above grade);
- Health condition; and
- Structural condition rating.

Where trees occur in groupings such as hedgerows, rather than tag and assess all trees individually, the number, species, size, and condition of the trees in each group were recorded.

Most of the property is agricultural and trees are limited to hedgerows and ornamental trees associated with farm properties and some tree communities (as described in **Section 3.3.2**). The trees that were inventoried individually or as group are illustrated on **Figure 3.3.5**. These results are detailed in **Appendix E**.

There are a number of landowners in the Study Area that are not participating in the current study. Trees located on non-participating landowner properties were not included in the tree inventory. An inventory of these trees will be completed prior to Draft Plan approval.

Further consideration will be given to preservation trees and tree groupings at the Draft Plan approval stage in accordance with the Town of Caledon guidelines. However, future Arborist Reports and Tree Preservation Plans can rely on the inventory created through this CEISMP.

3.3.6 Avifauna

A total of 48 bird species were recorded in the Study Area during the 2013 and 2014 surveys completed by Dougan & Associates *et al*. (2014a and 2014b). Most species observed were noted as common and widespread in Ontario and representative of open habitats. A species list was not included in the report;

however, it was noted that the following avian SAR were recorded from the Study Area in 2013 and 2014:

- Barn Swallow (*Hirundo rustica*) - 14 individuals were seen in six locations on the Subject Lands;
- Bank Swallow (*Riparia riparia*) - one individual was seen flying over Humber Station Road on July 13, 2013, although given the habitat in this location and the surrounding areas, Dougan & Associates *et al.* (2014b) assumed it was not likely breeding locally;
- Bobolink (*Dolichonyx oryzivorus*) - at least 42 individuals were seen in six general locations on the Subject Lands; and
- Eastern Meadowlark (*Sturnella magna*) - six individuals (which were all single birds singing) were seen in six locations on the Subject Lands.

In 2020, Beacon completed breeding bird surveys in the Study Area as shown on **Figure 3.3.6**. Surveys took place in the early morning on days with low winds (3 or less on the Beaufort scale), temperatures within 5°C of normal and minimal precipitation. The Study Area was walked such that all singing birds could be heard or observed and recorded on an aerial photograph of the Study Area as shown in the field notes (**Appendix F**). Survey details are presented in **Table 11**.

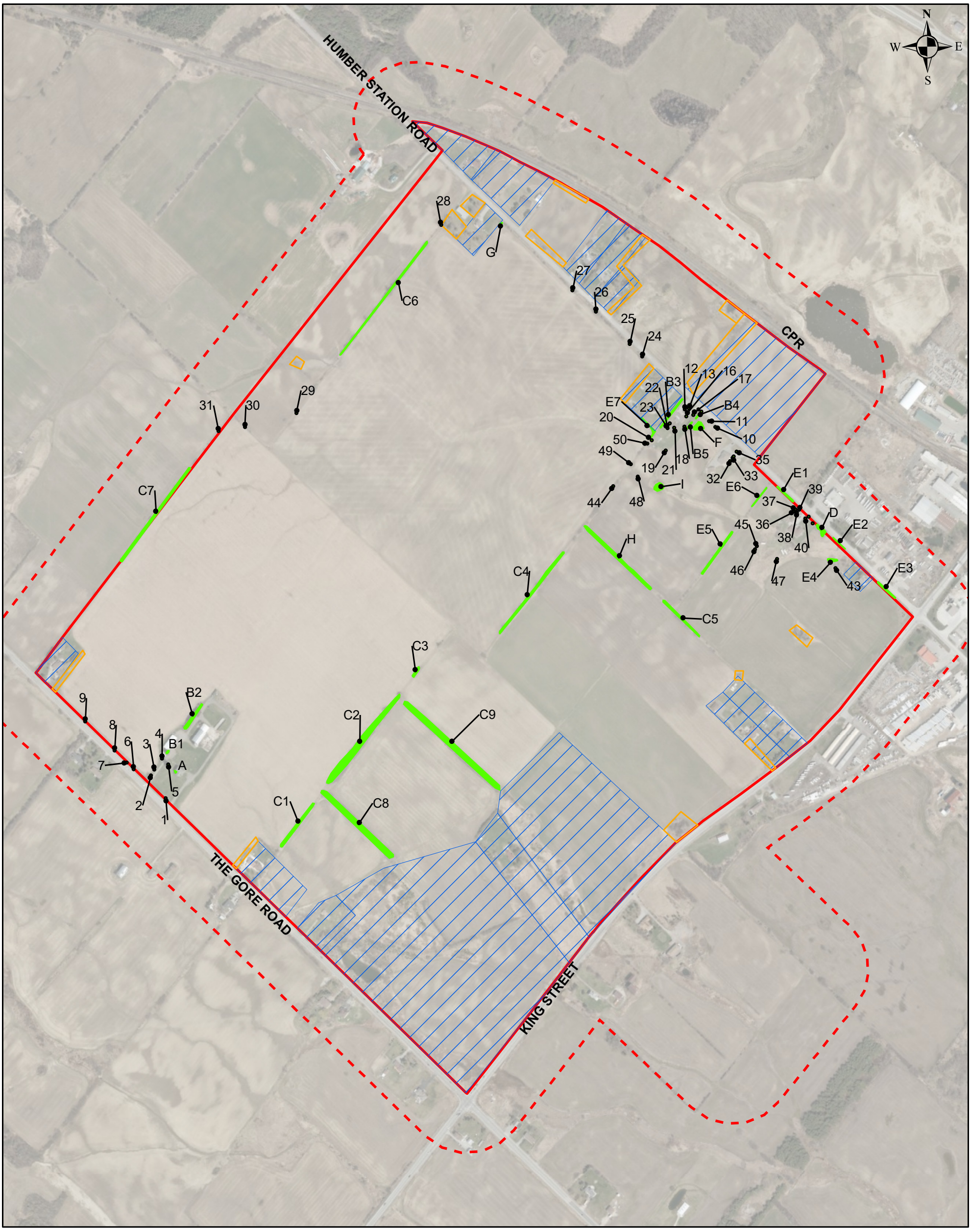
Table 11. Breeding Bird Survey Details 2020

Details	Survey 1	Survey 2	Survey 3
Date:	May 28, 2020	June 19, 2020	July 4, 2020
Start Time:	4:45	6:20	4:45
End Time:	8:15	9:10	8:30
Temperature (˚C):	16-18	19-20	18-21
Wind speed (km/h):	0	0	0
Cloud cover (%):	100	20-75	0
Precipitation:	None	None	None

A total of 47 species were documented (**Appendix G**) in 2020. Of the 47 species documented, 42 exhibited evidence of breeding on the Subject Lands. Species that were observed only flying or foraging over the Study Area included: Great Blue Heron (*Ardea herodias*), Peregrine Falcon (*Falco peregrinus*), Ring-billed Gull (*Larus delawarensis*), Northern Rough-winged Swallow (*Stelgidopteryx serripennis*), and Tree Swallow (*Tachycineta bicolor*).

Species observed were generally associated with the following three habitat types: agriculture/hedgerow, house/garden and wetland/early successional habitats. Field notes from the breeding bird surveys in 2020 indicated where each species has been recorded, and has been included as **Appendix F.**

The avian community is comprised of species that are indicative of agricultural and rural settings. This is consistent with the habitats present. Most of the Subject Lands are farmed and there are also residential and industrial areas nearby. Three of the most abundant species recorded included Red-winged Blackbird (*Agelaius phoeniceus*), Song Sparrow (*Melospiza melodia*) and Savannah Sparrow (*Passerculus sandwichensis*).



LEGEND

- SUBJECT LANDS
- STUDY AREA (120m)
- PARCELS NOT ACCESSIBLE
- TREE GROUPINGS
- INDIVIDUAL TREES (APPROXIMATE LOCATION) (FOR TAG NUMBER - PLEASE SEE ARBORIST REPORTS)
- C1 TREE GROUPING NUMBER
- ADDITIONAL TREES INVENTORIED IN SUPPORT OF DRAFT PLAN OF SUBDIVISION (APPROXIMATE LOCATION); PLEASE REFERENCE ARBORIST REPORTS FOR ARGO-MACVILLE AND ARGO-HUMBER STATION

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FIGURE 3.3.5

TREED RESOURCES

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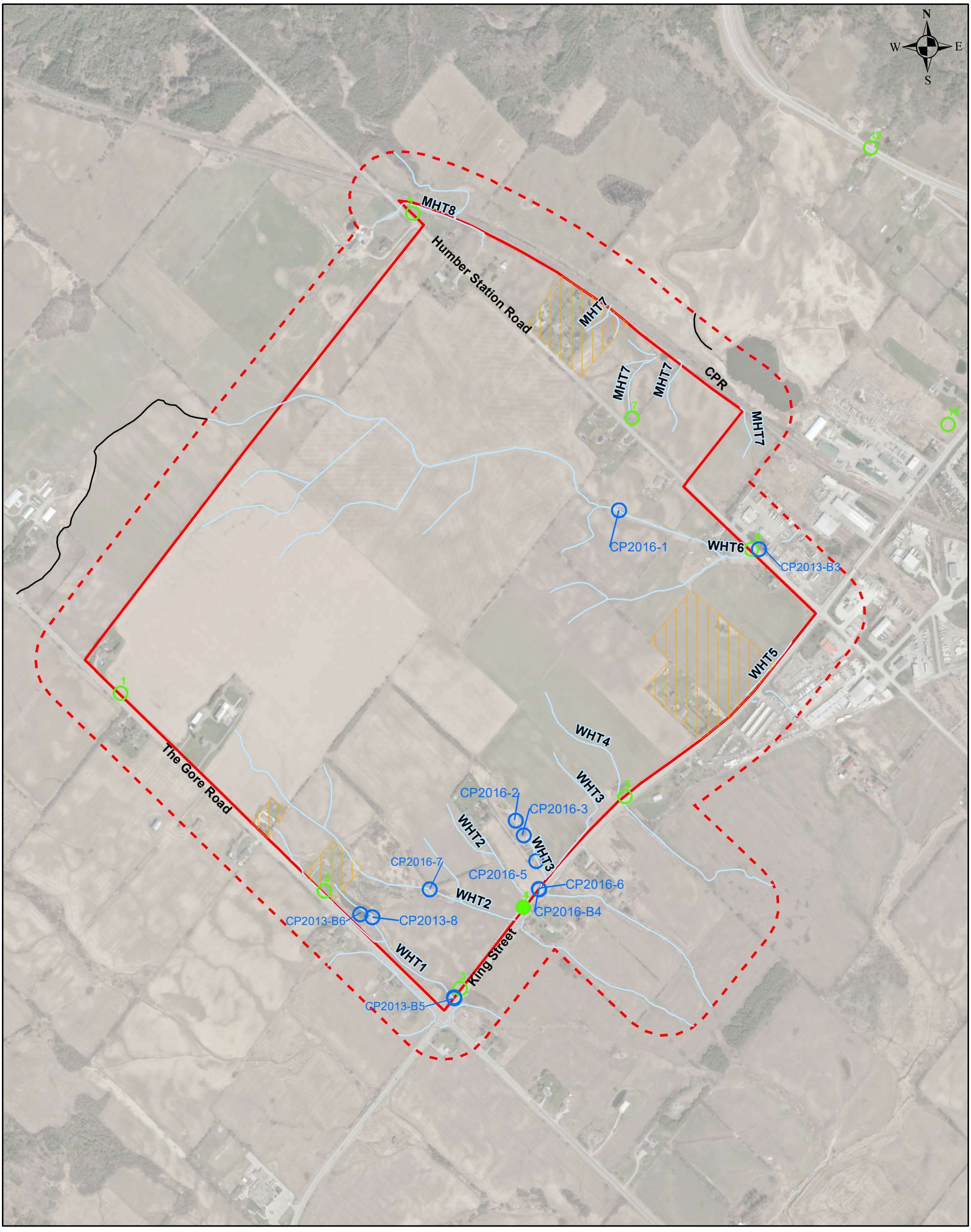

LEGEND

- SUBJECT LANDS
- STUDY AREA (120m)
- PORTIONS OF STUDY AREA NOT ACCESSED DURING BREEDING BIRD SURVEYS
- CP20XX-XX — FISH COMMUNITY SAMPLING SITES (C. PORTT & ASSOCIATES [YEAR-SAMPLING REACH NUMBER])
- 1 — AMPHIBIAN CALL STATION
- DRAINAGE FEATURES
- UNASSESSED DRAINAGE FEATURES
- WHT1/MHT1 — TRIBUTARY NAME AND NUMBER (i.e. WEST HUMBER TRIBUTARY; MAIN HUMBER TRIBUTARY)

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FIGURE 3.3.6

BIOLOGICAL SAMPLING

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Other species observed that are also tolerant of anthropogenically modified habitats include America Robin (*Turdus migratorius*), House Wren (*Troglodytes aedon*), European Starling (*Sturnus vulgaris*), Northern Cardinal (*Cardinalis cardinalis*), Indigo Bunting (*Passerina cyanea*), Brown-headed Cowbird (*Molothrus ater*) and American Goldfinch (*Spinus tristis*).

Other than the Red-winged Blackbird, which as discussed is an anthropogenic tolerant bird, a small number of species generally considered to be wetland associates were observed. A single Swamp Sparrow (*Melospiza georgiana*) and a few Common Yellowthroat (*Geothlyphis trichas*) were observed in the wetland habitats in the southern corner of the Subject Lands.

Of the 42 species that exhibited breeding evidence, all have a conservation rank of S5 (Secure) or S4 (Apparently Secure) (NHIC 2020). However, two avian species breeding in the Study Area are listed as Threatened under the *Endangered Species Act* (2007): Bobolink and Eastern Meadowlark.

Bobolink is an area sensitive open country grassland species that requires large blocks of open habitat such as pasturelands and older hay fields. It is estimated that there are 700,000 Bobolink that breed in southern Ontario (Cadman *et al*. 2007). The preferred breeding habitat of Bobolink in eastern North America is confined to open grasslands, particularly hayfields and pastures (McCracken *et al.* 2013, COSEWIC 2010). The species has an affinity for hayfields older than eight years (McCracken *et al*. 2013). It generally avoids habitats that are subject to flooding as well as early successional habitats with tree and shrub growth. However, throughout its range it can also be found in wet prairie, graminoid peatlands, abandoned fields with tall grass, native tall grass prairie, no-till cropland, and reed beds (COSEWIC 2010). On the Subject Lands, Bobolink were observed in Agriculture - Hay (ELC Unit 3c) and Agriculture - Row Crop (ELC Units 2b and 2i) on May 28, 2020 and in Agriculture - Hay (ELC Unit 3c) on June 19, 2020. No Bobolink were observed on the Subject Lands during the third breeding bird survey on July 4, 2020 as suitable habitat was no longer present due to cropping. The Subject Lands are regularly farmed, and crops rotated annually or more frequently. As there are no fields that support consistent cover for prolonged periods utilization of the fields by this species is highly variable and ephemeral. The area continues to be farmed and does not provide suitable habitat for these species.

Eastern Meadowlark is also considered an area sensitive species that breeds in large hay fields, pastures and old field meadows (COSEWIC 2011b). While this species has similar habitat preference to Bobolink, it can also be found in more successional habitats that contain sparse tree and shrub cover as well as a higher proportion of forbs. Eastern Meadowlark were observed on the Subject Lands in Agriculture - Row Crops (ELC Units 2c and 2d) on May 28, 2020 and in Agriculture - Hay (ELC Unit 3d) on July 4, 2020. Eastern Meadowlark was also observed west of the Subject Lands within the Study Area on June 19, 2020.

Historically, in eastern North America, open country species such as Bobolink and Eastern Meadowlark have benefited from human alteration of the landscape for agriculture. However, like many other open country species, their populations in Ontario and other jurisdictions are thought to have declined.

Further discussion for Bobolink and Eastern Meadowlark is provided in **Section 3.3.9.6.**

As previously mentioned, Bobolink and Eastern Meadowlark are area-sensitive, which are species that either require a larger block of suitable habitat in which to breed or which are more productive in large habitat blocks. The Savannah Sparrow is also considered a grassland area-sensitive species. It is very common and widespread and breeds in a variety of open field situations from agricultural fields to large cultural meadows.

TRCA ranks species of regional conservation concern and ranks them from L1 (highest concern) to L5 (least concern) (TRCA 2016). Seven species of the species observed from the Subject Lands are of regional concern and have rank of L1 to L3. Species include: Bobolink, Eastern Meadowlark, Wild Turkey (*Meleagris gallopavo*), Black-billed Cuckoo (*Coccyzus erythropthalmus*), Horned Lark (*Eremophila alpestris*), Brown Thrasher (*Toxostoma rufum*) and Vesper Sparrow (*Pooecetes gramineus*) which are ranked L1. Eastern Meadowlark are ranked as L2, meaning they typically occur in high-quality habitats and are of regional concern. The remaining five species are ranked L3, meaning they can withstand minor disturbance, are generally secure in the natural matrix but are of regional concern.

3.3.7 Herpetofauna

Anurans

Dougan & Associates *et al.* (2014a and 2014b) conducted nocturnal amphibian breeding surveys on April 25, May 27, and June 24, 2014. Five species of amphibians were recorded from the Study Area during these surveys, including Spring Peeper (*Pseudacris crucifer*), Wood Frog (*Lithobates sylvaticus*), Gray Tree Frog (*Hyla versicolor*), Green Frog (*Rana clamitans*), and American Toad (*Anaxyrus americanus*). All observations were associated with the wetlands and ponds within the Study Area; however, the precise locations of amphibian observations were not included in their reporting.

In 2020, Beacon completed additional amphibian surveys in the Study Area by establishing monitoring stations in locations similar to those used by Dougan & Associates *et al.* (2014a and 2014b). Call surveys are the primary method for identifying breeding habitats for anurans (frogs and toads) as this is when they are vocalizing and most detectable as different species breed at different times in the spring three surveys were completed in order to detect the full range of anuran species present on a site. Surveys focussed on potential anuran breeding habitat such as wetlands and ponds. The locations of the call survey stations are illustrated in **Figure 3.3.6**.

The surveys were conducted after dusk during suitable weather conditions between April and June, a minimum of 15 days apart. Weather details (i.e., air temperature, precipitation, wind speed, and cloud cover) at the time of survey were recorded (see **Table 12**). Surveys were conducted using the point count method whereby the surveyor stands at a set point for a specific period and record all species that can be heard calling over that time from within a 100 m radius sample area. Each survey station was surveyed for a minimum of three minutes. The approximate locations of calling anurans were noted on a standard MMP data sheet and chorus activity for each species was assigned a call code as follows:

- Code 0 - no calls;
- Code 1: individual calls do not overlap and calling individuals can be discretely counted;
- Code 2: calls of individuals sometimes overlap, but numbers of individuals can still be estimated; and
- Code 3: overlap among calls seems continuous (full chorus), and a count estimate is impossible.

Table 12. Anuran Survey Details 2020

Details	Round 1	Round 2	Round 3
Date:	April 27, 2020	May 27, 2020	June 22, 2020
Start time:	20:49	21:36	22:13
Temp (°C):	10	26	23-25
Wind (km/h):	1-11	0	0
Cloud cover (%):	<10	15	90-100
Precipitation	None	None	None/Fog

Five anuran species were recorded from ten stations in the Study Area during the 2020 nocturnal amphibian call surveys. Species recorded included American Toad, Green Frog, Gray Tree Frog, Spring Peeper and Wood Frog. These findings are consistent with the previous surveys completed by Dougan & Associates *et al.* (2014a and 2014b). The findings are summarized below in **Table 13**. It should be noted that Station 8 was not accessed in 2020, and that there is no Station 11.

Table 13. Anuran Survey Results 2020

Station	Round 1	Round 2	Round 3
1	-	GRTR 2(4)*	-
2	-	-	**GRFR 1(1)** **GRTR 2(5)** GRTR 2(4)*
3	-	-	-
4	-	-	GRTR 1(2)*
5	-	GRTR 1(2)*	-
6	-	-	-
7	**SPPE 3** SPPE *	**SPPE 2(10)** GRTR 3 SPPE 3	**AMTO 1(2)** **GRFR 1(1)** GRTR 2(3)
9	SPPE 3 WOFR 1(1) SPPE 3*	GRTR 3 SPPE 2(12) GRTR 3*	GRFR 1(1) GRTR 2(7) AMTO 1(1)* GRTR 2(5)*
10	SPPE 3 SPPE 3*	GRTR 2(8) SPPE 2(10) GRTR * SPPE 3*	GRTR 2*
12	SPPE 3	GRTR 2(10) SPPE 3 GRTR 2* SPPE 2*	AMTO 1(1) GRFR 1(2) GRTR 2(5)*

*= Call recorded from outside of station area
Results in **bold** are recorded within the Subject Lands
AMTO = American Toad, GRFR = Green Frog, GRTR = Gray Tree Frog, SPPE = Spring Peeper, WOFR = Wood Frog
Code 0 - No calling
Code 1 - Individuals can be counted; calls not simultaneous. Estimated number of individuals indicated in brackets
Code 2 - Calls distinguishable, some simultaneous calling. Estimated number of individuals indicated in brackets
Code 3 - Full chorus; calls continuous and overlapping.

As shown on **Figure 3.3.6**, the amphibian monitoring stations cover the Study Area. The results of the surveys completed to date indicate that most of the breeding is associated with the Provincially Significant Wetland (PSW) east of the Subject Lands. On the Subject Lands, there was only one station (Station 7)) were a call level code of three (3) was recorded on one occasion. This observation corresponds with Spring Peeper during the first round (April 27, 2020). Station 7 includes a Reed Canary Grass Mineral Meadow Marsh (ELC Unit 7f) and Pondweed Submerged Shallow Aquatic (ELC Unit 13).

Reptiles

Dougan & Associates *et al.* (2014b) completed incidental surveys for reptiles in 2013 and 2014. During these surveys, they recorded observations of Midland Painted Turtle (*Chrysemys picta marginata*) and Snapping Turtle (*Chelydra serpentina*) in a small, unevaluated wetland approximately 350 m outside of the Study Area.

Midland Painted Turtle is not considered significant in Ontario; although, in April 2018 it was designated Special Concern in Canada by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) due to loss of wetlands in Ontario; the *Species at Risk Act* has not created a schedule yet for Midland Painted Turtle. However, Snapping Turtle was assigned "Special Concern" status in Canada in 2008 and Ontario in 2009.

No formal surveys for reptiles were undertaken in 2020, however, on October 5, 2020, a juvenile Snapping Turtle was noted incidentally within the Study Area on the east side of the railroad tracks adjacent to the PSW pond unit.

As Snapping Turtle is a Special Concern, it is also discussed in the Significant Wildlife Habitat section of this report (**Section 3.3.9.4**).

3.3.8 Aquatic Habitat & Fish Communities

The CEISMP TOR require that detailed studies be undertaken to confirm which fish communities and aquatic habitats are present in the Study Area.

Based on the background review, MNRF and TRCA fish collection records are not available for the Study Area and Subject Lands. The MNRF Aquatic Resource Area (ARA) database does however note the following fishes as being associated with the broader Humber River system:

- American Brook Lamprey;
- Blacknose Dace;
- Bluntnose Minnow;
- Brook Trout;
- Brown Trout;
- Common Shiner;
- Creek Chub;
- Fantail Darter;
- Fathead Minnow;
- Johnny Darter x Tessellated Darter;
- Longnose Dace;
- Northern Hog Sucker;
- Rainbow Darter;
- Redside Dace;
- Rock Bass;
- Stonecat; and
- White Sucker.

The ARA database classifies all the drainage features within the Study Area as supporting a warmwater fishery.

A review of the DFO's Aquatic Species at Risk online mapping tool, indicates that the are no aquatic species at risk or critical habitat identified within the Study Area. Habitat for endangered Redside Dace is however mapped approximately 1.5 km downstream of the Subject Lands along Lindsay Creek (West Humber) immediately west of The Gore Road. Redside Dace is listed both federally and provincially as endangered and is regulated by DFO under the *Species at Risk Act* and by MECP under the *Endangered Species Act*. Through reviewing MNRF comments on the Background Environmental Study (Dougan & Associates *et al.* 2014b) dated March 11, 2016, it was suggested that "the watercourses within these lands [Option 3 lands] are considered 'contributing' habitat for Redside Dace".

Aquatic assessments of drainage features on the Subject Lands were completed in 2013 and 2016 by C. Portt & Associates. The purpose of these assessments was to characterize the fish communities under spring and early summer conditions and to search for migratory spawning fish species in these headwater areas.

An assessment of all drainage features entering or exiting the Subject Lands was completed on August 23, 2013 by C. Portt & Associates. The assessment recorded the amount of water, flow and instream habitat conditions during this typically dry season. Similar to the surface water assessment discussed in **Section 3.2.5**, the results of the aquatic assessment found that the drainage features on the Subject Lands were considered HDFs with intermittent flows and did not have the same complex function or aquatic communities that occur downstream of the Study Area where flows are seasonal or permanent (Dougan & Associates *et al*. 2014b).

C. Portt & Associates noted that the lower reaches of WHT1 and WHT6 support standing water with intermittent flows and considered these reaches to provide seasonal habitat. To characterize the fish community, C. Portt & Associates completed electrofishing along drainage features at seven stations on the Subject Lands in 2013 and 2016. These sampling locations are identified on **Figure 3.3.6**

Fish were captured at only two of the stations corresponding with HDF reaches WHT6-A and WHT1-B (**Figure 3.2.5.2b**). Brook Stickleback (*Culaea inconstans*) was observed at both reaches (stations CP2013-B3, CP2013-B6 and CP2016-1), and Fathead Minnow (*Pimephales promelas*) was observed only at WHT1-B (station CP2016-8).

Brook Stickleback is a coolwater species commonly associated with HDFs throughout southern Ontario (OFFLHD 2020). This species is regularly found in warmwater habitats including man-made drainage ditches, stormwater management ponds and other habitats that go dry in the summer (Stewart and Watkinson 2004).

Fathead Minnow is a warmwater species that prefers still waters of ponds, lakes, creeks and small rivers with muddy substrate (OFFLHD 2020). This species is common in Southern Ontario and is tolerant to anthropogenic activities.

As described in **Section 3.2.5.2**, Beacon reviewed the drainage features in the Study Area in 2020 and confirmed that the characterization of aquatic habitats is generally consistent with observations made by C. Portt and Associates and the HDFA prepared by Aquafor Beech Limited (2013). For this reason, additional fish community sampling was not undertaken by Beacon in 2020. It is Beacon's opinion that

HDF reaches WHT1-A, WHT1-B and WHT6-A provide fish habitat while the other HDF's are dry outside the spring freshet indirectly support fish habitat.

Through additional surface water monitoring work completed by DS Consultants Ltd. in 2020, it appears that HDF reaches WHT1-A and WHT1-B do receive some baseflow inputs. Additionally, Beacon has observed iron staining and watercress within HDF reach WHT1-B which suggests a more permanent flow regime and possibly a coolwater thermal regime. All other HDFs in the Study Area exhibit and intermittent flow regime and warmwater thermal regime.

3.3.9 Evaluation of Significant Natural Heritage Resources

The protection, maintenance, enhancement and restoration of ecosystems and their function in the landscape is necessary to maintain ecosystem integrity. This goal has been adopted in the Town's ecosystem principles and ecosystem planning strategy and is to be achieved through implementation of the policies outlined in Ecosystem Planning and Management section of the Town of Caledon Official Plan. All development within the Town of Caledon is required to satisfy the Environmental Performance Measure policies.

To determine which biophysical resources and ecological functions in the Study Area are considered significant we relied upon the significance criteria outlined in the PPS (2020) and associated Natural Heritage Reference Manual (2010), Region of Peel's Greenlands System policies and Town of Caledon's Environmental Performance Measures policies.

It should be noted that the Study Area only supports seven of the seventeen Environmental Performance Measures outlined in the Town of Caledon Official Plan. Environmental Performance Measures applicable to the Study Area are listed in **Table 14** below.

Table 14. Town of Caledon Environmental Performance Measures Applicable to the Study Area

Environmental Performance Measure	In Study Area
Woodlands	×
Wetlands	✓
Areas of Natural and Scientific Interest (ANSIs)	×
Environmentally Significant Areas (ESAs)	×
Niagara Escarpment Natural Areas	×
Niagara Escarpment Protection Areas	×
Habitat of Threatened and Endangered Species	✓
Fisheries	✓
Wildlife Habitat	✓
Valley and Stream Corridors	✓
Groundwater	✓
Wellhead Protection Areas	×
Soils	✓
Natural Slopes	×
Oak Ridges Moraine Key Natural Heritage Features	×
Oak Ridges Moraine Hydrologically Sensitive Features	×

Environmental Performance Measure	In Study Area
Greenbelt Key Natural Heritage and Key Hydrologic Features	✓

The following subsections describe how the significance of the various Environmental Performance Measures has been evaluated and what criteria have been applied. Significant natural heritage resources area illustrated on **Figure 3.3.9**.

3.3.9.1 Wetlands

The Study Area supports several wetland communities. The locations of these wetlands are illustrated on **Figure 3.3.2**.

All wetlands on the Subject Lands were evaluated in 2023, as described in **Appendix B**. The wetlands within the adjacent Study Area were also evaluated, with the single exception of the wetland feature (ELC Unit 7h) abutting W9 located to the east of the Subject Lands.

In terms of establishing the significance of these wetland features, we relied upon the criteria and definitions included in the PPS (2020) and Region of Peel and Town of Caledon official plans.

Both the PPS and ROP describe “Significant Wetlands” as follows:

> *…an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time.*

Based on the application of the provincial and regional significance criteria, only the one PSW unit W9 (ELC Units 8k & 14b) located to the east of the Subject Lands would be considered significant. Significant Wetlands are defined as “Core Areas” in the ROP.

The unevaluated wetland at ELC Unit 7h would qualify as “Potential Natural Areas and Corridors” (PNACs) and form part of the Regional Greenlands System. The ROP defers to local municipal plans regarding protection and management of PNACs; however, the Town does not have policies pertaining to PNACs. This CEISMP will consider the wetland at ELC Unit 7h to qualify as PSW until such a time as this wetland is evaluated.

The Town of Caledon Official Plan defines Significant Wetlands as “Wetland Core Areas”. New development is generally prohibited in Wetland Core Areas. The Town of Caledon Official Plan defines wetlands other than Significant Wetlands as “Other Wetlands”. Under the Town’s Environmental Ecosystem Framework, Wetland Core Area as included within “Natural Core Areas” and Other Wetlands are included under “Supportive Natural Systems”. Irrespective of these categorizations, the Town’s Environmental Performance Measures policies require all wetlands and their functions to be maintained so as not to compromise ecosystem integrity. While the Town’s policies prohibit any development within Wetland Core Areas (i.e., PSWs), they do permit development within Other Wetlands, provided it can be demonstrated to the satisfaction of the Town and applicable review agencies that such development will not compromise ecosystem integrity.

Based on the evaluation of the provincial, regional and local significance criteria pertaining to wetlands, the only significant wetland within the Study Area is the provincially significant wetland unit located to the east of the Subject Lands. All other wetlands in the Study Area are not considered significant. Irrespective of their significance status, all wetlands are subject to Town's Environmental Performance Measures policies.

3.3.9.2 Woodlands

The PPS (2020) defines Significant Woodlands as follows:

> *… an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history. These are to be identified using criteria established by the Ontario Ministry of Natural Resources…*

The Regional Official Plan defines Significant Woodlands as follows:

> *…an area which is ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or …the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history.*

Prior to application of the significant woodland criteria, it is necessary to first identify which of the treed features in the Study Area meet the definition of a "woodland" as per the Town of Caledon Official Plan.

Town of Caledon Official Plan Glossary of Terms (Section 6.7) defines "woodlands" as follows:

> *Woodlands, shall mean ecosystems comprised of treed areas and the immediate biotic and abiotic environmental conditions on which they depend. Woodlands provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, the provision of clean air and the long-term storage of carbon, the provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. Woodlands include woodlots, cultural woodlands, cultural savannahs, plantations and forested areas and may also contain remnants of old growth forests.*
>
> *Woodlands are further defined as any area greater than 0.5 hectares that has:*
> *a) A tree crown cover of over 60% of the ground, determinable from aerial photography, or*
> *b) A tree crown cover of over 25% of the ground, determinable from aerial photography, together with on-ground stem estimates of at least:*
> *i) 1,000 trees of any size per hectare, or*
> *ii) 750 trees measuring over five centimetres in diameter at breast height (1.37m), per hectare, or*

N
W
E
S

MHT8
MHT7
MHT7
MHT7
MHT7
CPR
HUMBER STATION ROAD
WHT6
WHT5
WHT4
WHT3
WHT3
WHT2
WHT2
WHT1
THE GORE ROAD
KING STREET

LEGEND

- SUBJECT LANDS
- STUDY AREA (120m)
- WETLAND CORE AREAS (i.e., PROVINCIALLY SIGNIFICANT WETLANDS)
- NON-PSW WETLANDS
- UNEVALUATED WETLANDS
- DRAINAGE FEATURES
- UNASSESSED DRAINAGE FEATURES
- FISH HABITAT

HABITAT OF ENDANGERED AND THREATENED SPECIES

- EASTERN MEADOWLARK HABITAT
- REDSIDE DACE CONTRIBUTING HABITAT

NOTE: SIGNIFICANT WILDLIFE HABITAT HAS NOT BEEN MAPPED. REFER TO REPORT SECTION 3.3.9.4
POTENTIAL HABITAT OF SAR BATS HAS NOT BEEN MAPPED. REFER TO REPORT SECTION 3.3.9.6
REFER TO FIGURES 3.2.5.2a AND 3.2.5.2b FOR WETLAND AND TRIBUTARY/REACH LABELLING

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FIGURE 3.3.9

SUMMARY OF SIGNIFICANT NATURAL HERITAGE RESOURCES

May 2023 Scale 1:9,000

iii) 500 trees measuring over 12 centimetres in diameter at breast height (1.37m), per hectare, or
iv) 250 trees measuring over 20 centimetres in diameter at breast height (1.37m), per hectare (densities based on the Forestry Act of Ontario, 1998),

and, which have a minimum average width of 40 metres or more measured to crown edges.

Treed portions with less than the required stocking level will be considered part of the woodland as long as the combination of all treed units in the overall connected treed area meets the required stocking level. Woodlands experiencing changes such as harvesting, blowdown or other tree mortality are still considered woodlands. Such changes are considered temporary whereby the forest still retains its long-term ecological value.

Woodlands do not include plantations that are:

a) Managed for production of fruits, nuts, Christmas trees or nursery stock;
b) Managed for tree products with an average rotation of less than twenty (20) years (e.g. hybrid willow or poplar); or,
c) Established and continuously managed for the sole purpose of complete removal at rotation, as demonstrated with documentation acceptable to the Region or area municipality, without a woodland restoration objective.

Additional exclusions may be considered for treed communities which are dominated by invasive non-native tree species such as buckthorn (Rhamnus species) and Norway maple (Acer platanoides), or others deemed to be highly invasive, that threaten the ecological functions or biodiversity of native communities. Such exceptions should be supported by site-specific studies that consider 1) the degree of threat posed; 2) any potential positive and/or negative impact on the ecological functions or biodiversity of nearby or adjacent native communities; and 3) the projected natural succession of the community. Communities where native tree species comprise approximately 10 percent or less of the tree crown cover and approximately 100 or fewer stems of native tree species of any size per hectare would be candidates for exclusion.

There are only four (4) treed communities within the Study Area. These are listed below.

- Cultural Woodland (ELC Unit 5) – 0.08 ha;
- Organic Deciduous Swamp (ELC Unit 12) – 0.04 ha;
- Cultural Plantation (ELC Unit 18a) – 0.96 ha; and
- Cultural Plantation (ELC Unit 18b) – 0.21 ha.

It should be noted that the ELC system for classifying treed features differs from the woodland definitions provided in the official plans.

ELC Units 5,12 and 18b are less than 0.5 ha and too small to qualify as woodlands.

ELC Unit 18a is larger than 0.5 ha but does not meet the minimum density requirements to qualify as a woodland under the ROP and Town of Caledon Official Plan definitions.

In summary, none of the treed features in the Study Area meet the definitions of a woodland.

3.3.9.3 Valley and Stream Corridors

The PPS (2020) does not include a natural heritage category for Valley and Stream Corridors. It does however have include a category for Significant Valleylands, however determination of significance is the responsibility of the municipality or partner agencies.

The PPS defines valleylands as follows:

> *Means a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year*

Significance as it relates to valleylands is interpreted as follows:

> *Ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system;*

The Region of Peel recognizes Valley and Stream Corridors as part of the Regional Greenlands System and defines them as follows:

> *Valley and stream corridors are the natural resources associated with river systems and are characterized by their landform, features and functions, and include associated ravines. Valley corridors and their associated ravines are distinguished from stream corridors by the presence of a distinct landform. Due to the inherent hazards of valley lands they have remained mainly undeveloped and vegetated. Valley and stream corridors are natural linkages in the landscape having important ecological functions, providing habitat for fish and wildlife and acting as corridors for movement.*

While the Regional Official Plan does not define valley and Stream Corridors as significant, it includes criteria and thresholds by which they are to be evaluated for inclusion as Core Areas of the Regional Greenlands System. However, the criteria exclude portions of tributaries contained within designated Rural Service Centres and rural settlements of the Rural System, so would not apply to the Subject Lands.

The Town of Caledon considers Valleylands and Stream Corridors to be a component of their Ecosystem Framework where they are recognized as Natural Corridors. The Town of Caledon defines Valley and Stream Corridors as follows:

> *Valley and Stream Corridor, shall mean continuous water-based ecosystems which are centred on watercourses, their associated floodplains, valley systems, vegetative communities and functionally-related tableland features.*

While the Study Area supports headwater drainage features, these features are not associated with any distinctive valley landforms. Therefore, by using the definitions listed above, Stream Corridors on the Subject Lands include HDF reach WHT6 as it has an associated floodplain.

3.3.9.4 Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) includes those natural areas, features, attributes and functions that represent the best examples of wildlife habitat within a municipality. The PPS (2020) defines SWH as follows:

> *Significant means: in regard to other features and areas, ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system…*

The responsibility for confirming SWH is assigned to the local or regional planning authority; however, municipalities often also rely upon proponents to identify "candidate SWH" through studies such as this CEISMP. Ultimately, it is the responsibility of the municipality to confirm SWH.

According to the *Significant Wildlife Habitat Technical Guidelines* (MNR 2000), there are four broad categories of SWH:

- Seasonal Concentration Areas of Animals;
- Rare Vegetation Communities or Specialized Habitat for Wildlife;
- Habitat for Species of Conservation Concern; and
- Animal Movement Corridors.

Within each of these categories, there are multiple subcategories of SWH, each of which is intended to capture a specialized type of habitat that may or may not be captured by other existing feature-based categories (e.g., significant wetlands, significant woodlands).

To determine whether the Study Area supports any wildlife habitat features, attributes or functions that could potentially qualify as candidate SWH, Beacon relied upon the provincial evaluation criteria provided in the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E* (MNRF 2015). A summary of this evaluation is presented in **Appendix H**.

In addition to applying the provincial criteria, Beacon also considered the evaluation criteria contained in the *Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study* (NSEI *et al*. 2009). An evaluation using the regional criteria is presented below in **Table 15**. It should however be noted that because these evaluation criteria predate the provincial criteria and have not been formally adopted in the Region of Peel's policies, greater weight has been placed on the provincial criteria as they more current and comprehensive.

Table 15. List of Regional Significant Wildlife Habitat Criteria

Significant Wildlife Habitats Criteria*	Subject Lands	Study Area	Not Present	Not Applicable
A1. Deer Wintering Area			✓	
A2. Colonial Bird Nesting Sites (e.g., heronry, gull colony)			✓	
A3. Waterfowl Nesting Habitat			✓	
A4i. Migratory Landbird Stopover Areas				✓
A4ii. Migratory Bat Stopover Areas			✓	
A4iii. Migratory Butterfly Stopover Areas				✓

Significant Wildlife Habitats Criteria*	Subject Lands	Study Area	Not Present	Not Applicable
A4iv. Migratory Waterfowl Stopover and/or Staging (Terrestrial)			✓	
A4v. Migratory Waterfowl Stopover and/or Staging (Aquatic)			✓	
A4vi. Migratory Shorebirds Stopover Areas			✓	
A5. Raptor Wintering Areas (i.e., used for feeding and/or roosting)			✓	
A6. Snake Hibernacula	✓	✓		
A7. Bat Maternal Roosts and Hibernacula			✓	
A8. Bullfrog Concentration Areas			✓	
A9. Wild Turkey Winter Range				✓
A10. Turkey Vulture Summer Roosting Areas			✓	
B1. Rare Vegetation Communities			✓	
B2. Forests Providing a High Diversity of Habitats (captured by Significant Woodlands)			✓	
B3. Old-growth or Mature Forest Stands (captured by Significant Woodlands)			✓	
B4. Foraging Areas with Abundant Mast (i.e., nut bearing trees)			✓	
B5. Highly Diverse Areas			✓	
B6. Cliffs and Caves			✓	
B7. Seeps and Springs			✓	
B8i. Amphibian Breeding Habitat - Forested Sites (e.g., vernal pools)			✓	
B8ii. Amphibian Breeding Habitats - Non-forested Sites (e.g., marshes)			✓	
B9. Turtle Nesting Habitat and Turtle Overwintering Areas	✓	✓		
B10. Habitat for Area-Sensitive Forest Interior Breeding Bird Species			✓	
B11. Habitat for Open Country and Early Successional Breeding Bird Species			✓	
B12. Habitat for Wetland Breeding Bird Species			✓	
B13i. Raptor Nesting Habitat - Wetlands, Pond and Rivers			✓	
B13ii. Raptor Nesting Habitat - Woodland Habitats			✓	
B14. Mink, River Otter, Marten and Fisher Denning Sites			✓	
B15. Mineral Licks				✓
C1. Species identified as Nationally Endangered or Threatened by COSEWIC which are not listed as Endangered or Threatened under Ontario's *Endangered Species Act*			✓	
C2. Species identified as Special Concern based on Species at Risk in Ontario List that is periodically updated by the MNRF/MECP	✓	✓		
C3. Species that are listed as rare (S1-S3) or historical in Ontario based on Records kept by the Natural Heritage Information Centre in Peterborough	✓	✓		
C4. Species whose populations appear to be experiencing substantial declines in Ontario	✓	✓		
C5. Species that have a high percentage of their global population in Ontario and are rare to uncommon in the Regional Municipality of Peel			✓	

Significant Wildlife Habitats Criteria*	Subject Lands	Study Area	Not Present	Not Applicable
C6. Species that are rare to uncommon in the Regional Municipality of Peel, even though they may not be provincially rare	✓	✓		
C7. Species that are subject of recovery programs			✓	
C8. Species considered important to the Regional Municipality of Peel, based on recommendation from a local Conservation Advisory Committee				✓
D1. Animal Movement Corridors	✓	✓		

*Criteria provided in the *Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study* (North-South Environmental Inc., Dougan & Associates, and Sorensen Gravely Lowes 2009).

Based on the application of the evaluation criteria contained in the *Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study* (NSEI *et al*. 2009; **Table 15**), it was determined the Subject Lands and Study Area could support seasonal wildlife concentration areas, specialized habitats for wildlife, habitat for species of conservation concern and animal movement corridors. Most of the areas identified as supporting potential candidate SWH are associated with natural features that will be protected.

The findings of the SWH evaluation based on the application of provincial and regional criteria are summarized below.

Seasonal Concentration Areas of Animals

Based on a review of evaluation criteria related to Seasonal Concentration Areas of Animals, it was determined that the Study Area could potentially host Snake Hibernacula. While no snake observations have been reported from the Study Area to date, given the size of the Study Area and types of habitats present (ponds, wetlands, fields), it is highly likely that snakes hibernation sites are present. Common snake species known to occur in the area can utilize building foundations, railway beds, barns and rodent holes and dens, all of which are present. Locating snake hibernacula is extremely difficult and resource intensive. No surveys for hibernacula were proposed or undertaken for this CEISMP. It is however recommended that such surveys be conducted at the site-specific level as described in **Section 9**.

Rare Vegetation Communities or Specialized Habitats for Wildlife

Based on a review of evaluation criteria related to Rare Vegetation Communities or Specialized Habitats for Wildlife, it was determined that the Study Area does not support any rare vegetation communities. In terms of specialized habitat for wildlife, the Study Area does support candidate SWH for overwintering and nesting turtles. As was discussed in **Section 3.3.7**, Dougan & Associates *et al*. (2014b) noted Midland Painted Turtle and Snapping Turtle in the ponds and wetlands to the east of the CPR rail line outside the Subject Lands. Given the size and depth of these ponds, it is likely that they support overwintering and nesting habitat for these species and would therefore qualify as candidate SWH for this category. While no turtles have been documented from the Subject Lands, it is also likely that this local population could also utilize the large pond beside The Gore Road (ELC Unit 10a) for overwintering and nesting. For this reason, ELC Unit 10a should also be considered SWH until more detailed surveys can be completed to confirm presence.

No basking or nesting surveys were proposed or undertaken for this CEISMP. It is recommended that such surveys be conducted at the site-specific level in proximity to ELC Unit 10a be completed as outlined in **Section 9**.

Habitat for Species of Conservation Concern

Based on a review of evaluation criteria related to Habitat for Species of Conservation Concern, it was determined that the Study Area supports potential habitat the following listed Special Concern species:

- Barn Swallow (*Hirundo rustica*): Potentially suitable foraging habitat is present within the meadow habitats on the Subject Lands and Study Area. This species was observed foraging over ELC Units 2e and 3c in 2020. Nesting was observed outside the Subject Lands, on a house at 7675 King Street;
- Snapping Turtle (*Chelydra serpentina)*: Potentially suitable habitat is present within the Bolton PSW to the east as well in the pond on the Subject Lands identified as ELC Unit 10a; and
- Monarch (*Danaus plexippus*): Potentially suitable habitat may be present within the meadow habitats on the Subject Lands and within the Study Area.

No turtle basking or nesting surveys were proposed or undertaken for this CEISMP. It is recommended that such surveys be conducted at the site-specific level in support of any future draft plan applications that are in proximity to ELC Unit 10a or the PSW ponds to the east of the CPR line. Likewise, no specific surveys of common milkweed, the food source for Monarch, were proposed or completed for this CEISMP. It is recommended that such surveys be conducted at the site-specific level as outlined in **Section 9**.

Animal Movement Corridor

Animal movement corridors in the Study Area are limited to the wetland communities associated with HDF WHT1. This linear feature likely supports local scale animal movements, however its function as a linkage is impaired by the presence of King Street. Nevertheless, it has been identified as potential candidate SWH. While the Study Area supports several hedgerow features, these features are generally too narrow and discontinuous to provide any significant linkage functions for wildlife. Further study is not recommended as the existing features that comprise animal movement corridors have been identified for retention in the future NHS.

Summary of Significant Wildlife Habitat

In summary, the Candidate SWH that has been identified through this CEISMP is limited to features that will ultimately form part of the future NHS. Habitat for Monarch as well as snake hibernacula could exist outside the NHS and for this reason it is recommended that this be confirmed through further study as recommended in **Section 9**.

3.3.9.5 Fish Habitat

The PPS (2020) defines Fish Habitat as follows:

> *Fish habitat: as defined in the Fisheries Act, means spawning grounds and any other areas, including nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes.*

Based on the aquatic habitat characterization, fish community sampling results and HDFA work completed on the drainage features within the Study Area, it is Beacon's opinion that HDF reaches WHT1-A, WHT1-B and WHT6-A provide fish habitat while the other HDF's are dry outside the spring freshet indirectly support fish habitat.

3.3.9.6 Habitats of Endangered and Threatened Species

Significance, as it relates to the habitat of endangered species and threatened species is defined by the PPS (2020) as:

> *…the habitat, as approved by the Ontario Ministry of Natural Resources, that is necessary for the maintenance, survival, and/or the recovery of naturally occurring or reintroduced populations of endangered species or threatened species, and where those areas of occurrence are occupied or habitually occupied by the species during all or any part(s) of its life cycle…*

In the *Bolton Residential Expansion Study Phase 3 Technical Memorandum* prepared by Dougan & Associates *et al*. (2014a), it is noted that a SAR screening letter was received from the MNRF on January 2, 2014 that included records of the following SAR within the BRES Study Area (Options 1 and 3 lands):

- Bobolink (*Dolichonyx oryzivorus*) - Threatened;
- Butternut (*Juglans cinerea*) - Endangered;
- Eastern Meadowlark (*Sturnella magna*) - Threatened; and
- Redside Dace (*Clinostomus elongatus*) - Endangered.

In undertaking the review for this CEISMP, Beacon also reviewed all available background information pertaining to SAR in the Study Area (ref. **Section 3.1**). This review revealed records for several additional endangered and threatened species to those previously noted. It was determined that there are records for seven (7) endangered and threatened species in the vicinity of the Study Area.

A complete summary is presented below **Table 16** and in **Appendix I**.

Table 16. Potential for Habitats of Threatened and Endangered Species

Species	ESA Status	Subject Lands	Study Area
Bobolink (*Dolichonyx oryzivorus*)	Threatened	No suitable breeding habitat. While Bobolink have been observed in some of the fallow fields, these same fields were planted with row crops which do not provide suitable habitat.	Same
Eastern Meadowlark (*Sturnella magna*)	Threatened	Breeding habitat confirmed in one field in 2020.	Same
Redside Dace (*Clinostomus elongatus*)	Endangered	Tributary reaches WHT1-A and WHT1-B are the only HDFs exhibit evidence of baseflow and stream permanence and could be considered contributing habitat for this species, as an existing population is recorded downstream of the Study Area, in Lindsay Creek and the West Humber River, as of 2023.	Same
Eastern Small-footed Myotis (*Myotis leibii*)	Endangered	Presence/Absence of listed bats to be confirmed. All buildings and structures to be screened for potential habitat and exit surveys completed where applicable. These surveys are to be completed at the draft plan stage or prior to building demolition.	Same
Little Brown Myotis (*Myotis lucifugus*)	Endangered	Same as above	Same as above
Northern Myotis (*Myotis septentrionalis*)	Endangered	Same as above	Same as above
Tricoloured Bat (*Perimyotis subflavus*)	Endangered	Same as above	Same as above

*Habitat as defined under the *Endangered Species Act* or MECP's Species Specific Guidelines

Discussion of how the habitats of these species have been considered though the land use planning for the study area is provided in **Section 4.1.4.3**.

3.3.9.7 Greenbelt Key Natural Heritage and Hydrologic Features

While the Greenbelt policies do not apply to the Subject Lands, these policies apply to the Study Area east of the CPR. This portion of the Study Area is designated as Greenbelt Natural Heritage System and Protected Countryside.

Identified features in this area include PSW and Other Wetlands. Wetlands are defined as both Key Natural Heritage Features and Key Hydrologic Features.

4. Constraints and Opportunity Analysis

The purpose of this constraint and opportunity analysis is to a) identify significant and sensitive biophysical features and functions that could potentially constrain how the Subject Lands are developed in the future, and b) to identify potential opportunities for enhancement of the natural environment and ecological functions in association with the future development.

The identification of potential biophysical constraints to future development is based on the findings of the background review, characterization of existing conditions, and evaluation of significance. Where conditions have been revealed that make land unsuitable for future development under the current environmental regulatory framework described in **Section 2**, these have been identified as potential constraints to development.

It is important to note that while an area or feature may be identified as a potential constraint, this does not necessarily mean the area is not developable. Constraints are treated variably according to their significance and sensitivity as well as the regulatory requirements applicable to them. For example, the Study Area supports numerous small drainage features or HDFs, and depending on the form and function of each, may or may not require protection. Similarly, areas that are currently subject to flooding and represent a constraint can also be modified and designed to reduce the extent of area being constrained.

4.1 Physical Resources

4.1.1 Groundwater Resources

Based on the findings of the subsurface drilling investigation, there is potential for grading or construction activities within the Subject Lands to intersect with the existing groundwater table. As a result, construction dewatering may be required. Groundwater level monitoring to-date indicates that groundwater levels range from 0.1 m (Elev. 275.7 masl) to 6.8 m (Elev. 255.2 masl) below the existing ground surface (bgs). The highest measured groundwater level of 0.1 mgs is considered to be localized in the south-central portion of the Subject Lands adjacent to King Rd. The groundwater levels in the monitoring wells have generally gradually declined during the late summer to the fall monitoring period, and then increasing throughout the winter peaking in mid spring. Groundwater levels in MWs increased following precipitation events. Season variation ranged from 0.43 m (BH20-3) to 3.7 M (BH20-11) during the monitoring period.

4.1.2 Surface Water Resources

4.1.2.1 Headwater Drainage Features

As was discussed in **Section 3.2.5.2**, all HDFs on the Subject Lands were assessed using the TRCA HDFA Guidelines (2014b). There are eight (8) tributaries on the Subject Lands; six (6) are headwaters to the West Humber River and two (2) are headwaters to the Main Humber River. For the purposes of the HDFA, the eight tributaries were subdivided into forty-three (43) reaches (**Figure 3.2.5.2b**). Based on the findings of the Aquafor Beech Limited (2013) HDFA and 2020 HDFA validation exercise

completed by Beacon in 2020, management recommendations have been assigned to each reach in accordance with the TRCA HDFA Guidelines (2014b).

The TRCA HDFA Guidelines (2014b) include six classes of management depending on the level of ecohydrological functions supported by an HDF reach. An abbreviated summary of the management categories is provided below to inform the constraint analysis.

- Protection – protect and/or enhance in situ;
- Conservation – maintain, relocate and/or enhance within its riparian corridor;
- Mitigation – replicate or enhance functions;
- Recharge Protection – maintain water balance;
- Maintain or Replicate Terrestrial Linkage – maintain or replicate linkage corridor; and
- No Management Required – no mitigation or management required.

There are sixteen (16) HDF reaches that have been identified as No Management (ref. **Table 6**). These reaches can be removed without any need for mitigation or management; therefore, it is recommended that they be classified as low constraint features for the purposes of the CEISMP constraint analysis.

There are thirteen (13) HDF reaches that have been identified as Mitigation (ref. **Table 6**). If necessary, these reaches can be removed provided their functions can be replicated or enhanced as part of the future development using LIDs and lot-level controls. It is therefore recommended that they be classified as moderate constraint features for the purposes of the CEISMP constraint analysis.

There are an additional thirteen (13) reaches that have been identified as Conservation (ref. **Table 6**). If necessary, these reaches can be relocated and/or enhanced as part of the future development using natural channel design and wetland creation methods. It is therefore recommended that they be classified as moderate constraint features for the purposes of the CEISMP constraint analysis.

There is one (1) HDF reach (WHT6-A) that has been identified as Protection. This reach is to be protected but can be enhanced using natural channel and wetland design principles. It is therefore recommended that this reach be classified as a high constraint feature for the purposes of the CEISMP constraint analysis.

4.1.2.2 Geomorphological Hazards

As was discussed in **Section 3.2.5.2**, HDFs with drainage areas less than 100 hectares do not generate sufficient hydraulic energy to initiate migration and the associated risk of potential erosion for property and infrastructure. Due to the poorly defined nature of the HDFs and absence of evidence of active geomorphic processes (i.e., erosion, aggradation or migration), it is our opinion that there are no geomorphic hazards that would be considered constraints to future development. The regulatory floodline represents a more appropriate tool for delineating the hazard limits of these drainage features.

4.1.2.3 Flood Hazards

The drainage features within the Study Area are all considered to be headwater features and generally do not require flood mapping due to their small corresponding drainage areas (less than 50 hectares),

with the exception of West Humber River Tributary (WHT6), which has a larger drainage area, but is proposed to be realigned.

The existing HEC-RAS model geometry for the West Humber and Main Humber Rivers was established in the Humber River Hydrology Update prepared by TRCA and Civica Infrastructure (April 2018). TRCA provided this model to Urbantech. The model geometry for the existing conditions was updated with detailed LIDAR / site survey information in several locations, with a focus on the more significant crossings of Humber Station Road, the CPR line and King Street. The HEC-RAS model was also refined using the updated flows from the existing hydrologic model created based on the pre-development drainage plan. Refer to FSR Drawing 202 for the existing Regional flood mapping drawing and FSR Appendix 2 for the hydraulic model results (Urbantech Consulting 2023). This regional flood mapping was used to identify the limits of existing flood hazards and is shown on the comprehensive constraint map (**Figure 4.2**).

4.1.2.4 Slope Hazards

There are no valleylands or steep slopes associated with the Subject Lands that would represent a slope hazard. As such, slopes do not represent a constraint to future development.

4.1.3 Water Balance Considerations

One component of achieving the sustainability and adaptive management objectives for the community is the integration of best management practices pertaining to maintaining as closely as possible, pre-development ground water conditions post-development. With changes in impervious areas, and potential changes to surface and ground water quality and quantity, best management practices which serve to promote post-development groundwater infiltration/recharge and maintain pre-development water balance conditions to the greatest feasible extent are required.

4.1.3.1 Site Level Water Balance

To understand existing hydrologic conditions across the Subject Lands, a Thornthwaite site level water balance assessment was completed as discussed in **Section 3.2.6.1** of this report. The assessment was completed to provide a baseline for the volume of infiltration, runoff, evapotranspiration and evaporation currently generated as a result of existing conditions. The annual volumes of generated were calculated as follows:

- Evaporation - 3,734 m^3/year;
- Evapotranspiration - 953,221 m^3/year;
- Infiltration - 138,717 m^3/year; and
- Runoff - 332,131 m^3/year.

With the construction of impervious surfaces across the Subject Lands as a result of development, without mitigation, inevitable changes to hydrologic systems are anticipated. The changes would include reduced area where evapotranspiration and infiltration can occur and increased evaporation and runoff from impervious surfaces. The reduction in infiltration is of particular concern when trying to maintain the integrity of local water resources. As a result, best management practices and Low Impact

Development (LID) measures which serve to promote post-development groundwater infiltration are recommended.

The success of LIDs to provide increased infiltration across the post-development Subject Lands is dependent on the permeability of underlying native soils. Based on infiltration testing completed by DS and reported under Section 4.3.4 of the Hydrogeological Investigation (DS Consultants Ltd. 2023), the Subject Lands primarily consists of a low permeable silty clay till with a measured infiltration rate ranging from about 16 to 38 mm/hr with an average of 26 mm/hr. Soils with infiltration rates over 15 mm/hr are considered suitable for Soakaways, infiltration trenches and chambers (CVC and TRCA 2010). Applicable LIDs anticipated to provide an appropriate level of mitigation are discussed in **Section 5.3.4** of this report.

4.1.3.2 Wetland Water Balance Risk Evaluation

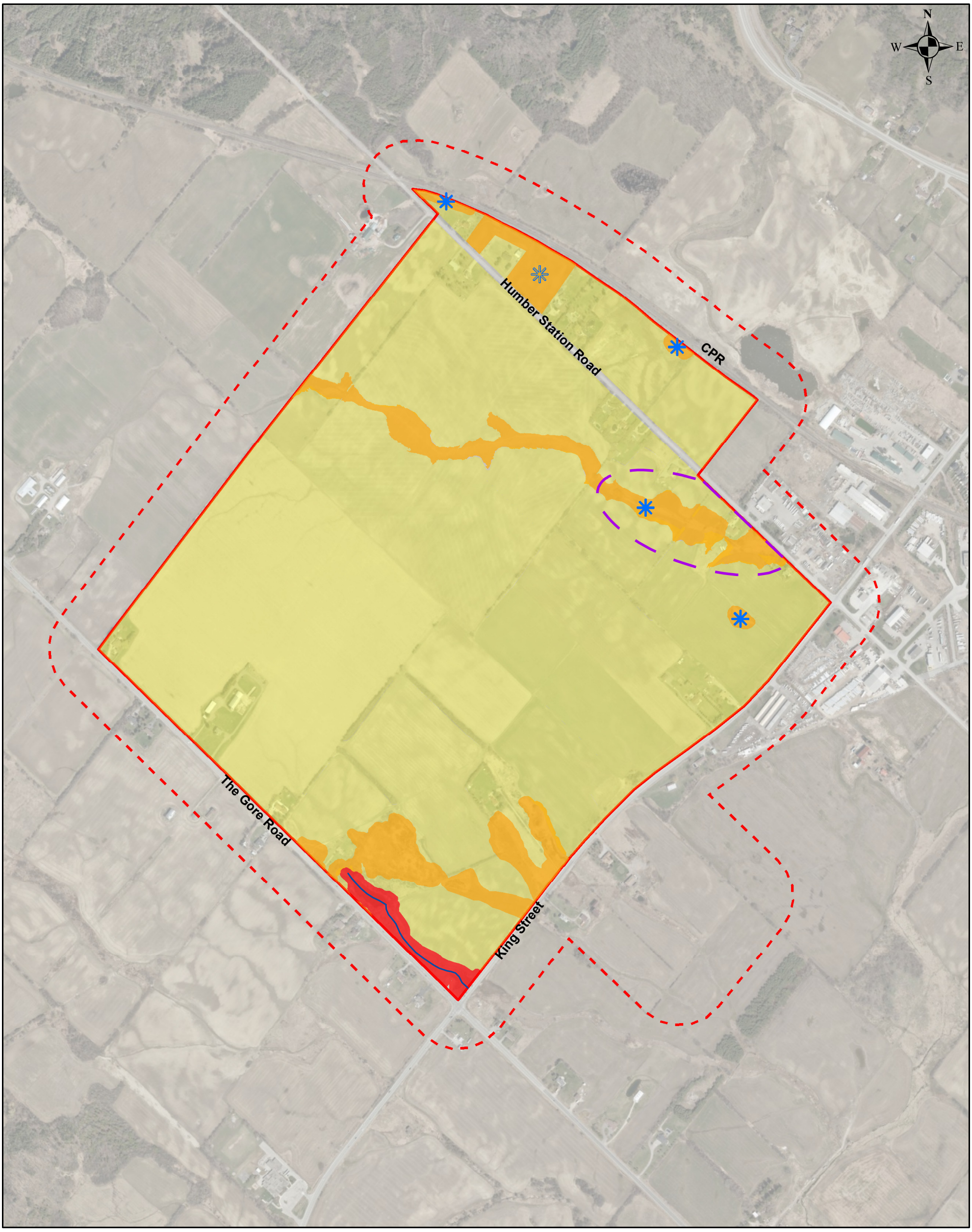
To aid in determining the level of risk and evaluation requirements for retained wetlands (W1 through W6) within the Subject Lands, an assessment was completed using the Wetland Water Balance Risk Evaluation guidelines provided by the TRCA (2017). The guideline provides a four-step process as follows:

1. *Determine which retained wetland(s) may be impacted by the proposal.*
2. *Determine the magnitude of potential hydrological change.*
3. *Determine the sensitivity of the wetland and its associated flora and fauna to hydrological change.*
4. *Integrate information from step 1, 2, and 3 to assign a level of risk to the proposal.*

Section 6.3 of the Hydrogeological Investigation (DS Consultants Ltd. 2023), provides the criteria and evaluation for determining the magnitude of potential hydrological impact to Wetlands W1 through W6. The analysis completed shows there is a Low magnitude of hydrological change as a result of Impervious Cover Score (ICS) and a High magnitude of hydrological change as a result of Changes to Catchment Size for (CCS) each of the wetland units. The overall magnitude of hydrological change is provided in **Table 17** below.

Within **Table 17** below, the sensitivity of the wetlands from an ecological perspective (i.e., Step three within the TRCA Guidance Document) were determined with the following CEISMP findings:

- Vegetation Community Type (ELC): **Section 3.3.2** and **Figure 3.2.2**;
- High Sensitivity Fauna Species: **Sections 3.3.6**, **3.3.7**, **3.3.8** and **Appendix I**;
- High Sensitivity Flora Species: **Section 3.3.4** and **Appendix D**;
- Significant Wildlife Habitat: **Sections 3.3.9.4** and **3.9.5.5**; and
- Hydrological Classification Considering Ecology: **Figure 3.2.2**.



LEGEND

- SUBJECT LANDS
- STUDY AREA (120m)
- 2020-08-24_SubjectProperty_214476
- OPPORTUNITY FOR ENHANCED CORRIDOR
- FISH HABITAT

CONSTRAINT ANALYSIS

- HIGH CONSTRAINT:
  REDSIDE DACE HABITAT AND 10 m WETLAND BUFFER
  FISH HABITAT
  HEADWATER DRAINAGE FEATURE IDENTIFIED FOR PROTECTION
- MODERATE CONSTRAINT:
  EXISTING FLOODPLAIN
  NON-PSW WETLANDS PLUS 10 m BUFFER
  HEADWATER DRAINAGE FEATURE IDENTIFIED FOR CONSERVATION AND MITIGATION
- LOW CONSTRAINT:
  HEADWATER DRAINAGE FEATURE IDENTIFIED FOR NO MANAGEMENT AGRICULTURAL LANDS AND CULTURAL VEGETATION COMMUNITIES (SUBJECT TO ENDANGERED BAT HABITAT ASSESSMENT IN EXISTING BUILDINGS)
- OPPORTUNITY TO COMBINE SMALL, ISOLATED WETLAND COMMUNITIES INTO A CORRIDOR
- EASTERN MEADOWLARK HABITAT

NOTE: REFER TO FIGURE 3.2.5.2b FOR HEADWATER FEATURE MANAGEMENT RECOMMENDATIONS

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BEACON ENVIRONMENTAL | DS CONSULTANTS LTD. | GSAI Glen Schnarr & Associates Inc. | URBANTECH

Caledon Station Community-Comprehensive Environmental Impact Study and Management Plan

PROJECT No. 214476

FIGURE 4.2

COMPREHENSIVE CONSTRAINTS AND OPPORTUNITIES MAP

May 2023 Scale 1:9,000

Table 17. Wetland Water Balance Risk Evaluation Summary

Hydrological Considerations						
Wetland Number	**Impervious Cover Score**	**Change in Catchment Area (%)**	**Overall Magnitude of Hydrological Change**			
W1	0.5	71 % decrease	High			
W2	0	40 % decrease	High			
W3	0.2	87 % decrease	High			
W4	1.5	68 % decrease	High			
W5	0.7	75 % decrease	High			
W6	0.1	81 % decrease	High			
Ecological Considerations						
Wetland Number	**Vegetation Community Type (ELC)**	**High Sensitivity Fauna Species**	**High Sensitivity Flora Species**	**Significant Wildlife Habitat***	**Hydrological Classification Considering Ecology**	**Overall Ecological Wetland Sensitivity**
W1	Medium	None	-	None	High	High
W2	Medium	High	-	High	High	High
W3	Low	Low	-	None	Palustrine	TBD
W4	Medium	Low	-	None	High	High
W5	Medium	None	-	None	High	High
W6	Medium	None	-	None	High	High
Overall Wetland Risk Ranking						
Wetland Number	**Overall Wetland Risk Ranking**					
W1	HIGH					
W2	HIGH					
W3	HIGH					
W4	HIGH					
W5	HIGH					
W6	HIGH					

*Refers to Candidate Significant Wildlife Habitat to be confirmed through further study at the draft plan stage.

4.1.4 Natural Heritage Constraints

4.1.4.1 Significant Natural Heritage Features

Based on the evaluation of significance presented in **Section 3.3.9**, it was determined that significant natural heritage features in the Study Area are primarily associated with the watercourses and wetlands on the Subject Lands and Study Area.

Significant natural heritage features identified within the Study Area include the following:

- Fish Habitat;
- Significant Habitat for Endangered and Threatened Species (refer to **Section 4.1.4.3**);
- Other Wetlands;
- Significant Wildlife Habitat; and

- Linkages.

The features listed above qualify as components of the Town's Ecosystem Framework by satisfying the criteria and definitions in the MOP.

4.1.4.2 Natural Heritage System

Currently, there is no formalized natural heritage system identified for the Study Area. The Subject Lands are located outside provincial plan areas (i.e., the Greenbelt Plan, the Niagara Escarpment Conservation Plan and the Oak Ridges Moraine Conservation Plan). The Subject Lands do not overlap with any components of the provincial Growth Plan Natural Heritage System, Region of Peel Greenlands System or Town of Caledon Environmental Policy Area. The only feature in the Study Area that is recognized as part of the above systems is the PSW that partially overlaps with the eastern portion of the Study Area to the east of the CPR line.

It should be noted that as part of the Town's Bolton Residential Expansion Study, Dougan & Associates *et al*. (2014a and 2014b) had developed a preliminary natural heritage system for the for the Subject Lands. This preliminary natural heritage system was developed primarily to assist the Town with its calculations to determine future developable area contained within the Option 3 lands (Subject Lands). It was recognized that this system would be further refined through the LOPA process.

Through the additional work completed as part of this CEISMP, a natural heritage system has been developed for the Study Area. The proposed natural heritage system is discussed in **Section 5.2**.

4.1.4.3 Species at Risk

As noted in **Section 3.3.9.6** and detailed in **Appendix I**, the following endangered and threatened and/or their habitat is present on the Subject Lands:

- Eastern Meadowlark (*Sturnella magna*) - Threatened;
- Redside Dace (*Clinostomus elongatus*) - Endangered; and
- SAR Bats:
    - Eastern Small-footed Myotis (*Myotis leibii*) - Endangered;
    - Little Brown Myotis (*Myotis lucifugus*) - Endangered;
    - Northern Myotis (*Myotis septentrionalis*) - Endangered; and
    - Tricoloured Bat (*Perimyotis subflavus*) - Endangered.

This report identifies SAR habitats and species at a landscape level rather than on a case-by-case basis. A strategy for all SAR known to the Study Area to be used at the draft plan stage is included in **Section 9**.

Eastern Meadowlark

Eastern Meadowlark has been recorded in various location the Subject Lands and Study Area in 2013/2014 (Dougan & Associates *et al.* 2014a and 2014b), and habitat remaining for this species during the last breeding bird survey in 2020 was ELC Unit 3d as the results of the last breeding bird survey

provide a higher level of confidence of actual breeding locations (refer to **Figure 3.3.9**). Other areas where Eastern Meadowlark had been recorded are now farmed and no longer provide suitable habitat. Removal of the habitat for this species for agricultural purposes is permitted under the provisions of Ont. Reg. 242/08 under the *Endangered Species Act*. Therefore, ELC Unit 3d is constrained within the Caledon Station Secondary Plan.

Redside Dace

Through reviewing the Background Environmental Study (Dougan & Associates *et al*. 2014b), Jackie Burkart from the MNRF (March 11, 2016) requested more details and provided the following comment:

- *Any features considered to be Redside Dace 'contributing habitat' will require maintenance and / or replication of functions.*
- *Where degradation to aquatic systems has been noted (e.g., barriers to fish migration, undersized culverts) it is recommended that opportunities for restoration be identified through consultation with MNRF.*
- *Restoration should aim to maintain or improve suitable habitat for Redside Dace and other species. Where stream realignments and / or the removal of features is contemplated, it is recommended that a comprehensive fisheries compensation plan be developed, in consultation with MNRF and other agencies.*

Redside Dace is a federally and provincially endangered fish species that occupies watercourses south of the Subject Lands; historic correspondence and available resources for the Study Area indicate the potential for contributing habitat for Redside Dace only. Contributing habitat is regulated through the *Endangered Species Act*.

Habitat mapping guidelines for the identification of habitat of Redside Dace in relation to the PPS (**Section 2**) are under development and not yet available. For the purposes of this study, the intention was to identify Redside Dace habitat using guidance provided in the Redside Dace Recovery Strategy (Redside Dace Recovery Team 2010) which recommends:

> *All reaches currently occupied by Redside Dace, upstream headwaters (natural heritage features and supporting functions supporting the occupied reaches) and historically occupied reaches where there is a high likelihood of rehabilitation be prescribed as habitat within a habitat regulation under the Endangered Species Act, 2007.*
>
> *Redside Dace habitat consists of two elements. The first element includes bankfull stream width within the aquatic resource area. The second element of habitat includes the meander belt width of the stream and associated riparian habitat that is a minimum of 30 metres from the meander belt (measured horizontally).*

The drainage features on the Subject Lands are HDF's, and the meander belt is not applicable in this situation. Additionally, a majority of these HDF's do not maintain a baseflow and course sediment supply functions are limited as most of the HDF's are farmed and/or tiled. Those that could provide potential Redside Dace contributing habitat that could constrain the development are those that have permanent flow and a coolwater thermal regime (i.e. HDF reaches WHT1-A and WHT1-B).

SAR Bats (Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis and Tricoloured Bat)

As Ontario's bat species at risk only became listed as endangered in 2013, the habitat for these species was not discussed in the previous background studies prepared by Dougan & Associates *et al.* (2014a and 2014b). These listed species include:

- Little Brown Myotis or Little Brown Bat (*Myotis lucifugus*);
- Northern Myotis (*M. septentrionalis*);
- Tri-colored Bat (*Perimyotis subflavus*); and
- Eastern Small-footed Bat or Eastern Small-footed Myotis (*M. leibii*).

As species specific regulations have not yet been developed for the listed bat species, their habitat continues to be defined using the general habitat definition under the ESA, however MECP has focused their regulatory and protection efforts on maternity roosts.

In 2017 a guidance document was prepared by the province to assist in identifying potential maternity roost habitats within treed areas. The document - A *Survey Protocol for Species at Risk Bats within Treed Habitats Little Brown Myotis, Northern Myotis & Tri-Colored Bat* (MNRF 2017) - states that suitable maternity roost habitat includes any coniferous, deciduous or mixed wooded ecosite, including treed swamps, that includes trees at least 10 cm diameter-at-breast height (dbh). Based on the ELC work completed in **Section 3.3.2**, it was determined that there is only one ELC community in the Study Area would qualify as providing potential maternity roost habitat. This community corresponds with ELC Unit 12, an Organic Deciduous Swamp. It is anticipated that this community will be protected within the future natural heritage system. No snag surveys have been completed to confirm the presence/absence of suitable maternity habitat trees. Therefore, it is recommended that the potential habitat be confirmed through site-specific studies at the draft plan stage.

As several of the listed bat species are also known to establish maternity roosts in buildings, it is recommended that the buildings on the Subject Lands be screened for potential habitat and that exit surveys be completed for any buildings that could potentially support bats to determine in listed species are present or absent. This should be completed through site-specific studies at the draft plan stage (as discussed in **Section 9**).

4.2 Constraint and Opportunities Mapping

Based on the constraints and opportunities identified above, a map was prepared to summarize the spatial extent of the various constraints and opportunities where applicable. The purpose of the map is to inform and guide the design and development of the Caledon Station Land Use Plan and Preliminary Framework Plan. To assist with the design, constrained lands were ranked based on their levels of significance and sensitivity as follows:

A **High Constraint** rating has been generally been assigned to areas that support features and functions that are highly sensitive and/or to otherwise constrained lands. Development is generally not permitted with high constraint areas with limited exceptions.

A **Moderate Constraint** rating has been assigned to areas that support less sensitive features and functions that can be replaced or replicated and/or to otherwise constrained lands. Development is permitted within moderate constraint areas where it can be demonstrated that habitats and functions can be replaced and replicated to achieve a net ecological benefit.

A **Low Constraint** rating has been assigned to areas that support features and functions that support little to no valued ecological functions and/or to otherwise constrained lands. Development is permitted in low constraint areas with little to no mitigation required.

For the purposes of developing a comprehensive constraint map for the Study Area, constraint ratings have been assigned to features and areas as follows:

Areas of High Constraint

- Provincially Significant Wetlands;
- Habitats of Endangered & Threatened Species;
- Fish Habitat;
- Headwater Drainage Features with Management Recommendation of Protection;
- High Quality Wildlife Habitat; and
- High Quality Natural Communities.

Areas of Moderate Constraint

- Unevaluated Wetlands;
- Floodplains;
- Headwater Drainage Features with Management Recommendation of Conservation or Mitigation;
- Cultural and Degraded Natural Communities; and
- Low Quality Wildlife Habitat.

Areas of Low Constraint

- Headwater Drainage Features with Management Recommendation No Management;
- Agricultural Lands; and
- Cultural Vegetation Communities.

A Comprehensive Constraints and Opportunities Map is presented in **Figure 4.2**.

5. Development of the Caledon Station Land Use Plan and Preliminary Framework Plan

The Caledon Station Secondary Plan is the outcome of years of land use planning which initially commenced in 2010 when the Town of Caledon adopted Official Plan Amendment 226 (OPA 22) to update population and employment forecasts and allocations for the 2031 planning horizon. Since 2010, the planning process has included the Bolton Residential Expansion Study (BRES) which was undertaken by the Town of Caledon to identify a recommended expansion area to accommodate the allocated growth. Through this process, the Subject Lands (BRES Option 3) were identified as to preferred option for this growth based on several screening criteria that consider the existing natural

heritage features. All of the Secondary Plan lands are now included in the Region of Peel's 2051 Urban Area now.

The goal for the Caledon Station Land Use Plan is to create a complete, compact, livable, walkable, cyclable, and transit-oriented community which integrates and protects the area's headwaters and wetlands into a natural heritage system.

Caledon Station has been designed to achieve the following objectives:

- Create a transit-oriented community anchored by a GO Transit hub that balances pedestrian, cycling, transit and vehicular connections;
- Provide a high-quality built form character and architectural design that exemplifies and promotes the identity of Caledon;
- Establish a vibrant, mixed-use environment that attracts activity throughout the day and evening;
- Create a central character avenue with an attractive, high-quality streetscape and built form design that links the community;
- Establish a range and mix of housing types that reinforce identifiable neighbourhoods and achieve density targets;
- Create walkable, pedestrian scaled neighbourhoods with amenities and transit stops within walking distance and a safe, comprehensive path and trail system that links with the broader Caledon network;
- Protect and enhance significant and sensitive natural heritage features within a natural heritage system, and to compliment this system with open spaces along with a hierarchy of park spaces with flexible design and innovative programming options to serve the neighbourhood needs;
- Integrate appropriate low-impact development strategies as a key component of open space and built form design; and
- Integrate smart community technologies that establish broadband connectivity for an improved quality of life through learning, work and play.

The design of the Caledon Station Land Use Plan is the outcome of integrated and iterative approach. Key initial considerations for the community design were integration of a proposed natural heritage system (see **Section 5.2**) and areas required to accommodate future stormwater management facilities (see **Section 5.3**). As the locations of the natural heritage system and stormwater management area are essentially fixed, the limits of these areas were used to create the foundational framework for the community design to which other elements were subsequently added (i.e., roads, greenways, development blocks). Through an iterative process, the project study team has refined the community design to meet the various objectives noted above and to achieve consistency with the Town's strategic directions and goals and environmental performance measures.

5.1 Description of the Caledon Station Land Use Plan and Framework Plan

The Caledon Station Land Use Plan (**Figure 5.1a**) and Framework Plan **(Figure 5.1b**) were developed with extensive input from the multi-disciplinary project study team to ensure consistency with the Town's principles, strategic directions, and goals.

TOWN OF CALEDON

Schedule C-8

(A Subschedule to Schedule "C")

CALEDON STATION SECONDARY PLAN: LAND USE PLAN

- Low Density Residential
- Medium Density Residential
- Mixed-Use
- GO Transit Hub
- Institutional
- Open Space Policy Area
- Environmental Policy Area
- Boundary of Greenbelt Plan Area
- Stormwater Pond Facility
- Settlement Boundary
- Elementary School
- Collector Road
- Railway

Base Data Source: Teranet, 2013

0 0.125 0.25 0.5 km

HUMBER STATION RD.

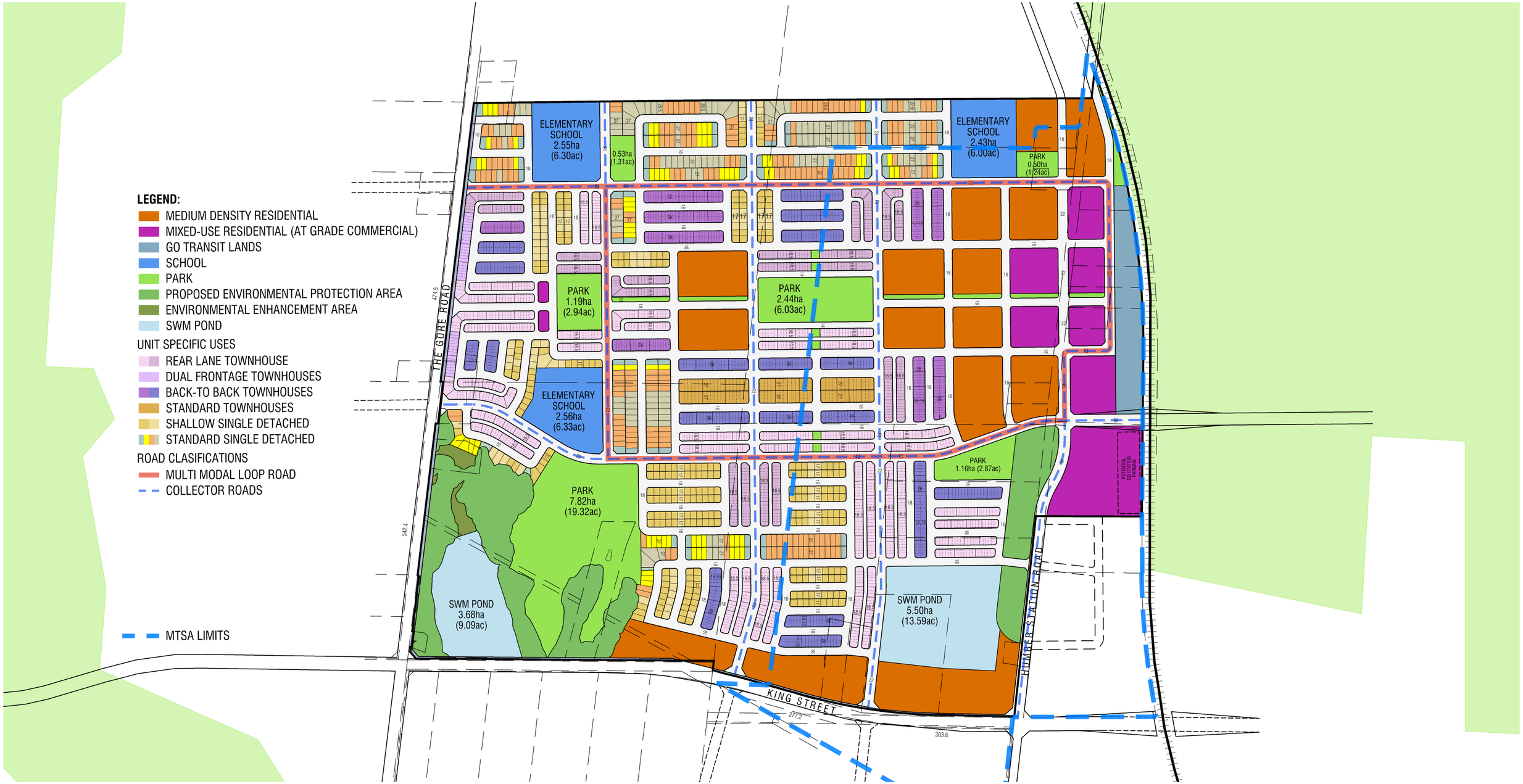
THE GORE ROAD

KING STREET

CP RAILWAY

HUMBER STATION RD.

KING STREET



DRAFT

- All Units In Metric Unless Otherwise Noted.
- Base Information Obtained From Various Sources And Is Approximate.
- Schedule / Plan Information Is Conceptual And Requires Verification by Appropriate Agency.

GERRARD DESIGN

CALEDON STATION FRAMEWORK PLAN

MAY 5, 2023
PROJECT 1420
SCALE 1:8000

CP-37

The Secondary Plan Land Use Plan (**Figure 5.1a**) has been designed to establish a transit-oriented community, including an active transportation strategy with cycling infrastructure throughout, integration of the environmental policy area, mixed housing types, high quality architecture, walkability and a main street with central character. Land Use Designations on the Secondary Plan Land Use Schedule include Low Density Residential, Medium Density Residential, Mixed Use, GO Transit Hub, Commercial/Mixed Use, Institutional, Employment, Open Space Policy Area, Environmental Policy Area, and Stormwater Pond Facility. These Land Use Designations have been implemented through the Framework Plan (**Figure 5.1b**), where various types of residential built forms at varying densities, as well as mixed uses, institutional uses and GO Transit Hub uses have been integrated into the Plan layout. The net Subject Lands area is 181.90 hectares (ha), however, after deducting 1.43 ha for road widening and 10.52 ha of NHS, the net developable area of the Framework Plan is 169.95 ha Refer to **Figure 5.1b** for site statistics of the Framework Plan.

One of the earliest components for consideration that led to the Plan layout was the delineation of the Environmental Policy Areas both within and beyond the Plan Area. These areas represent constraints to development and special consideration is given to the siting and sizing of these areas within the Plan layout. Infrastructure considerations, including stormwater management, roads and servicing have also been considered as early components affecting the Plan layout. As well, logical siting of the elementary and secondary school sites was considered early in the Plan evolution.

Establishing a transit-oriented community requires creating a community which is anchored to the Transit hub area, while introducing higher densities, a mix of built forms and mixed uses close to the Hub, and creating a balance of walkability, cyclability, transit opportunities and vehicular connections and enhanced connectivity in all travel modes both within and beyond the Plan area. The Preliminary Framework Plan achieves this by creating a central character avenue with attractive, high-quality streetscape and built form design that links the community, infrastructure, and mixed uses. The Plan has been structured with distinct neighbourhood areas and two-character district areas which are anchored by the Transit Hub at the eastern limit of the Plan Area. The Plan compliments and the Environmental Policy Areas by introducing a series of high-quality parks and open spaces, as well as a range and mix of land uses and residential built forms throughout the Plan.

5.2 Natural Heritage System

As was discussed in **Section 3.3.1.**, the Subject Lands are primarily under agricultural use and natural heritage resources are limited to several headwater drainage features and wetlands located on the southern portion of the Subject Lands. Existing biophysical resources in the Study Area were characterized using primary and secondary data collected and analysed in accordance with accepted technical standards, protocols and guidelines as is outlined in **Section 3**. The significance of the various natural heritage resources was evaluated using provincial, regional and local scale environmental planning criteria and environmental performance measures as outlined in **Section 3.3.9**. The findings of this evaluation were used to identify constraints to development as well as opportunities for enhancing ecosystem functions as outlined in **Section 4**. The proposed natural heritage system is intended to integrate all high and moderate constraint features while allowing for reconfiguration of moderate constraint features provided a net gain in area and function can be achieved. The multi-disciplinary team used this information to engage in an iterative process to balance the community objectives. The limits of the proposed natural heritage system in conjunction with the limits of the proposed stormwater

management facilities required to service the future community were further refined to establish the future limits of development which formed the basis for the Land Use Plan and Framework Plan.

The proposed natural heritage system has been designed to include all the significant natural heritage resources identified on the Subject Lands, except for a small field in the northern portion of that has been identified as habitat for threatened Eastern Meadowlark. The proposed natural heritage system is comprised of two separate blocks which are proposed to be designated as Environmental Policy Area on the Land Use Plan and Framework Plan (ref. **Figures 5.1a & 5.1b**, respectively).

On the southern portion of the Subject Lands, the proposed natural heritage system is comprised of the following features:

- Non-Provincially Significant (Other) Wetlands W1, W2, W3, W4, W5 and W6 (defined as the "Macville Area Wetlands" in **Appendix B**);
- Headwater Reaches (WHT1-A to WHT1-E; WHT2-A; WHT2-B; WHT2-F; WHT3-A; WHT3-B);
- Direct Fish Habitat (WHT1-A; WHT1-B; WHT6-A);
- Contributing Habitat for Endangered Redside Dace (WHT1-A; WHT1-B); and
- Significant Wildlife Habitat – (potential turtle overwintering & nesting – ELC Unit 10a).

To protect these features a buffer of 10 m has been applied based on the future land use scenario of low-density residential development adjacent to these features. As the boundaries of the Macville Area Wetlands were staked by MNRF in 2016 and represent the outermost components of the proposed natural heritage system, the application of a 10 m buffer to the surveyed limits of these wetlands results are considered appropriate and reliable for designating the limits of the areas to be designated as Environmental Policy Area in the Land Use Plan.

On the remainder of the Subject Lands, natural heritage resources are limited to a few, very small, isolated Other Wetlands and headwater drainage features. All wetlands have been assigned a moderate constraint rating and only one headwater tributary (WHT6) was identified as a high and moderate constraint feature. The lower reaches of this tributary have been assigned management classifications of protect (WHT6-A) and conservation (WHT6-B). This tributary feature also supports wetlands W7 and W8. Wetlands W7 and W8 are represented by reed canary grass marshes that support limited native diversity and two wetlands are associated with dug pond features that are too small to support wildlife staging, breeding, or overwintering habitat functions. This headwater feature and its associated wetlands form a narrow linear strip that does not connect to any nearby features in the landscape. The downstream reach of Tributary WHT6 effectively terminates at Humber Station Road and the upstream reaches terminate in agricultural fields. Based on background review, W7 flows into an underground pipe and downstream HDF for approximately closest natural heritage feature is a PSW approximately 715 m downstream.

Due to the fragmented and isolated nature of the very small wetland features (ELC Units 5, 7e, 7f, 7l, 13 and 14a) it was determined that retaining these features within the future urban matrix would not provide for an interconnected natural heritage system. Removal of these isolated features to accommodate development was also not considered feasible as it could result in a loss to ecosystem functions. Instead, it is proposed that Tributary WHT6, which contains wetlands W7 & W8 and represents the largest habitat block be transformed into an enhanced corridor/greenway that is centred roughly on existing reaches WHT6-A to WHT6-C. It is estimated that the total area of the very small wetlands is 1.27 ha, and to ensure there is no net loss of wetlands as result of the development, at least

1.27 ha of wetland will be compensated for in the enhanced corridor/greenway. This would ensure that the ecosystem functions of these features are retained on the landscape.

A conceptual design for this enhanced corridor/greenway has been prepared by the Study Team using natural channel design principles. Within the FSR, Drawing 401 contains an illustration of the channel cross-sections while Drawing 304 illustrates the channel in plan-view (Urbantech Consulting 2023). The proposed conceptual corridor design incorporates the following elements:

- Conveyance of regional storm;
- Meanderbelt width of 12 m;
- Low flow channel with a naturalized, sinuous planform and design elements, such as secondary channels and medial bars to enhance aquatic and terrestrial habitat conditions;
- Creation of hummocky, wetland habitat area within the floodplain equivalent to that of wetlands removed (1.27 ha);
- Minimum 30 m bottom width to facilitate creation of at least 1.27 ha of wetland compensation;
- Minimum 53 m top width;
- Maximum 3:1 side slopes;
- 2-3 m wide trail system along the top of slope abutting developable lands; and
- Stone core pocket wetland at SWMF 1 outfall and associated conveyance channel.

The proposed enhanced corridor/greenway will create a single contiguous natural heritage system block that will provide for significantly enhanced ecosystem functions relative to that of the existing isolated features on the northern and eastern portions of the Subject Lands (see **Figure 5.2**).

The corridor dimensions have been validated to ensure that various design objectives noted above can be achieved. This level of detail was required to ensure that the extent and limits of Environmental Policy Area are appropriately reflected on the Land Use Plan and Framework Plan Concept.

Once the Caledon Station Secondary Plan is approved, the Study Team will prepare and submit a separate Corridor Design Brief for Tributary WHT6 for review and approval.

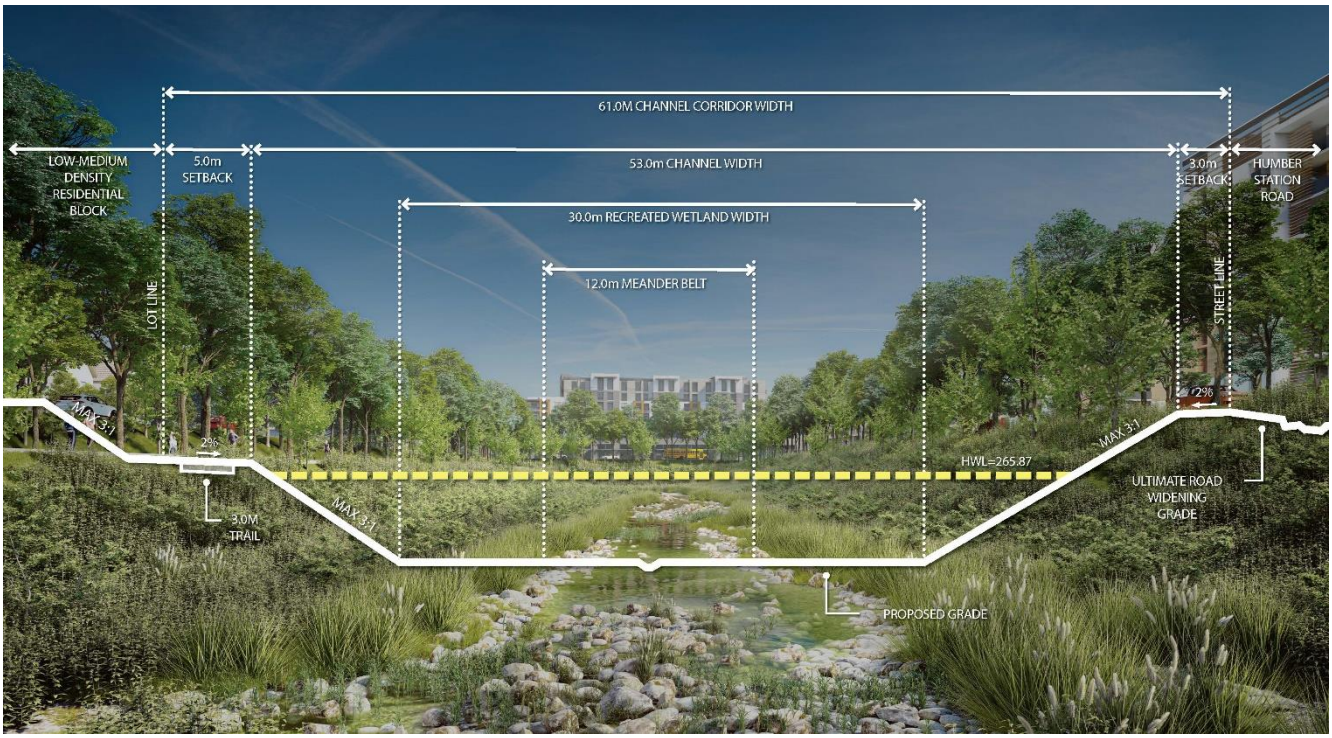


Figure 5-2. Rendering of Proposed Greenway Corridor along Tributary WHT6

5.3 Stormwater Management Strategy

Under existing conditions, the majority of the Subject Lands (consisting of the western, central and southeastern portions) drain to the West Humber River. Surface drainage leaves the Subject Lands via culverts located along King Street West (five culverts) and Humber Station Road (one culvert). The northeastern portion of the Subject Lands is located within the Main Humber River watershed. Surface flow from this area drains toward the CPR line and is conveyed downstream via three (3) culverts under the rail line.

Under proposed conditions, the stormwater management strategy developed by Urbantech Consulting (2023) maintains the approximate pre-development watershed divide, as well as individual subcatchment/outlets within each watershed. Outside of alterations to imperviousness, this approach minimizes, to the greatest extent possible, changes to overall drainage patterns within the Subject Lands. The existing external drainage area north of Subject Lands (79 ha) will be directed to the proposed enhanced corridor/greenway west of Humber Station Road via a clean water pipe (CWP). This includes drainage area from west of The Gore Road.

The major and minor drainage systems designed by Urbantech Consulting (2023) will convey storm runoff to three (3) proposed end-of-pipe stormwater management facilities (SWMF) prior to discharge to receiving drainage features within the Subject Lands. SWMF 1 is situated northwest of the intersection of King Street & Humber Station Road as it abuts King Street to the south and Humber Station Road to the east. SWMF 2A is situated in the southwest of the Caledon Station Secondary Plan (CSSP) lands, east of wetland W2 and west of wetland W4. SWMF 2B is located south of King Street

in future development lands also owned by the CSSP applicant. Preliminary sizing of these facilities is provided herein.

As described in the FSR (Urbantech 2023), SWM targets / sizing criteria for the Subject Lands were established based on the TRCA (2012a) Stormwater Management Criteria document and TRCA (Civica 2018) Humber River Hydrology Update pre-development conditions, in addition to the following:

- Ensure that existing flow rates downstream of the subject lands do not vary for the larger storm events during post-development conditions, thereby providing flood protection for properties downstream of the Subject Property;
- Provide adequate drawdown time / erosion control to protect the form and function of downstream receiving reaches;
- Meet the Enhanced (Level 1) criteria as per the MOE SWM Planning and Design Manual (March 2003) for stormwater quality treatment;
- Maintain recharge volumes through the use of low impact development and other practices, as required; and
- Maintain water balance to wetland features.

5.3.1 Quantity Control

Quantity control target release rates for SWMFs \ were determined based on unit flow rates for the 2-year to 100-year storm events as identified by TRCA (Civica 2018) for the West Humber River watershed and the associated contributing drainage area to each SWMF. In accordance with direction provided by TRCA (email dated April 17, 2020), control of the Regional storm will also be provided. The Flow Nodes were also evaluated to ensure that the post-development peak flow rates do not greatly vary from the pre-development conditions at each Flow Node location to provide flood protection for the downstream properties All facilities will have multiple outlet controls including an extended detention outlet, quantity control, emergency spillway and a maintenance sump.

The proposed pond outfall locations are illustrated on Drawings 601 and 602 of the FSR (Urbantech Consulting 2023). In accordance with the TRCA (2012a) Stormwater Management Criteria document, the outfalls have been placed:

- Outside of the 25-year floodline, where possible;
- Outside of the 100-year erosion limit, where possible;
- Outside of the meander belt, where applicable; and
- Optimal 45-degree angle of release to receiving reaches to reduce erosion impacts where possible.

Design elements including stone-core wetlands and, in the case of the enhanced corridor/greenway, conveyance channel, are proposed to provide energy dissipation, water quality benefits and enhanced detention/retention at both outfalls.

5.3.2 Quality Control

SWF forebays have been designed according to the settling and dispersion length equations provided in Section 4.6.2 of the MOE SWM Planning and Design Manual (2003). Permanent pool volumes have

been designed to meet the Enhanced (Level 1) criteria as per the MOE SWM Planning and Design Manual.

5.3.3 Erosion Control

The Urbantech Consulting (2023) FSR identifies that stormwater erosion control requirements for SWMF 1, 2A and 2B will be met by providing a minimum 48-hour (maximum 72-hour) drawdown time for the 25mm storm event. Target release rates for the SWMFs were determined based on an average release rate of 0.72 L/s/ha in accordance with the Town of Caledon Bolton Residential Expansion Study and the associated contributing drainage area to each SWMF. The target extended detention release rates of 0.050 m^3/s for SWMF 1, 0.02 m^3/s for SWMF 2A and 0.026 m^3/s for SWMF 2B, will mitigate potential impacts to downstream receiving reaches due to post-development stormwater release.

5.3.4 LID and Site Water Balance

To achieve the water balance requirements, the FSR (Urbantech Consulting 2023) identified the following Low Impact Development (LID) measures as being most feasible for application in the Subject Lands:

- **Downspout Disconnection:** Roof leader discharge to pervious surfaces such as lawns or to LID measures provides a source of clean water that can be infiltrated. This is a low / no maintenance, lot-level control that is typically implemented by default;
- **Additional Topsoil Depth:** Coupled with downspout disconnection, an additional depth of topsoil beyond the minimum requirements provides additional storage volume at the lot-level which reduces runoff volume and promotes filtration / infiltration. This is a low / no maintenance practice;
- **Swales:** Swales will be required in the Subject Lands to convey surface flows and have the added benefit of encouraging infiltration as well as peak flow / velocity reduction and improvements to water quality. Suggested swale locations include:
    - Swales in Greenland corridors;
    - Swales in Parks and Schools (public ownership);
    - Swales downstream of stormwater management outfalls;
    - Swales adjacent to rear lots located within buffers;
    - Overland flow easements; and
    - Side Yard / Rear Yard swales (private ownership);
- **Infiltration/Filtration Facilities:** Dedicated infiltration facilities involve construction below grade and their performance is subject to the groundwater table elevations and infiltration rates of the native material. Infiltration facilities should be designed with an emergency overflow spillway to the storm sewer system to prevent infiltration trenches from being fully saturated. If groundwater levels preclude infiltration, the LIDs will be built with an impervious liner and underdrain to provide filtration benefits; and
- **Rainwater Harvesting:** Rainwater harvesting typically consists of the use of rain barrels within private property to attenuate stormwater for later use for irrigation. This measure is not guaranteed to remain in place over the long-term, as their longevity is subject to the homeowner. However, it is recommended that rainwater harvesting be considered on a larger scale to supplement the municipal supply to irrigate park / open space areas.

LID techniques were selected based on the Framework Plan land use concept and preliminary site grading. The proposed LID features and the LID Map will be further developed following the completion of additional studies. Selection of the LID techniques should consider the maintenance requirements as some of the technologies proposed may be privately-owned and operated, while others may be in public ownership and operated and maintained by the municipality.

5.4 Servicing Strategy

5.4.1 Water Supply

As determined in the Bolton Residential Expansion Study (Region of Peel, September 24, 2020) the Subject Lands are generally outside of the range of elevations associated with Pressure Zone 6 of the existing water distribution infrastructure in Bolton. As such, ultimate development of the lands will require the addition of Pressure Zone 7. Previous studies completed in support of subject property identified a new Zone 7 booster pumping station at King Street and Coleraine Drive. Ultimately, floating storage is proposed in the form of an elevated tank (ET) to provide storage for flow equalization, fire demands and emergencies. The ET is to be situated in the vicinity of the northwest corner of the subject lands. The excerpt from the Peel Region study is included in the FSR (Urbantech Consulting 2023).

A technical memorandum (May 11, 2023) has been prepared by R.J. Burnside & Associates Limited on behalf of the Bolton Option 3 Landowners Group to provide water distribution servicing recommendations in support of interim and ultimate development of the Subject Lands.

Water servicing can be provided for the entire CSSP lands with the following provisions:

- A new Booster Pumping Station is constructed in the vicinity of Coleraine Drive and King Street and the diameter of the proposed trunk watermain from the Booster Pumping Station to a point approximately 1200 m southwest is increased to 600 mm, from the currently proposed 400 mm diameter required for the ultimate build out condition;
- The Booster Pumping Station will require appropriately sized booster pumps to provide the ADD, MDD and PHD within the 40 psi to 100 psi pressure range; and
- The Booster Pumping Station will also require a fire pump to provide the MVSP lands with 220 L/s of fire flow.

It is noted that further consultation with Peel Region and Town of Caledon will be required regarding the external watermain alignment and necessary EA requirements for the external infrastructure. The specific arrangement of the Booster Pumping Station would be determined during detailed design.

Based on the preliminary water modeling by Burnside, the external trunk watermain size is increased from 400mm diameter (recommended by Bolton Residential Expansion Area Study) to 600mm diameter to address the future potential population density increase.

5.4.2 Wastewater

The proposed CSSP development is tributary to the South Peel Wastewater System and is ultimately treated in the G.E. Booth Wastewater Treatment Plant.

The 2020 Bolton Residential Expansion Study (BRES) indicated that the Subject Lands are to be serviced by extensions and improvements of existing infrastructure located on Coleraine Drive. Since 2020, interim and ultimate sewer solutions have been contemplated by Peel Region that diverge from the approved Master Plan.

The CEISMP recommends implementing the ultimate solution which provides servicing for the greatest catchment area from day 1 and eliminates the expenditure of the interim solution.

Further coordination with the Region of Peel infrastructure planning group is required to confirm the best solution for servicing of the Subject Lands as well as the design and approval process to accomplish same.

6. Impact Assessment

6.1 Approach

The CEISMP TOR requires that an impact assessment for the natural features associated with the Study Area. More specifically:

> *Through an analysis of the dynamics and interrelationships of the ecosystem, the study will assess the potential environmental impacts of locating residential uses and the associated infrastructure within the respective study areas, and their compatibility with the Town's ecosystem goals, objectives, policies and performance measures.*

One of the primary objectives followed in designing the Framework Plan for the Caledon Station community was to protect existing natural heritage features and functions within an enhanced NHS and to locate development outside of natural hazards (as described in **Section 5.1**). Since impact avoidance is generally the most effective means of reducing the risk of development impacts on the natural environment, the CEISMP has recommended that the future development limits be established outside of any significant natural heritage features and natural hazards as explained in **Section 4**. Therefore, the impacts are generally limited to those that are indirect, which can be mitigated.

As with the other components of this CEISMP, an integrated multi-disciplinary approach has been applied to assessing the potential impacts of redeveloping the Subject Lands, as shown in **Table 18** below. This approach allows for assessment of some of the more complex biophysical relationships documented within the Subject Lands and the Study Area, such as relationships between ground and surface water resources in sustaining wetlands, and fish and wildlife habitat.

The impact assessment presented in this CEISMP is based on:

- The most detailed level of information available related to biophysical resources based on primary and secondary data and analyses (as presented in **Section 3**); and
- The findings of the constraint analyses (presented in **Section 4**) to identify sensitive and significant natural features and ecological functions that require protection to maintain the integrity and biodiversity of the natural heritage within the Study Area, as well as to identify natural hazards present.

The impact assessment matrix is structured to:

- Identify the specific development activity (impact source);
- Describe the potential effect on environmental receptors (features and functions);
- Recommend mitigation measures to address potential impacts (to be implemented through environmental management plans detailed in **Section 7**); and
- Describe the net effect on the biophysical environment.

The impact assessment matrix is organized according to ecosystem components (e.g., geology, landforms, hydrogeology, hydrology, aquatic systems, terrestrial systems, etc.). The matrix describes the impact source(s) (development/ site alteration activity), the potential impact to the impact receptor(s) (features, attributes and functions), the recommended mitigation (including special monitoring or management needs), and the anticipated residual impacts.

As the community has been designed to avoid direct impacts to most natural heritage features and ecological functions, the impact assessment is focussed primarily on addressing indirect impacts.

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Table 18. Impact Assessment Matrix

Category	Feature/Function	Proposed Activity	Potential Impacts	Recommended Mitigation/Management	EMP Section	Effect
Geology	**Bedrock Geology**	Grading and Servicing	Bedrock on the Subject Lands is at least 10 m below ground surface and will not be impacted by grading and servicing.	None	7.4	Neutral
	Surficial Geology/ Physiography/ Topography	Site Preparation, Grading, Servicing	The topography of the Subject Lands is gently rolling topography and slopes generally to the south. Relief across the Subject Lands ranges from approximately 281 metres above sea level (masl) at the highest point in the northwest corner, to 262 masl in the southwest corner. To accommodate future development, the subject lands will be graded. Based on the preliminary grading plans, it is not anticipated that the magnitude of these grade changes will alter the character of the landform, however topographic relief will be affected at a local scale.	• Maintain a cut and fill balance to the extent feasible to minimize importing and exporting. • Match grades at outer property limits. • Match grades at EPA feature limits.	7.4	Neutral
Soils	**Topsoil**	Site Preparation, Grading, Servicing	Site preparation will require topsoil striping and stockpiling to facilitate grading and servicing. Topsoil resources can be lost through mixing with sub soils and exposure to sun, wind, and water erosion.	• Protect and reuse topsoil resources by minimizing exportation or importation. • Implement Best Management BMP's such as proper separation, stockpiling and erosion control measures, amendment and reapplication to the site following construction. • Develop Soil Management Plans in accordance with TRCA's *Preserving and Restoring Healthy Soil: Best Practices for Urban Construction* (TRCA 2012b). • Conform to the requirements of the Town of Caledon Fill By-Law (2007-59)	7.5	Neutral
Air Quality	**Air**	Site Preparation, Grading, Servicing	Dust from the construction activities could degrade local air quality and have localized short-term negative impacts on vegetation resources in the adjacent EPA.	• Prepare and implement a Dust Management Plan (DMP) prior to site preparation. • Dust should be monitored and managed throughout the construction period and dust suppression measures implemented. • Conform to the requirements of the Town of Caledon Fill By-Law (2007-59)	7.5	Neutral
Groundwater	**Groundwater Flows**	Grading, Servicing and Development	The direction of groundwater flow in the larger study area is expected to be in a southeasterly direction towards the Humber River and/or Lake Ontario in the south. Based on the groundwater levels at the Site, the direction of groundwater flow generally coincides with the regional flow towards the southeast, however a local groundwater divide is noted along the central portion of the Site, where a secondary flow towards the southwestern corner of the Subject Lands is also noted. The installation of site servicing utility lines and underground basement/parking levels and/or foundation has the potential to disrupt the pre-existing groundwater flow dynamics at the Site.	• Implement Best Management Practices (BMPs) for servicing construction. • Utilize trench plugs or anti-seepage collars along installed services to prevent redirection of groundwater flows and water table lowering. • All excavations for site servicing and/or underground levels should be backfilled with soil material of similar permeabilities to the excavated parent native soil to minimize disruption to the groundwater flow regime. It is recommended that backfilling of all excavations or trenches, where necessary, be completed using the excavated native soil.	7.2	Neutral
	Groundwater Quality	Grading, Servicing and Development	Under the post-development scenario, contaminants such as oil, sand, salt and other debris may also affect the water quality of surface runoff and consequentially that of the groundwater systems.	• Implement the Erosion and Sediment Control Plan (ESC Plan) as detailed in the FSR (Urbantech Consulting 2023). • Implement the Stormwater Management Strategy and Plan as detailed in the FSR (Urbantech Consulting 2023). • Implement Low Impact Development (LIDs) Strategy and Plan as detailed in the FSR (Urbantech Consulting 2023).	7.3	Neutral

	Dewatering	Grading, Servicing and Development	Temporary dewatering operations during the construction period has the potential for impacts to existing natural surface water features and/or users of groundwater in the area.	• Develop and implement a Dewatering Management Plan (DMP) at the detailed design stage to ensure groundwater is managed appropriately.
				  • Secure permits from the MECP for dewatering activities.
				  • Groundwater infiltration into the temporary excavations will be controlled by the Contractor.
				  • If there are exceedances of the discharge water against the PWQO criteria, then pre-treatment should be completed prior to discharging into the receiving surface water source.
				  • Where dewatering is required, effluent shall be discharged in a way that prevents sedimentation to the watercourses.
					7.6	Neutral

Category	Feature/Function	Proposed Activity	Potential Impacts	Recommended Mitigation/Management	EMP Section	Effect
Surface Water	**Drainage Patterns**	Grading, Servicing and Development	The proposed development will result in alterations to drainage catchment areas. As noted in Section 4.1.3.2, it is anticipated that there will be a runoff deficit to the wetland features which has the potential to impact the wetlands. It is anticipated that these impacts can be mitigated through implementation of a variety of measures to ensure wetlands functions are maintained.	• The targets for runoff and infiltration will be established through the Feature Based Wetland Water Balance Analysis once completed. • A combination of mitigation measures (SWM, LIDs and cut-off swales, etc.) will be explored so as not adversely affect flows and habitat functions. • See FSR and Hydrogeological Investigation	7.3, 7.4	Neutral
	Headwater Drainage Features	Grading, Servicing and Development	HDFs in the Study Area have been assessed and management recommendations assigned to determine which features are to be retained, relocated, or removed and functions replicated or not. As was discussed in **Section 4.1.2.1**, 16 of the 43 HDF reaches require no mitigation and another 3 are low functioning and will be removed but have their conveyance functions replicated by maintaining downstream flows through the development design. Another 13 HDF reaches are classified as conservation and most of these will be retained in-situ, except for WHT6-B and WHT6-C which will be relocated to an enhanced corridor greenway where their functions will be replicated and enhanced. One HDF reach (WHT6-A) was classified as protection. This feature will be retained in-situ, but subject to natural channel design and wetland enhancement. Also see Wetlands.	• Maintain existing water balance to HDF reaches identified as protection, conservation or mitigation. • Replicate the ecological functions of any HDFs ranked as protection, conservation or mitigation • Prepare a Corridor Design Brief for Tributary WHT6 demonstrating how functions are to be replicated and enhanced. • Construct the proposed enhanced corridor/greenway for Tributary WHT6.	7.1, 7.3	Neutral-Positive
	Surface Water Runoff	Grading, Servicing and Development	Stormwater runoff captured by the proposed stormwater infrastructure could exacerbate the transitional/adjustment erosion processes in downstream reaches without appropriate quantity control.	• Implement SWM plan. • Refer to FSR (Urbantech Consulting 2023)	7.3, 7.4, 7.5	Neutral
	Geomorphological Processes	Grading, Servicing and Development	Grading and development will increase the overall area of impervious surfaces which will result in decreased infiltration and increased runoff. These increases can result in more frequent short duration high flow events, leading to increased erosion.	Utilize established thresholds for determining appropriate release rates from the stormwater management ponds. The SWM outfall will require site specific geomorphic assessments for appropriate design to avoid and minimize impacts.	7.3	Neutral
	Water Quality	Grading, Servicing and Development	Stormwater runoff captured by the proposed stormwater infrastructure could affect water quality in downstream reaches if released without quality control.	• Refer to FSR (Urbantech Consulting 2023) • Implement BMPs outlined in the Guidance for Development Activities in Redside Dace Protected Habitat (MNRF 2016)	7.3, 7.4	Neutral
	Temperature	Grading, Servicing and Development	Stormwater runoff captured by the proposed stormwater infrastructure could affect water quality in downstream reaches if released without thermal control. The proposed SWM Pond will store the equivalent volume of the 10 mm storm event between a depth of 1.5 m for the bottom draw outlet which is in accordance with *Guidance for Development Activities in Redside Dace Protected Habitat* (MNRF 2016).	• Refer to FSR (Urbantech Consulting 2023)	7.3	Neutral

	Site Water Balance	Grading and Development	Grading activities and conversion of the Subject Lands from agricultural lands to a mix of mainly residential development units may result in some compaction of native soils and will result in an increase in the overall imperviousness of the Subject Lands. During the post-construction period, there will be an increase in the area of impervious surfaces which in turn will result in an overall decrease in the available pervious area in which infiltration can occur. In the post-construction scenario, a decrease in the annual AET and infiltration volumes is anticipated. Further, there will be an increase in the volume of evaporation and runoff.	• Surficial LID techniques recommended for the Study Area include:
				  • increasing topsoil thickness across low and medium density lots, boulevards and parks;
				  • reducing lot grading;
				  • directing roof runoff to pervious areas (i.e., rear yards) via downspout disconnection will be implemented to provide lot level controls; and
				  • Runoff in rear yards (natural runoff plus downspout disconnection) conveyed to rear lot grassed swales and infiltration trenches in the adjacent NHS.
				• BMPs for topsoil placement will be used to minimize compaction.
					7.2	Neutral

Category	Feature/Function	Proposed Activity	Potential Impacts	Recommended Mitigation/Management	EMP Section	Effect
	Feature Based Water Balance Analysis	Grading and Development	The proposed development will result in changes to the existing drainage areas and has the potential to impact on the water balances of existing natural heritage features that are proposed for protection within the natural heritage system. Depending on the magnitude of the changes there could also be changes to the hydrology and hydro regimes sustaining features such as wetlands and HDFs. A wetland water balance risk evaluation was completed and determined that the majority of the features are within the high-risk category and require further investigation.	• It is recommended that a Wetland Water Balance Analysis be prepared in accordance with TRCA guidelines once more baseline hydrogeological data is available (see Section 9 – Ongoing and Future Work). • Depending on the findings of the Wetland Water Balance Analysis, mitigation measures may need to be applied. • Surpluses can be addressed by implementing LIDs and enhanced storage and detention measures. • Deficits can be addressed by implementing, split drainage on Lots, Roof Drainage Collection Systems.	TBD	TBD
Natural Heritage System	**Linkages**	Grading, Servicing and Development	Existing linkages on the Subject Lands are limited to local linkages, which are limited in terms of the level of function they provide in their current state.	• Encourage wildlife passage through the NHS and parks as a means of reducing the potential for vehicular impacts.	7.1	Neutral
	Significant Woodlands	Grading, Servicing and Development	There are no significant woodlands on or adjacent to the Subject Lands.	None.	N/S	Neutral
	Wetlands	Grading, Servicing and Development	There are no provincially significant wetlands associated with the Subject Lands, however a portion of the Study Area overlaps with part of a wetland features that is identified as provincially significant. Wetlands W1 through W6 on the Subject Lands are non-provincially significant (other) and will be protected within the proposed natural heritage system. As some wetland features are very small and isolated (ELC Units 5, 7e, 7f, 7l, 13 and 14a), it is proposed that these be consolidated and enhanced within an enhanced corridor/greenway along a re-aligned Tributary WHT6. The proposed corridor has been sized to ensure that an equivalent area of wetland habitat can be accommodated.	Potential impacts to wetlands can be reduced by implementing the following impact avoidance and mitigation measures: • Naturalize Buffers using native species; • Avoid directing untreated runoff to the wetlands; • Implement recommendations from the ESC Plan including measures as outlined in the *Guidance for Development Activities in Redside Dace Protected Habitat* (MNRF 2016) and *Erosion and Sediment Control Guideline for Urban Construction* (2006) to be provided at the detailed design stage; • Implement ESC Plan as detailed in the FSR (Urbantech Consulting 2023). measures at limit of development in advance of site preparation activities and outside the wetland boundaries when constructing SWM outfalls and bridge abutments; • Install ESC fencing around the work area required for removal of cart paths and culverts; • Implement 1:1 compensation for development or alteration in Other Wetland areas; • Restore affected areas with native vegetation.	7.1	Positive
	Valleylands	Grading, Servicing and Development	There are no valleylands associated with the Subject Lands.	None.	N/A	Neutral
	Trees	Grading, Servicing and Development	The majority of the Subject Lands is comprised of agricultural land and is relatively open. It is anticipated that all trees situated in areas to be developed will be removed. These removals are not anticipated to adversely impact the NHS, as the trees removed will be replaced with site-appropriate native and non-invasive species. No trees will be removed from the proposed NHS.	More trees will be planted than removed to accommodate development. Tree preservation and replacement requirements to be addressed in Arborist Reports.	7.1	Positive
Wildlife	**Birds**	Grading, Servicing and Development	The open land bird species found within the Subject Lands are expected to undergo a moderate shift in species diversity and numbers with residential development. However, roughly the same number of species would be expected in the agricultural areas both pre- and post-development, and species in both cases would be disturbance-tolerant species. For instance, one would expect fewer or no Savannah Sparrows, Song Sparrows and Eastern Kingbirds, but more Mourning Doves, N. Cardinals, Chipping Sparrows. All the wetland and	• Undertake vegetation / tree clearing between August and April so as not to impact breeding birds and not contravene the *Migratory Birds Convention Act.* • Establish buffers and fencing at development limits adjacent to the NHS to reduce human encroachments and predation by pets. • Post signage to keep pets and people out of the NHS	7.1	Neutral

Category	Feature/Function	Proposed Activity	Potential Impacts	Recommended Mitigation/Management	EMP Section	Effect
			edge species that occur within the NHS are expected to remain subject to the usual annual variation.			
	Reptiles	Grading, Servicing and Development	No significant reptile habitats (i.e., hibernacula, nesting sites) have been identified on the Subject Lands. However, the protected NHS could provide habitat for a range of amphibians and reptiles and may include some significant habitats for these species. No such habitats will be removed from the proposed NHS which contains meadows and wetlands.	• The loss of potential foraging habitats for snakes can be mitigated by retaining meadow and other types of habitats within the NHS and through the creation of the greenway corridor. • The nearby PSW will be protected from development, which provides great habitat for reptile use. • See Section 9 for additional recommendations	7.1	Neutral
	Amphibians	Grading, Servicing and Development	No significant amphibian habitats (i.e., breeding sites) have been identified on the Subject Land. In the adjacent lands, the protected Bolton PSW provides amphibian habitat. No such habitats will be removed from the proposed NHS which contains wetlands.	• The loss of potential habitats for amphibians can be mitigated by retaining wetlands and other types of habitats within the NHS and through the creation of the greenway corridor. • The nearby PSW will be protected from development, which provides great habitat for amphibian use. • See Section 9 for additional recommendations	7.1	Neutral
	Mammals	Grading, Servicing and Development	All the mammal species that are currently present on and adjacent to the Subject Lands are urban tolerant species and expected to remain in the post development environment. Like the birds, it is anticipated there will be a slight shift in species assemblages toward a greater number of species that are more tolerant of urban environments. For example, Deer use is expected to decrease, while Raccoon and Striped Skunk populations could increase. Wildlife movement patterns in the general vicinity are expected to change as landscape resistance will increase as a result of development. It is expected that future wildlife movement will be more concentrated to the north and east in the Humber River valleylands.	• Encourage wildlife passage through the NHS and parks as a means of reducing the potential for vehicular impacts.	7.1	Neutral
	Significant Wildlife Habitat (SWH)	Grading, Servicing and Development	Candidate SWH identified through this CEISMP is primarily located in the Natural Heritage System that will be protected from development.	• Implement and naturalize Buffers as recommended in this EIS. • Install fencing between rear lots and the NHS to limit encroachments. • See Section 9 for additional recommendations.	7.1	Neutral-Positive
Fish Habitat	**Fish Habitat**	Grading, Servicing and Development	The CEISMP has identified that HDF reaches WHT1-A, WHT1-B and WHT6-A provide fish habitat. No development or site alteration is proposed within the HDF reaches WHT1-A and WHT1-B, however HDF reach WHT6-A will be enhanced through the proposed enhanced corridor/greenway.	Potential impacts to fish habitat can be reduced by implementing the following measures: • Develop and implement ESC and Spill Prevention plans at the draft plan stage. • Minimize non-essential vegetation clearing and grading, and integrate a phasing workplan for grading and construction; • Stabilize soils that will be exposed for long periods of time; and • During site preparation and construction ensure surface water is properly managed and treated using approved BMPs. Mitigation measures for flood control, water quality, temperature impacts, and erosion are noted above under Surface Water.	7.1, 7.3, 7.5	Positive
Provincially Threatened and Endangered Species	**Eastern Meadowlark**	Grading, Servicing and Development	Eastern Meadowlark is a Provincially Threatened bird species that breeds in grasslands of various types. Eastern Meadowlark has been recorded in various location the Subject Lands and Study Area in 2013/2014 (Dougan & Associates *et al.* 2014a and 2014b), and habitat remaining for this species during the last breeding bird survey in 2020 was ELC Unit 3d as the results of the last breeding bird survey provide a higher level of confidence of actual breeding locations (refer to **Figure 3.3.9**). Other areas where Eastern Meadowlark had been recorded are now farmed and no longer provide suitable habitat.	The removal of the Eastern Meadowlark habitat will need to be mitigated through compensation (e.g., creation new or enhanced habitat, that is the same size as that being removed) in accordance with the *Endangered Species Act* and regulations pertaining to this species. See Section 9 for additional recommendations	7.1	Neutral
	SAR Bats		There are four endangered bat species in Ontario: Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis and Tricoloured Bat. Based on the ELC	The removal of the SAR Bat habitat will require a permit under the *Endangered Species Act* and regulations pertaining to this species.	7.1	Neutral

Category	Feature/Function	Proposed Activity	Potential Impacts	Recommended Mitigation/Management	EMP Section	Effect
			work completed, it was determined that one ELC community in the Study Area could be suitable maternity roost habitat: Organic Deciduous Swamp (ELC Unit 12), which is protected by the NHS. Additionally, anthropogenic structures on the Subject Lands have the potential to provide SAR bat maternity roost habitat.	See Section 9 for additional recommendations		
	Redside Dace	Site Preparation, Grading, Servicing and Development	This CEISMP has identified potential for contributing habitat for Redside Dace habitat along two reaches of Tributary WHT1 on the Subject Lands (WHT1-A & WHT1-B). No development or site alteration is proposed within the HDF reaches WHT1-A and WHT1-B and their associated wetlands. All grading, servicing and development will occur outside potential contributing habitat for this species and will therefore not have a direct impact on the identified habitat. Furthermore, a wetland buffer has been proposed that will mitigate indirect impacts the habitat. Potential residual indirect impacts that may result from the proposed development are outlined below: **Grading** • Potential to introduce sediments and nutrients into the drainage features. • Alterations to existing drainage catchment areas has the potential to temporally and spatially alter surface water inputs which can affect flows, erosion rates and water temperatures. **Servicing** • Installation of underground services has the potential to alter groundwater flows and pathways, which may reduce baseflow contribution to HDFs, resulting in thermal impacts and altered baseflows. Installation of underground services may require dewatering of groundwater which may result in reduced baseflow contributions and increase flows at discharge location. **Development:** • Development is proposed adjacent to HDF reaches WHT1-A and WHT1-B. • Development will create impervious surfaces that will increase overall runoff volumes and decrease infiltration within the catchment areas of features. • Decreases to infiltration can reduce base flow contributions to these HDFs and impact fisheries through reduced flow and elevated temperatures. • Increased runoff and flows to the downstream drainage features can result in erosion and flooding.	Mitigation measures will be implemented in accordance with the *Guidance for Development Activities in Redside Dace Protected Habitat* (MNRF 2016). Potential impacts to Redside Dace in downstream reaches can be reduced by implementing the following measures: • Develop and implement ESC and Spill Prevention plans at the draft plan stage. • The ESC Plan should include a multi barrier approach be applied around areas identified as contributing Redside Dace habitat. The multi-barrier should consist of a double row straw bale reinforced sediment fence; • Minimize non-essential vegetation clearing and grading, and integrate a phasing workplan for grading and construction; • Stabilize soils that will be exposed for long periods of time and store stockpiled soil outside of the potential Contributing Redside Dace habitat; • During site preparation and construction ensure surface water is properly managed and treated using approved BMPs; and • If water is to be discharged directly to Contributing Redside Dace habitat, all plans must be approved by MECP. Mitigation measures for flood control, water quality, temperature impacts, and erosion are noted above under Surface Water.	7.1, 7.3, 7.5	Neutral

7. Environmental Management Plan

The CEISMP TOR requires that an environmental management strategy be created as part of this report. More specifically:

> *The study will outline an environmental management strategy for the preferred development locations which will recommend measures for the management, enhancement, restoration and monitoring of the ecosystem.*

The Caledon Station Land Use Plan and Framework Plan were designed with the objective or protecting, maintaining and enhancing the natural heritage system, thereby avoiding directly impacting upon the ecosystems in the Study Area. Consequently, the Impact Assessment presented in **Section 6** of this CEISMP was focussed primarily on evaluating and mitigating potential indirect impacts that could adversely affect natural heritage features and ecological functions. Included in the Impact Assessment Matrix presented in **Table 18** are recommendations for various mitigation measures that are to be implemented during development of the future community to ensure the natural heritage features and ecological functions are protected, maintained and enhanced. These various recommendations have been compiled into several management plans that describe the measures in further detail. Implementation of these management plans will ensure that the Town's environmental performance measures can be satisfied while developing this community.

7.1 Natural Heritage Resource Management Plan

As was described in **Section 5.2**, a proposed natural heritage system was developed through this CEISMP and has been identified as EPA on the Macville Community Land Use Plan and Framework Plan. The natural heritage system is comprised of two blocks. The larger block is located on the southern portion of the Subject Lands and is comprised of existing wetlands and HDFs. The smaller block located on the eastern portion the Subject Lands is represented by a proposed enhanced corridor/greenway system centred on Tributary WHT6. This corridor has been designed consolidate several small and isolated wetland features into a single contiguous wetland centred on a realigned tributary corridor.

Under the proposed Land Use Plan and Framework Plan, this natural heritage system will be protected within an EPA land use designation which effectively mitigates most direct impacts through impact avoidance. The natural features that comprise the natural heritage system will however require some level of management to ensure protection and enhancement can be achieved. The following subsections include recommendations for protecting, maintaining, restoring and enhancing the natural heritage resources and ecological functions associated with these systems. As one EPA is based on protecting existing features and the other EPA is based on creating new features, the management requirements for each are discussed separately below.

7.1.1.1 Southern Natural Heritage System

The southern natural heritage system is anchored by three tributary systems of the West Humber River (WHT1, WHT2 and WHT3). Associated with these tributaries are a very close grouping of wetland

communities W1 to W6, known as the “Macville Area Wetlands”. These wetlands are comprised mainly of mineral reed canary grass and cattail marshes, shallow aquatic wetlands associated with a dug pond, and a couple organic marsh and swamp communities. Most of these wetland communities are sustained by surface water, however there is evidence to suggest that some are seasonally sustained by groundwater discharge. These groundwater inputs contribute to baseflows along Tributary WHT1 and contribute to more perennial flows and cooler stream temperatures. For this reason, this tributary and its associated wetlands have been identified as fish habitat as well as potential contributing habitat for endangered Redside Dace that are known to occur downstream of the study area.

Protection of the natural heritage features and ecological functions associated with the natural heritage system can be achieved by:

- Prohibiting development and site alteration within the natural heritage features;
- Maintaining the existing water balances of the natural heritage features by implementing the recommendations in the SWM Management Plan and LID Management Plan;
- Applying as 10 m buffer to the limits of the staked wetland features; and
- Placing the natural heritage features and associated buffers within an EPA designation.

Maintenance and enhancement of the ecological integrity of the natural heritage features of their ecological functions can be achieved by:

- Removing foreign waste and debris from the natural heritage features;
- Controlling populations of invasive species present within the natural heritage features;
- Restoring native species diversity to the habitats by planting appropriate native vegetation;
- Enhancing wildlife habitat through plantings and artificial habitat creation (e.g., bird/bat boxes snake hibernacula, turtle nesting area);
- Enhance fish habitat by providing more diverse riparian cover and removing barriers to fish passage;
- Enhancing hydrologic connectivity of Macville Area Wetlands at abandoned rail line (e.g., W3 to W4 culvert) by replacing with a naturalized channel;
- Integrating trails within buffers to provide for formal separation between the limits of development and the natural heritage features;
- Naturalizing the buffers with dense shrub planting to create a living fence barrier between development and natural features;
- Incorporating LIDs within buffers to maximize their effectiveness;
- Installing fencing at the limits of development;
- Posting educational signage in the buffer to discourage encroachments into the natural heritage features; and
- Monitoring the health and condition of the natural heritage features and performance of environmental protection and management systems as outlined in **Section 8**.

7.1.1.2 Tributary WHT6 Enhanced Corridor/Greenway

As was discussed in **Section 5.2**, a conceptual plan was developed for the WHT6 tributary corridor/greenway to confirm that the corridor has been sized appropriately on the Land Use Plan and Framework Plan and can meet the following design objectives:

- Conveyance of regional storm;
- Accommodation of meander belt;
- Sinuous low flow channel;
- Run, riffle, and pool habitats;
- Low gradient profile to promote wetland establishment;
- Wetland habitat area equivalent to that of wetlands removed (1.27 ha);
- 2.5:1 – 3:1 side slopes; and
- 2–3 m wide trail system on top on one side.

As the proposed Tributary WHT6 corridor/greenway will be newly created, the protection requirements applied to it are different from that applied to existing natural heritage features and systems. For example, buffers are typically applied to existing natural heritage features to mitigate the effects of intruding new land uses or new stressors to adjacent lands, however in this case, the corridor is being constructed at the same time as the rest of the development and therefore does not necessitate a buffer as no new land uses or stressors are being introduced. Therefore, the focus of protection efforts has been focussed on measures that can be applied to retaining the biodiversity of the existing wetland features that will be relocated within the new corridor.

Protection, Maintenance and Enhancement of habitats, biodiversity and ecological functions can be achieved by including the following in the Corridor Design Brief for Tributary WHT6:

- A Wetland Protection and Salvage Plan that describes in detail:
  - How the various wetland features to be removed will be protected in the interim while the channel corridor is constructed;
  - How the soil seedbanks from these wetlands will be salvaged, stockpiled and reapplied to the constructed corridor, and
  - Permitting requirements.
- Details of the following:
  - Ecological design goals and objectives; and
  - Landscaping and Habitat Creation Plans.

Monitoring requirements for the corridor is as outlined in **Section 8**.

7.1.1.3 Bolton Wetlands Overpass

As was discussed in **Section 5**, a collector road crossing the CPR line is proposed at the southern limit of the Humber Station Draft Plan. This collector road will be an overpass and will intersect with the existing Greenbelt wetlands (W9 and ELC Unit 7h).

As design of this crossing proceeds, consideration for the protection of the existing wetlands will be required. These two wetlands shall be evaluated or remapped, in accordance with Ontario Wetland Evaluation System. Detailed hydrologic evaluation of the wetlands, especially W9, will be required as per the Greenbelt Plan, in order to demonstrate no negative impact to the Key Hydrologic Feature. A natural heritage evaluation may also be required in accordance with the Greenbelt Plan.

7.2 Groundwater Resource Protection

Based on an assessment of the hydrogeological conditions on the Subject Lands, an Environmental Management Plan has been prepared to be utilized during and following the construction period. The Environmental Management Plan includes the recommended monitoring program, triggers for mitigation and recommended mitigation measures for groundwater levels and discharge of water during construction. The Environmental Management Plan for the protection of groundwater resources is presented in Table 14 of the Hydrogeological Investigation (DS Consultants Ltd. 2023). Components of this plan have been incorporated into the integrated multi-disciplinary Impact Assessment Matrix provided in **Table 18** of this CEISMP.

7.3 Water Balance Management Plan

7.3.1.1 Site Water Balance

The results of the post-development site water balance assessment as provided in Section 5.3 of the Hydrogeological Investigation (DS Consultants Ltd. 2023), shows there is an overall decrease in evapotranspiration (AET) and infiltration in comparison to pre-development conditions across the Subject Lands. A summary of the results without mitigation is provided in **Table 19** below:

Table 19. Summary of Pre- and Post-Development Site Water Balance (without Mitigation)

	Pre-Development	Post-Development	Change
ET (m^3/year)	3,734	153,774	-150,040
AET (m^3/year)	953,221	261,884	691,337
Infiltration (m^3/year)	138,717	44,502	94,215
Runoff (m^3/year)	332,131	967,643	-635,512

In the post-construction scenario, an increase in impervious surfaces result in a decrease in area where evapotranspiration and infiltration can occur. A reduction in infiltration could reduce groundwater levels and potentially change groundwater gradients and groundwater contributions to onsite wetlands. Groundwater elevations across the Site are high and present a challenge for mitigating infiltration deficits. With this in mind, best efforts have been made to reduce the infiltration deficit using lot level, passive Low Impact Development (LID) measures. The location and design of the LIDs are provided in the FSR (Urbantech, May 2023). The mitigation was entered into the post-development water balance to assess the effectiveness at addressing infiltration deficits. The following mitigation considered.

Connected Impervious and Pervious Surfaces

Considering the high groundwater elevations across the Site, lot level mitigation was considered the best approach for improving infiltration in the post-development condition. The current LID plan includes connecting about 9.8 ha of impervious surfaces with 20.5 ha of pervious area to maximize infiltration potential. The areas considered include impervious roofs and paved areas to rear yards and pervious

areas of parks, channels and SWM ponds from Catchments 101, 104, 105 and 106. Stormwater generated from the impervious areas contribute to the pervious area during precipitation events and is made available for evapotranspiration, infiltration and runoff. The result is increased evapotranspiration and surplus available for infiltration and runoff. The effectiveness of connecting the impervious and pervious areas is estimated to provide and infiltration benefit of 18,041 m^3/yr. Detailed calculations are presented in **Table 4, Appendix G** of the Hydrogeological Investigation (DS Consultants Ltd. 2023).

Silva Cells

The Silva Cell is a patented modular suspended pavement system that holds unlimited amounts of lightly compacted soil while supporting traffic loads. That soil serves to provide stormwater treatment and storage for on-site infiltration. Areas considered as contributing catchments for the Silva Cells includes approximately 6.3 ha impervious area and about 4.0 ha pervious area, from road ROWs and parks in Catchment 104, 105 and 106. The Silva Cells were designed to capture a 25mm storm event for each respective catchment. As a result, it is expected that the Cells are capable of storing and infiltrating a maximum of 90% annual rainfall depth however, surplus available form the impervious and pervious surfaces accounts for less. The effectiveness of the Silva Cells is estimated to provide and infiltration benefit of 54,323 m^3/yr. Detailed calculations are presented in **Table 4, Appendix G** of the Hydrogeological Investigation (DS Consultants Ltd. 2023). Including the above mitigation, the post-development infiltration deficit is reduced to 21,851 m^3/yr from pre-development conditions.

It should be noted that the detailed design of the LID facilities at the Site during the post-construction period have not been finalized. Changes or additions to the LID plan should include a revised water balance. Please refer to the above-referenced Functional Service Report (FSR) by Urbantech (2023) for further information regarding the LIDs under consideration.

7.3.1.2 Feature Based Water Balance

The proposed development will result in changes to existing drainage areas and has the potential to impact the water balances of existing natural heritage features that are proposed for protection within the natural heritage system including wetlands W1 through W6. Based on the Wetland Risk Assessment completed for these wetlands, reductions in wetland catchment areas range from 40 to 87%. Anticipated magnitudes of hydrologic change are considered to present a high risk to the form and function of the wetlands and will require further investigation as recommended in **Section 9**.

To aid further assessment at the Draft Plan stage, baseline hydrogeological data for wetlands W1 through W6 is being gathered. It is recommended that the baseline monitoring continue over the spring and summer of 2023, and that this data eventually be used along with a catchment specific feature-based water balance model to refine mitigation measures and storm water management techniques required to address potential deficits or surpluses. Mitigation provided for the Site Water Balance to address infiltration deficits from pre to post-development conditions is expected to help sustain groundwater contributions to wetlands, however, infiltration facilities which specifically target upgradient areas of the wetlands will likely be required to further mitigate the feature-based water balance.

Storm water management techniques which aim to mitigate runoff contributions to the wetlands will also be required. In anticipation of this, the proposed drainage plan was designed to promote drainage of clean sources of water (vegetated areas and roof drainage) towards the wetlands. Uncontrolled flows

from the development are being directed to Wetlands W1, W3, W5, and W6 to replicate the existing runoff. In particular, all lots backing onto the wetland features have been designed to drain clean flows from half of the rooftop and half of the yards towards the adjacent wetland area. Refer to the FSR (Urbantech, May 2023) for details and calculations regarding stormwater management considerations.

7.4 Stormwater Management Plan

7.4.1.1 SWM Strategy and Objectives

The SWM strategy maintains the approximate pre-development watershed divide between the West Humber River and Humber River as well as the individual subcatchments/outlets within each watershed as described in **Section 5.3**. This approach ensures that, with appropriate SWM controls, minimizes change to the overall drainage patterns and sources of drainage to each outlet aside from that associated with increased imperviousness.

Three (3) end-of-pipe stormwater management facilities (wet ponds) are proposed to treat the post-development drainage areas within the West Humber watershed illustrated in FSR Drawing 501 (Urbantech Consulting 2023). It is noted that while quantity controls are not required within the Main Humber River watershed, water quality controls will be provided within these lands, as required.

SWMF 1 is situated northwest of the intersection of King Street & Humber Station Road as it abuts King Street to the south and Humber Station Road to the east. SWMF 2A is situated in the southwest of the Subject Lands, east of wetland W2 and west of wetland W4. SWMF 2B is located south of King Street in future development lands also owned by the CSSP applicant. Preliminary sizing of these facilities is provided herein. Preliminary sizing of these facilities is provided in the FSR (Urbantech Consulting 2023).

Other SWM facility types (dry ponds, wetlands, etc.) were not considered for this development. Wet ponds were determined to be more appropriate in terms of meeting the quality and quantity control requirements for the subject lands.

The SWM facilities have been situated in the proposed locations for the following reasons:

- To make use of existing/natural low points in terrain to minimize earthworks/cut and fill operations and maintain existing drainage patterns as much as possible;
- To maintain a permanent pool and drain into the receiving channels / existing / planned storm sewer outlets;
- To locate SWM facilities adjacent to the EPA and maintain flow input locations along the receiving channels where possible;
- To minimize storm sewer infrastructure size and avoid potential servicing crossing conflicts; the contributing areas to the SWM facilities are generally limited to 65 ha; and
- To optimize land use by maximizing tableland and serviceable area.

As shown on FSR Drawings 501-503 (Urbantech Consulting 2023), the SWM facilities are located at the proposed drainage outlets along King Street and just south of the Subject Lands. These locations represent the low areas within the West Humber subcatchments intersected by the Subject Lands.

7.4.1.2 Quantity Control

The SWM targets / sizing criteria for the Subject Lands were established based on the TRCA SWM Criteria (2012a) and the TRCA pre-development hydrologic model presented in the Humber River Hydrology Update (Civica 2018).

These studies involved hydrologic modelling for pre- and post-development conditions, resulting in SWM design criteria to control the post-development drainage areas to pre-development flow rates, in addition to meeting the following requirements:

- Ensure that existing flow rates downstream of the subject lands do not vary for the larger storm events during post-development conditions, thereby providing flood protection for properties downstream of the Subject Lands;
- Maintain recharge volumes through the use of low impact development and other practices as required based on hydrogeological assessments; and
- Maintain water balance to wetland features.

Table E.1: Summary of Unit Flow Relationships, Humber River Watershed in the TRCA SWM Criteria (2012a) provided the equations to determine the quantity control unit flow rates for the 2-year to 100-year storm events within the West Humber River watershed.

Regional control of post-development flow rates to pre-development levels is provided, as evaluated at a common downstream location. Regional storm control is required as per email correspondence with TRCA dated April 17, 2020.

7.4.1.3 Quality Control

Quality control is provided to ensure:

- MECP-recommended stormwater quality treatment of runoff; and
- Adequate drawdown time / erosion control to protect the form and function of watercourses downstream of the SWM facilities.

The following specific SWM criteria were established, for quality control:

Permanent Pool Volume - each stormwater management facility within Subject Lands must meet the Enhanced (Level 1) criteria as per the MOE SWM Planning and Design Manual (March 2003).

Extended Detention / Erosion Control – The extended detention volume for erosion control is based on detention of the 25 mm storm event from 48 hours to 72 hours for controlled release from the SWM ponds. An average release rate of 0.72 L/s/ha was utilized in accordance with the Town of Caledon Bolton Residential Expansion Study.

7.5 Low Impact Development (LID) Plan

To achieve the water balance targets noted in the preceding section, the SWM strategy must incorporate measures to direct the excess runoff from impervious surface into pervious areas or Low Impact Development (LID) measures to promote attenuation / infiltration.

TRCA have endorsed the use of LID measures, particularly in a “treatment-train” approach involving consecutive stormwater management / LID measures in series to enhance the overall performance, reliability, and effluent water quality. LID measures were discussed in Section 5.3.4.

The opportunities for LIDs within ROWs are to be further explored following the Town’s review of the alternative ROW design standards presented in the Urban Design Guidelines.

7.6 Erosion and Sediment Control Plan

Rigorous erosion and sediment control measures will be designed, implemented and maintained throughout the construction period. At detailed design, an Erosion and Sediment Control Plan will be prepared and designed in conformance with the Town and Conservation Authority guidelines. Erosion and sediment control will be implemented for all construction activities including topsoil stripping, earthworks, foundation excavation and stockpiling of materials and will remain in place and functional until bare surfaces are stabilized.

The following erosion and sediment control measures should be considered for use during construction:

- Natural features will be staked and temporary fencing provided to keep machinery out of sensitive areas;
- Sediment control fence and snow fence will be placed prior to earthworks;
- Logistics/construction plan will be implemented to limit the size of disturbed areas, minimizing the non-essential clearing and grading areas;
- Temporary sediment ponds;
- Rock check-dams and cut-off swales will be provided, where required, in order to control, slow down and direct runoff to sediment basins;
- Sediment traps will be provided;
- Gravel mud mats will be installed at construction vehicle access points to minimize off-site tracking of sediments;
- All temporary erosion and sediment control measures will be routinely inspected / monitored and repaired during construction. Temporary controls will not be removed until the areas they serve are restored and stable;
- The “multiple barrier approach” will be applied to all construction stages to ensure erosion is prevented rather than reduced. Recommended measures are to be installed prior to the initiation of the earthworks and grading; and
- Reference will be made to the Guidelines for Erosion and Sediment Control for Urban Construction Sites prepared by the Greater Toronto Conservation Authorities (2020) when preparing Erosion and Sediment Control Plans.

7.7 Construction Dewatering Management Plan

7.7.1.1 Construction Dewatering (Short-term Discharge)

Based on the preliminary designs, the proposed plans for development will consist of low-rise residential blocks, commercial and institutional zones, storm water management (SWM) ponds and greenspace. Development of the Subject Lands will also include the construction of roadways and associated storm, sanitary sewer and water distribution infrastructure. Given that the detailed design of the proposed plans for development is not currently finalized, it is assumed that the proposed residential blocks will comprise of one (1) level of underground basement and/or parking. Further, the institutional and mixed commercial use blocks and the GO station block will be constructed slab-on-grade.

Based on the findings of the subsurface drilling investigation, there are significant variations noted in the subsurface stratigraphic and groundwater conditions across the Subject Lands. The construction of the low-rise residential blocks and the site servicing will encounter varying subsurface conditions at different locations across the Subject Lands. Based on the review of the proposed preliminary grading plans, it is understood that the site grades will generally range from approximately 280.0 masl in the northwestern corner to an approximate elevation of 262.2 masl in the southwest and 265.1 masl in the southeastern corner of the Site. For the purpose of assessing the requirements for groundwater control and dewatering during the construction period, a conceptual model of the Subject Lands has been prepared based on the proposed site grading and the worst-case subsurface conditions. Conceptual models for the mid-rise residential development and the three (2) storm water management ponds are prepared based on inference from nearby boreholes and monitoring wells in the locality of these proposed structures.

The results of the groundwater monitoring to-date indicate that the groundwater levels at the Subject Lands ranged from 255.2 masl (BH20-7) to 276.16 masl (BH20-1) meters above sea level (masl). The highest measured groundwater level of 0.5 m above ground surface is considered to be localized in the south-central portion of the Site. For the purpose of assessing the requirements for groundwater control and dewatering during the construction period for the low-rise residential development and the site servicing, the prevailing groundwater table at the Subject Lands is considered to be the next highest measured water level of 1.2 m bgs (BH20-6, September 2020).

It is expected that the trenching and excavation earthwork during the construction period will extend below the groundwater table in certain areas of the Subject Lands and groundwater control and dewatering will be required to ensure the excavation area remains dry and safe. Generally, the excavations will be completed into the cohesive clayey silt till, however will extend into the underlying silty sand till / silt unit in certain locations. The site services trenching and the excavation for the storm water management pond in the southeastern corner of the development has the potential to encounter modern alluvium deposits which may provide higher flows of groundwater seepage. The geometric mean hydraulic conductivity for the overburden across the Subject Lands is estimated to be 3.4×10^{-7} m/sec.

The dewatering estimates for the site servicing and residential block developments also includes a 50% safety factor and provision for controlling storm water in the excavation area from an incidental 2-year storm event. As per the Ministry of Transportation (MTO) Intensity-Distribution-Frequency (IDF) curves for the Town of Caledon, a 2-Year storm that is 2-hours in duration would result in a 13.5 mm/hr of rainfall intensity.

Detailed calculations for construction dewatering flow estimates are provided within the Hydrogeological Investigation (DS Consultants Ltd. 2023). Considering the unsealed excavation method, the total maximum estimated steady-state flow rates for temporary dewatering volumes for each development type was estimated as follows:

- Site servicing (30 m x 2 m per day) – **15,500 L/day**;
- SWM Pond 1 – 899,000 **L/day**;
- SWM Pond 2A – **280,000 L/day**;
- Interim SWM Pond 2 – **240,500 L/day**;
- Medium Density Residential Blocks, Low-Rise Development – **346,830 L/day for one (1) residential low-rise block**; and
- Townhouse & Single Detached Units – **186,705 L/day for one (1) unit**.

Given that the detailed design for the proposed plans for development were not available at the time of writing this report, various assumptions were made to assess the requirements for groundwater control and dewatering during the construction period. During the detailed design stage, if the assumptions made therein Section 7.0 of the Hydrogeological Investigation (DS Consultants Ltd. 2023) deviate from the finalized developmental designs, DS should be consulted to revise the estimated groundwater seepage rates and permitting requirements.

7.7.1.2 Permanent Drainage (Long-term Discharge)

The proposed SWM pond designs will require permanent groundwater control. This is required to prevent hydrostatic pressure from up lifting the base of the pond during both normal operation and maintenance events. For this reason, control of permanent drainage within these structures will likely be required. For the purpose of assessing permanent flows into the private water drainage system, the following design considerations relative to groundwater conditions are assumed:

- Monitoring Wells BH22-33, BH20-7 and Borehole BH22-13 are located in close proximity to SWM Ponds 1, 2A and the interim SWM Pond 2, respectively; and
- The proposed SWM Pond depths for SWM Pond 1, 2A and Interim SWM Pond are 260.0 masl, 259.0 masl and 268.6 masl, respectively.

The total maximum estimated steady-state flow rates for permanent drainage volumes to each SWM Pond including a 50% safety factor was estimated as follows:

- SWM Pond 1 – **255,750 L/day**;
- SWM Pond 2A – **11,250 L/day**; and
- Interim SWM Pond 2 – **45,000 L/day**.

It is understood that the low-rise residential block will include one (1) level of underground basement, which will likely be constructed above the water table and with a water-proofing membrane. A perimeter drainage system will be installed, however all collected percolating stormwater will be discharged to landscaped/vegetated areas of individual residential lots. Further, the institutional and commercial zones will be constructed slab-on-grade. For this reason, all low-rise residential blocks, institutional and commercial zones are not anticipated to require any permanent groundwater drainage control.

Given that the detailed design for the proposed plans for development were not available at the time of writing this report, various assumptions were made to assess the requirements for groundwater control and dewatering during the construction period. During the detailed design stage, if the assumptions made therein Section 7.0 of the Hydrogeological Investigation (DS Consultants Ltd. 2023), deviate from the finalized developmental designs, then DS should be consulted to revise the estimated permanent drainage rates and permitting requirements.

7.7.1.3 Permit Requirements

Environmental Activity and Sector Registry (EASR) /Permit to Take Water (PTTW) Application

An Environmental Activity Sector Registration (EASR) Posting is required to be submitted to the Ministry of the Environment, Conservation and Parks (MECP) if the taking of groundwater and stormwater for a temporary construction project is between 50,000 L/day and 400,000 L/ day. The EASR application is an online registry and should be submitted to the MECP before commencing any construction dewatering operations. A PTTW is required to be submitted to the MECP if the taking of groundwater and stormwater for a temporary construction project is greater than 400,000 L/ day.

During the construction period, the anticipated groundwater dewatering volumes throughout the Subject lands are expected to be between 50,000 L/day and 400,000 L/ day. As a result, on any given day, an EASR Posting with the MECP is anticipated to be required prior to commencing any construction dewatering operations. It should be noted that the above dewatering estimates are based on the assumption that the excavation at any given day will only include one (1) unit services trench and one (1) of each type of residential block to be opened concurrently. If additional excavations/trenches are opened simultaneously at any given day beyond the above and other assumptions made in Section 7.0 of the Hydrogeological Investigation (DS Consultants Ltd. 2023), then additional dewatering volumes can be expected. If the dewatering rates at any given day exceed 400 m^3, then a PTTW from the MECP will be required during the construction period.

During the post-construction period, the anticipated permanent drainage flows are anticipated to range between 11,250 L/day to 255,750 L/day for the SWM Ponds. Given that the estimated permanent drainage flows are expected to be greater than the MECP threshold of 50,000 L/day, a long-term PTTW will be required in support of permanent groundwater control for the SWM Ponds should design details corroborate the assumptions made in this assessment.

Discharge Permits (Construction Dewatering and Permanent Drainage)

The Subject Lands are located within the Humber River watershed, which is located within the regulatory jurisdiction of the TRCA. A discharge permit may be required from the TRCA, Peel Region and/or Town of Caledon if the water is to be discharged to a nearby/on-site surface water feature during the construction period. A discharge and monitoring plan will need to be prepared prior to obtaining a discharge approval from the TRCA, Peel Region and/or Town of Caledon.

If the private water during the post-construction period is anticipated to be discharged into the proposed municipal sewer system, a sewer discharge agreement with the Town of Caledon and/or Regional Municipality of Peel will be required prior to any discharging operations.

8. Long Term Environmental Monitoring Plan and Comprehensive Adaptive Management Plan

As was discussed in **Section 3**, monitoring of various biophysical parameters within the Study Area commenced in 2013 in support of the Town of Caledon Bolton Residential Expansion Study process. Additional monitoring was completed to gather the required technical information to support the Caledon Station CEISMP. Much of this monitoring has now been completed, however some hydraulic and hydrogeological monitoring is ongoing, and it is proposed that this monitoring continue through the remainder of the planning stages as well as during and following construction.

The CEISMP TOR requires that both a Long-Term Environmental Monitoring Plan (LTEMP) and a Comprehensive Adaptive Management Plan (CAMP) be prepared. From the descriptions provided in the CEISMP TOR, the LTEMP and CAMP are highly interrelated. While the CEISMP TOR suggest that these two monitoring items be presented as separate chapters, we believe that because of their inter-relatedness that they instead be combined into a single chapter.

The primary objective of the LTEMP is to monitor changes to various environmental parameters over time, including pre-development, during development and post-development, and where possible to identify the causal factors. Where unanticipated changes are observed through monitoring that can also be clearly be attributed to the change in land use, then the LTEMP should provide an evaluation to assess whether intervention is necessary.

The primary objective of the CAMP is to monitor the effectiveness of the mitigation measures and environmental management strategies that have been implemented as part of the future development to ensure they are performing as intended and to identify an adaptive process through which adjustments can be made should monitoring reveal that these measures and strategies are not performing as intended.

The LTEMP and CAMP have been integrated into **Table 20** below. For continuity, the table follows as similar framework used in the Impact Assessment Matrix (**Table 18**).

Table 20. Long Term Environmental Monitoring Plan (LTEMP) and Comprehensive Adaptive Management Plan (CAMP)

Category	Long Term Environmental Monitoring Plan							Comprehensive Adaptive Management Plan		Responsibilities for Monitoring and Cost*
	Performance Measure Indicator(s)/ Objectives(s)	Monitoring Parameter	Monitoring Target(s) or Threshold(s)	Methods / Protocols / Analyses	Monitoring Frequency and Duration			Trigger	Response	
					Pre-Construction	During Construction	Post-Construction			
PHYSICAL RESOURCES										
Groundwater Quantity	To assess changes in the groundwater elevations and horizontal and vertical flow conditions in the study area over the established monitoring period.	1a. Groundwater Elevations	No specific targets or thresholds. Will be assessed relative to baseline conditions.	• Manual measurements from monitoring wells and continuous interval readings (using data loggers) at selected locations. • Manual and continuous water level measurements from drive-point piezometers installed along watercourse banks at selected locations.	For 1 to 2 years prior to construction. Monthly manual measurements for first year and quarterly for second year to assess seasonal conditions. Continuous interval readings at selected locations	Quarterly manual measurements and continuous interval measurements during construction at selected locations until 85% build-out.	Continuous interval measurements at selected locations for 5 years following 85% build-out. Quarterly manual measurements at selected locations at 1, 3 and 5 years following 85% build-out.	Significant change in ground water elevation in comparison to baseline conditions.	Opportunity to re-assess SWM Plan for enhanced infiltration or redirection of stormwater.	DS Consultants Ltd. and Urbantech Consulting
		1b. Groundwater Flow Direction (inferred from elevations and gradients)	No specific targets or thresholds. Will be assessed relative to baseline conditions.	Mapping of interpreted potentiometric surface elevations and groundwater flow directions using groundwater elevation monitoring data.	Once prior to construction.	Annually during construction until 85% build-out.	Once at 1, 3 and 5 years following 85% build-out.	Significant change in ground water flow in comparison to baseline conditions.	Opportunity to re-assess SWM Plan for enhanced infiltration or redirection of stormwater.	DS Consultants Ltd. and Urbantech Consulting
Groundwater Quality	To assess changes in groundwater quality conditions during monitoring period.	2. Groundwater Quality: General Chemistry	No specific targets or thresholds. Will be assessed relative to baseline conditions.	Sampling from selected wells and laboratory analysis of general quality indicators: pH, conductivity, total dissolved solids (TDS), basic ions (including chloride and nitrate) and selected metals. Sampling is to occur from the same wells each monitoring year, except in cases where wells have been decommissioned due to construction	Once prior to construction for selected monitoring wells.	Annual collection and analysis of groundwater from selected monitoring wells until 85% build-out.	Once at 1, 3 and 5 years following 85% build-out.	Significant change in ground water quality in comparison to baseline conditions.	Opportunity to re-assess SWM Plan for enhanced infiltration or redirection of stormwater. Opportunity to alter land use practices to protect groundwater quality	DS Consultants Ltd. and Urbantech Consulting
Surface Water Quantity	To assess potential changes in flow conditions in HDFs	3. HDF Flow Conditions	No specific targets or thresholds. Will be assessed relative to baseline conditions.	Spot flow measurements at selected locations (as established for the baseline conditions).	Quarterly for 1-2 years prior to construction.	Quarterly for duration of construction period until 85% build-out.	Quarterly manual measurements at selected locations at 1, 3 and 5 years following 85% build-out.	Significant change in HDF water flow in comparison to baseline conditions.	Apply findings and results to future development to reduce long-term impact. Can also be applied in determining any required fisheries compensation from future development. Modify outflow rates as necessary to optimize: • Storm flow rate control • Base flow augmentation • Seasonal stormwater management considerations	DS Consultants Ltd. and Urbantech Consulting

Category	Long Term Environmental Monitoring Plan							Comprehensive Adaptive Management Plan		Responsibilities for Monitoring and Cost*
	Performance Measure Indicator(s)/ Objectives(s)	Monitoring Parameter	Monitoring Target(s) or Threshold(s)	Methods / Protocols / Analyses	Monitoring Frequency and Duration			Trigger	Response	
					Pre-Construction	During Construction	Post-Construction			
									Opportunity to re-assess SWM Plan for enhanced infiltration or redirection of stormwater.	
Surface Water Quality	To assess changes to water quality. To provide reference data for assessing water quality in relation to SWM outfall locations.	4. HDF Water Quality: Temperature	No specific targets or thresholds. Will be assessed relative to baseline conditions.	Temperature loggers installed in selected locations along HDFs.	Continuous logging at 15-minute intervals from May to October for 2 years at selected locations.	Continuous logging at 0.25 hr intervals from May to October for duration of construction period until 85% build-out.	Continuous logging at 15-minute intervals from May to October for (a) years 1, 3 and 5 following 85% build-out, and (b) 1 and 3 years following 100% build-out.	Significant change in HDF water temperature in comparison to baseline conditions.	Evaluate potential to alter SWM management operational characteristics to minimize thermal impacts (outflow rates, permanent pool depth) to optimize performance.	DS Consultants Ltd. and Urbantech Consulting
		5a. HDF Water Quality: General Chemistry – Lab Analysis	PWQO Limits for Ontario and relative to baseline conditions.	Surface water sampling and general quality analysis from selected locations HDFs. Quality parameters include pH, hardness, total suspended solids (TSS), basic ions (including chloride), nutrients (including phosphorus) and total metals. Locations include upstream and downstream of SWM outfalls.	Wet and dry samples taken quarterly, and event based for 1 to 2 years prior to construction.	Wet and dry samples taken quarterly, and event based for duration of construction period until 85% build-out.	Wet and dry samples taken quarterly, and event based (a) 1, 3 and 5 years following 85% build-out and (b) 1 and 3 years following 100% build-out.	Significant change in HDF water chemistry in comparison to PWQO Limits for Ontario and baseline conditions.		DS Consultants Ltd. and Urbantech Consulting
		5b. Stream Water Quality: General Chemistry – In Situ Analysis	PWQO Limits for Ontario and relative to baseline conditions.	Field measurements of pH (field), conductivity, total dissolved solids (TDS), turbidity and dissolved oxygen (DO) from select surface water sampling sites.	In-situ readings taken quarterly, and event based for 1 to 2 years prior to construction.	In-situ readings taken quarterly, and event based for duration of construction period until 85% build-out.	In situ readings taken quarterly and event based (a) 1, 3 and 5 years following 85% build-out and (b) 1 and 3 years following 100% build-out.			DS Consultants Ltd. and Urbantech Consulting
Water Balance	To assess potential changes in water balance (surface water quantity and groundwater recharge)	6. Water Budget	No specific targets or thresholds. Will be assessed relative to baseline conditions.	Groundwater and surface water levels to be assessed as per Monitoring Parameter 1 and 3. Water level trends correlated to established baselines conditions are necessary to assess changes to groundwater recharge and surface water runoff resulting from development. Continued monitoring of wetland water levels is required to observe changes to the established hydroperiods and to determine the effectiveness of the mitigation measures (including the LIDs).	See Monitoring Parameters 1 and 3.	See Monitoring Parameters 1 and 3.	See Monitoring Parameters 1 and 3.	Significant change in water balance (surface water quantity and groundwater recharge) in comparison to baseline conditions.	Apply findings and results to future development to reduce long-term impact. Can also be applied in determining any required fisheries compensation from future development. Modify outflow rates as necessary to optimize: • Storm flow rate control • Base flow augmentation • Seasonal stormwater management considerations Opportunity to re-assess SWM Plan for enhanced infiltration or redirection of stormwater.	DS Consultants Ltd. and Urbantech Consulting
Stormwater Ponds	To confirm SWM Ponds meet Town of Caledon design criteria, including	7. SWM Ponds Design (including landscaper plantings)	Built in accordance with the approved design.	Following the construction of the SWM facilities, a qualified professional is required to certify that the constructed facilities and structural details were monitored and inspected routinely during	Not Applicable	Survey and certification of SWM Ponds required once after construction, including assessment of	Inspection monitoring 4 times per year or following significant rainfall events for at least 2 years following 85% build-out, or	SWM Pond not built-in accordance with the approved design.	SWM Pond to be redesigned to meet the design criteria of the Town of Caledon.	DS Consultants Ltd., Urbantech Consulting and Beacon

Category	Long Term Environmental Monitoring Plan							Comprehensive Adaptive Management Plan		Responsibilities for Monitoring and Cost*
	Performance Measure Indicator(s)/ Objectives(s)	Monitoring Parameter	Monitoring Target(s) or Threshold(s)	Methods / Protocols / Analyses	Monitoring Frequency and Duration			Trigger	Response	
					Pre-Construction	During Construction	Post-Construction			
	inspection monitoring.			construction and, as such, are built in accordance with the approved design.		plantings once each year as per warranty.	every second year until Town assumption. Qualitative monitoring of landscape plantings once at 5 years following 85% build-out.	Decline of vegetation in comparison to initial planting conditions.	Refine vegetation management strategies to achieve desired natural cover, including additional plantings as required. Apply findings and results to future development phases.	
	To confirm SWM Ponds meet Town and MOECC ECA water level and flow criteria.	8. SWM Ponds Water Levels and Flow	Analysis should yield an estimate of the drawdown time for a particular rainfall event and a rough estimate of the hydrograph.	Flow loggers to be deployed downstream of the flow control orifice in the outlet control structure to record flow changes following precipitation events at 15-minute intervals. Continuous water level readings should be recorded from a secure station near the sediment forebay headwalls.	Not Applicable	Continuous readings at 15-minute intervals from April/May to October/November starting once the pond has been constructed and filled until 85% build-out.	Continuous readings at 15-minute intervals for 3 years from April/May to October/November following 85% build-out. If SWM pond not assumed by Town after 3 years, continuous hourly readings may be required every second year until Town assumption or as agreed by the Town.	Significant change in SWM Pond water levels and flow in comparison to Town and MOECC ECA water level and flow criteria.	Modify outflow rates as necessary to optimize: • Storm flow rate control • Base flow augmentation • Seasonal stormwater management considerations Opportunity to re-assess SWM Plan for enhanced infiltration or redirection of stormwater.	DS Consultants Ltd. and Urbantech Consulting
	To confirm SWM Ponds meet Town and MOECC ECA water quality criteria.	9. SWM Ponds Water Quality: Temperature	None but to serve as reference for discharge temperatures.	Temperature data loggers to be deployed seasonally each year at each pond's inlet, maximum depth, mid depth, surface, and at discharge point of bottom draw. Temperature loggers to be time synchronized with a recording frequency set at 15-minute intervals. One oxygen/temperature profile to be completed in mid-August of year 2.	Not Applicable	Continuous readings at 15-minute intervals from April/May to October/November starting once the pond has been constructed and filled until 85% build-out.	Continuous readings at 15-minute intervals for 3 years from April/May to October/November following 85% build-out. If SWM ponds not assumed by Town after 3 years, continuous hourly readings may be required every second year until Town assumption or as agreed by the Town.	Significant change in SWM Pond water temperature in comparison to Town and MOECC ECA water quality criteria.	Evaluate potential to alter SWM management operational characteristics to minimize thermal impacts (outflow rates, permanent pool depth) to optimize performance.	DS Consultants Ltd. and Urbantech Consulting
		10. SWM Ponds Water Quality: General Chemistry (Laboratory and *in situ*)	None but to serve as reference for discharge quality.	Water quality samples to be taken at each pond inlet and pond outlet at least 6 to 8 times per year. Water quality sampling parameters for laboratory analysis include pH, hardness, total suspended solids (TSS), basic ions (including chloride), nutrients (including phosphorus) and total metals. *In situ* field measurements to include: pH (field), conductivity, turbidity and dissolved oxygen (DO).	Not Applicable	Wet and dry samples taken quarterly, and event based each starting once the ponds have been constructed and filled until 85% build-out. Between 6 and 8 samples to be collected annually and to include dissolved oxygen (DO).	Wet and dry samples taken quarterly, and event based for at least 2 years following 85% build-out, or every second year until Town assumption.	Significant change in SWM Pond water chemistry in comparison to Town and MOECC ECA water quality criteria.		DS Consultants Ltd. and Urbantech Consulting
	To confirm SWM Ponds meet Town of Caledon design criteria prior to assumption.	11. SWM Ponds Sediment Depth	The greater of 5% decrease in TSS removal efficiency or 50% available forebay volume.	Disk/Rod Method or Town-Approved Alternative; min. 2 perpendicular transects, min. 5 points per transect.	Not Applicable	Not Required	Once prior to assumption by the Town.	Different SWM Pond sediment depth in comparison to Town of Caledon design criteria prior to assumption.	Evaluate potential to alter SWM management operational characteristics to minimize thermal impacts (outflow rates, permanent pool depth) to optimize performance.	DS Consultants Ltd. and Urbantech Consulting

Category	Long Term Environmental Monitoring Plan							Comprehensive Adaptive Management Plan		Responsibilities for Monitoring and Cost*
	Performance Measure Indicator(s)/ Objectives(s)	Monitoring Parameter	Monitoring Target(s) or Threshold(s)	Methods / Protocols / Analyses	Monitoring Frequency and Duration			Trigger	Response	
					Pre-Construction	During Construction	Post-Construction			
LID Measures	To assess performance of LID measures	12. Groundwater Levels and Infiltration Rates of Infiltration in Selected LIDs as applicable	No specific targets or thresholds. Groundwater levels will be assessed in relation to overall water table elevations compared to pre-construction water table elevations.	Visual inspection of all LID areas to confirm installation as specified and certification of LIDs by a Qualified Inspector. Monitoring of standpipes installed in selected LIDs with level loggers, and measurement of groundwater levels in wells and piezometers (as per Monitoring Parameter 1a) for assessment of the overall groundwater conditions in the developed area. Water quality measurements (specifically temperature with temperature loggers) will be obtained from the outflow drains from neighbourhood park to storm sewer, if feasible.	Pre-construction (baseline data) from Ecosystem Component Monitoring Parameter 1a – Groundwater Levels to be referenced. Monitoring within selected LIDs to occur in the "during construction" phase following their construction and certification.	Each LID selected for monitoring will be assessed for infiltration rate immediately following installation. Monitoring of the water levels and infiltration rates in selected LIDs will occur quarterly (i.e., once in spring, summer, fall and winter) for 2 years following construction and certification of the trenches.	Monitoring of the water levels and infiltration rates in selected LIDs will occur quarterly (i.e., once in spring, summer, fall and winter) in years 1, 3 and 5 following 85% buildout. Monitoring of the water levels and infiltration rates in selected LIDs will occur quarterly (i.e., once in spring, summer, fall and winter) at years 1 and 3 following 100% buildout if deficiencies identified.	Significant change in groundwater levels in selected LIDs in relation to overall water table elevations compared to pre-construction water table elevations	Opportunity to re-assess SWM Plan for enhanced infiltration or redirection of stormwater.	DS Consultants Ltd. and Urbantech Consulting
		13. Stream Water Quality Downstream of LIDs	See Monitoring Parameters 5a. Stream Water Quality: General Chemistry – Lab Analysis and 5b. Stream Water Quality: General Chemistry – In Situ Analysis	DS Consultants and Urbantech						DS Consultants Ltd. and Urbantech Consulting
Erosion & Sediment Control (ESC) Measures	To confirm that all ESC measures have been implemented and are performing as per specifications.	14. Condition of ESC Measures	All ESC fencing, check dams, and sediment pond or equivalent are in good working order.	Visual inspection prior to and following all significant rainfall events (10 mm) or days of cumulative rainfall, after significant snowmelt events, and daily during extended rain or snowmelt periods.	ESC measures are generally installed as the first step of construction. As such, the monitoring will be further detailed as part of the "During Construction" monitoring.	Comprehensive inspection immediately following installation but prior to grading or site alteration. Weekly reporting during active construction. Routine inspections also required following all significant (i.e., 10 mm or more) rainfall events, following significant snowmelt events, and during extended rain or snowmelt periods.	During construction monitoring will apply until the site is stabilized, at which time the relevant ESC measures will be removed and the ESC monitoring will cease.	ESC measures have become damaged or ineffective.	Immediately fix ESC measures.	Beacon
NATURAL HERITAGE RESOUCES										
Fluvial Geomorphology and Aquatic Habitat	To assess conformance of the constructed Tributary WHT6	15. Stream Morphology and Aquatic Habitat Conditions	Overall maintenance of channel form (I.e., minimal evidence	The following monitoring protocols will be implemented at approximately the same time (summer or fall) of each year:	Once prior to construction to confirm baseline conditions and establish	Construction of the low flow channel will be supervised by a Qualified Inspector.	**Year 1** As-built survey immediately following construction to evaluate	Significant changes in channel form/cross-sectional area.	Opportunity to re-assess SWM Plan to evaluate storm flow rate control or seasonal stormwater management considerations.	Beacon

Category	Long Term Environmental Monitoring Plan							Comprehensive Adaptive Management Plan		Responsibilities for Monitoring and Cost*
	Performance Measure Indicator(s)/ Objectives(s)	Monitoring Parameter	Monitoring Target(s) or Threshold(s)	Methods / Protocols / Analyses	Monitoring Frequency and Duration			Trigger	Response	
					Pre-Construction	During Construction	Post-Construction			
	with design drawings and monitor for adjustments in channel form/function. To assess changes to aquatic habitat in the study area over the established monitoring period. Aspects of aquatic habitat are also being monitored through Measure 4. Stream Water Quality: Temperature, Measure 5a. Stream Water Quality: General Chemistry – Lab Analysis, and Measure 5b. Stream Water Quality: General Chemistry – In Situ Analysis.		of active erosion, bankfull dimensions/cross-sectional area remain generally consistent over monitoring period). Channel design enhancement elements are performing as intended. Overall maintenance and/or enhancement of aquatic habitat over monitoring period	• As-built survey for the constructed low flow channel. • General field reconnaissance to identify areas of potential concern • Repeated photographs from known vantage points.	vantage points for repeated photographs.		conformity of the low flow channel with design specifications and to obtain reference data for comparison with subsequent surveys. Monitoring parameters will include a digital survey of a longitudinal profile of the channel centreline and four detailed cross-sections (two pools, two riffles); and General field reconnaissance along the entire length of the constructed channel immediately following the first large flooding event to identify any potential areas of concern. Repeated photographs from a known vantage point to assess design performance and document observed indicators of channel adjustment (i.e., bank erosion, bed incision/scour, sedimentation). **Years 2-5** Annual post-construction monitoring of the realigned channel during the summer or fall, including: • Longitudinal profile of the channel centreline; • Detailed cross-sections (one pool, one riffle); and • Repeated photographs from a known vantage point	Design enhancement element failure or evidence of excessive erosion. Significant evidence of erosion or aggradation.	Design remediation to address areas of concern.	

Category	Long Term Environmental Monitoring Plan							Comprehensive Adaptive Management Plan		Responsibilities for Monitoring and Cost*
	Performance Measure Indicator(s)/ Objectives(s)	Monitoring Parameter	Monitoring Target(s) or Threshold(s)	Methods / Protocols / Analyses	Monitoring Frequency and Duration			Trigger	Response	
					Pre-Construction	During Construction	Post-Construction			
							to assess design performance and document observed indicators of channel adjustment (i.e., bank erosion, bed incision/scour, sedimentation). Plantings will be monitored within their warranty period and as a completed project in year five.			
Buffer Areas – Naturalization Plantings	To assess the survival and condition of buffer and naturalization plantings to ensure that: a) the plantings are installed and established as per the approved landscape plans; and b) over time, the areas become self-sustaining naturalized communities.	16. Buffer Zone Naturalization Plantings	Plantings healthy, well-established and in general conformance with the landscaping plans.	The condition of these plantings will be assessed using visual assessments and comparisons with contractor drawings.	Not Applicable	Once at time of installation, and annually for 2 years following installation in fall.	Once at 5 years following 85% build-out.	Significant change in health of vegetation plantings in comparison to established conditions.	Refine vegetation management strategies to achieve desired vegetation diversity, including additional plantings as required. Apply findings and results to future development phases.	Beacon
Buffer integrity and effectiveness in limiting encroachments in NHS	To evaluate the effectiveness of buffers in reducing the number and extent of human-related disturbances / encroachments into the NHS.	17. Human-Related Disturbances in NHS adjacent to Proposed Development	No specific targets or thresholds. Will be assessed relative to baseline conditions with consideration for approved activities (e.g., trail, plantings, culverts) in this zone.	The NHS edge assessed will include the buffer and at least 20 m into the adjacent natural features. Approved versus unsanctioned disturbances will be distinguished. Disturbances in the Buffer/Enhancements versus the Key Features will also be distinguished.	Once prior to development in summer.	None	Once at 1, 3 and 5 years following 85% build-out in summer.	Compromised integrity and human-related disturbances / encroachments into the NHS. compromised (i.e. informal trails, unauthorized gates, pet encroachment, etc.).	Implement corrective actions/measures such as: developing and enforcing bylaws, and educating residents. Implement Management strategies to reduce stress and restore buffer functions.	Beacon
Ecological Communities	To assess changes in floristic quality within the NHS	18. Plant Diversity	No specific targets or thresholds. Will be assessed	The floristic quality of vegetation communities within the natural heritage system will be determined by undertaking a floristic quality assessment (FQA).	Once prior to development	None	Once in year 5 following 85% build-out.	Significant change in plant diversity in NHS in comparison to baseline conditions.	Refine vegetation management strategies to achieve desired vegetation diversity, including additional plantings as required.	Beacon

Category	Long Term Environmental Monitoring Plan							Comprehensive Adaptive Management Plan		Responsibilities for Monitoring and Cost*
	Performance Measure Indicator(s)/ Objectives(s)	Monitoring Parameter	Monitoring Target(s) or Threshold(s)	Methods / Protocols / Analyses	Monitoring Frequency and Duration			Trigger	Response	
					Pre-Construction	During Construction	Post-Construction			
			relative to baseline conditions.	These values can be compared over time to identify trends.					Apply findings and results to future development phases.	
	To assess the distribution and abundance of invasive plant species within the NHS	19. Extent of invasive species in NHS	No specific targets or thresholds. Will be assessed relative to baseline conditions.	Vegetation surveys will identify populations of invasive species. The location of the species and their population densities will be mapped and described to facilitate comparison over the long-term.	Once prior to development	None	Once in year 3 and 5 following 85% build-out.	Significant change in extent of invasive species in NHS in comparison to baseline conditions.	Implement an appropriate management strategy to eliminate or reduce invasive species cover. Apply findings and results to future development phases.	Beacon
	To assess changes in the type and extent of natural cover within the NHS.	20. Vegetation community types	No specific targets or thresholds. Will be assessed relative to baseline conditions.	Ecological communities will be classified according to ELC standards. The area of each ELC vegetation type will be estimated using aerial photography. GIS analyses will be used to compare changes in area over time.	Once prior to development	None	Once in year 5 following 85% build-out.	Significant change in vegetation community types in NHS in comparison to baseline conditions.	Refine vegetation management strategies to achieve desired natural cover, including additional plantings as required Apply findings and results to future development phases.	Beacon
Natural Heritage Wildlife – Breeding Birds	To assess changes in the diversity and abundance of breeding avian species within the NHS	21. Breeding Bird Diversity and Abundance	No specific targets or thresholds. Will be assessed relative to baseline conditions.	Breeding bird surveys will be conducted at fixed plot locations throughout the NHS using standard protocols concerning weather and time of year (late May to early July), and twice per breeding season.	Twice each year for at least 2 years prior to construction.	Twice each year during construction until 85% build-out.	Twice in years 1, 3 and 5 following 85% build-out.	Significant change in the diversity and abundance of breeding avian species within the NHS in comparison to baseline conditions.	Apply findings and results to future development to reduce long-term impacts.	Beacon
Natural Heritage Wildlife – Breeding Anurans	To assess changes in the diversity and abundance of breeding anurans species within the NHS	22. Anuran Diversity and Abundance	No specific targets or thresholds. Will be assessed relative to baseline conditions.	Surveys following Marsh Monitoring Program protocols	Three times per year for at least 2 years prior to construction	Twice each year during construction until 85% build-out.	Twice in years 1, 3 and 5 following 85% build-out.	Significant change the diversity and abundance of breeding anurans species within the NHS in comparison to baseline conditions.	Identify potential stressors to the amphibian community and implement an appropriate management strategy to eliminate or reduce impacts. A wetland performance reviews may be warranted if amphibian breeding is not sustained. Apply findings and results to improve current habitat and to guide future development to reduce long-term impacts.	Beacon

*Costing to be determined once LTEMP and CAMP approved.

9. Ongoing and Future Work

This CEISMP and companion FSR (Urbantech Consulting 2023) include sufficient detail to implement the recommendations of the Environmental Management Plan (**Section 7**) and the Long-Term Environmental Monitoring Plan and Comprehensive Adaptive Management Plan (**Section 8**) at a site-specific scale. It is anticipated that future development of the Subject Lands will proceed through submission of several draft plans or site plan applications.

Based on the comprehensiveness of the characterization work, opportunity and constraint analysis, impact assessment and proposed environmental management and monitoring plans contained in this CEISMP and the associated FSR (Urbantech Consulting 2023), preparing similar studies at the site-specific level would result in considerable redundancy in reporting as well as review time. For these reasons, it is not recommended that additional site-specific Environmental Impact Studies (EISs) and Functional Servicing Reports (FSRs) be prepared in support of future draft plan and site plan applications. Instead, it is recommended that proponents of future development prepare Compliance Letters to the satisfaction of the Town, Region of Peel and TRCA summarizing how proposed draft plans or sit plans conform to the goals, objectives, targets, environmental management and monitoring plans outlined in this CESIMP and associated FSR (Urbantech Consulting 2023).

For future development applications that have a high level of conformity with the Caledon Station land use and framework plans and this CEISMP and the FSR (Urbantech Consulting 2023), a Compliance Letter could take the form of a brief report or checklist. For future development applications that deviate substantially from the Caledon Station land use and framework plans and the CEISMP and FSR, a Compliance Letter would need to be accompanied by more substantial technical reports and studies.

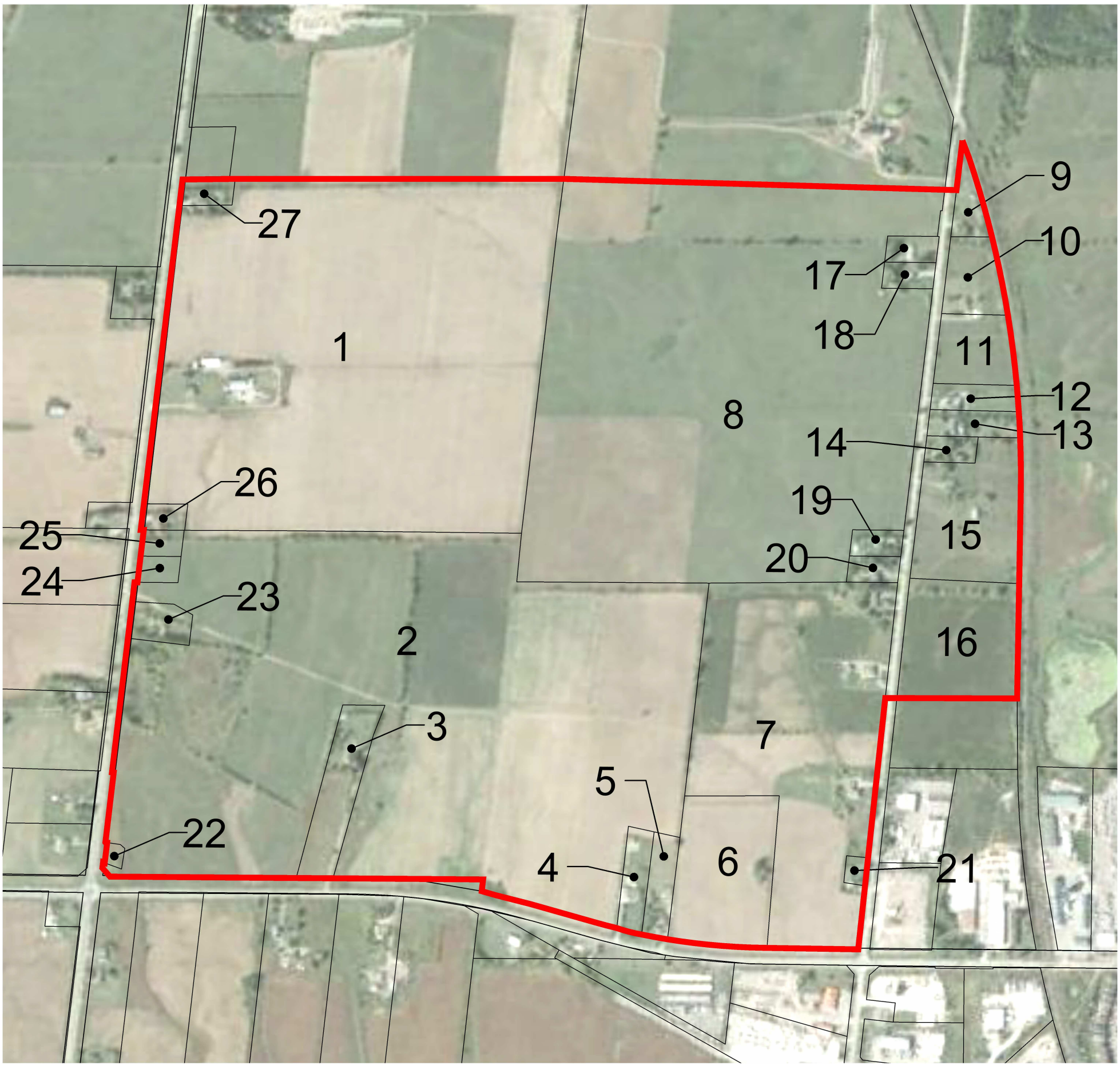
As was noted in in this CEISMP, there are some outstanding information and data gaps which are the result of not being able to access certain properties to undertake technical investigations. These gaps are related primarily to hydrogeological monitoring. While these information gaps do not significantly affect the community design or the associated Environmental Management Plans, these gaps should be filled by continuing ongoing monitoring programs and/or conducting supplemental investigations or analyses to confirm that future development plans comply with the Environmental Management Plans described in the CEISMP and FSR.

Table 21 summarizes ongoing and future work that should be undertaken on specific properties in support of draft plans or site plans and the appropriate stage in the planning and development process. Where work may be specific to a property, these properties are also noted and illustrated on **Figure 9**.

Table 21. Summary of Ongoing and Potential Future Work

Study Type	Study Purpose	Stage	Properties (refer to Fig. 9)
Ongoing Groundwater Monitoring	To inform LID design	Detailed Design	All
Infiltration Testing	To inform LID design	Detailed Design	All
Ongoing Geotechnical & Hydrogeological Assessment	To confirm dewatering and SWM pond requirements	Detailed Design	1(interim SWM pond) 6,7 (SWM pond 1) 2 (SWM Pond 2)

Study Type	Study Purpose	Stage	Properties (refer to Fig. 9)
			7(WHT6 Conveyance channel corridor)
Feature Based Wetland Water Balance	To inform design of water delivery systems	Draft Plan	2 (Speirs)
ESC Plans	To manage sediment laden runoff and protect the environment	Draft Plan/ Detailed Design	All
Restoration Plans	To rehabilitate areas of EPA affected by servicing crossings and SWM outfalls	Detailed Design	2 (EPA Wetlands)
Buffer & Setback Planting Plans	To create ecologically appropriate buffers to EPA	Detailed Design	2 (EPA wetlands) 7 (EPA greenway corridor)
Enhancement Area Landscaping Plans	To create ecologically appropriate enhancement areas	Detailed Design	2 (adjacent to EPA wetlands)
WHT6 - Wetland Design Restoration Plans	To create wetland habitat within WHT6 greenway corridor as compensation for removal several small isolated non-PSW wetland features.	Detailed Design	7, 21 (WHT 6 Greenway Corridor)
Turtle Basking and Nesting Surveys	Confirmation that the pond and wetlands are used for overwintering and/or nesting.	Draft Plan	2 (EPA wetland 3)
Snake Hibernacula Surveys	Confirmation of potential snake hibernacula.	Draft Plan	All properties with suitable habitat.
Bat Maternity Colony Surveys	To confirm presence of potential bat maternity colonies for the purposes of conforming with the Endangered Species Act.	Detailed Design – Prior to site alteration and building demolition.	All properties with suitable habitat - buildings and structures
File Notice of Activity for Eastern Meadowlark to MECP	To comply with Endangered Species Act regulations	Detailed Design	10, 11
Tree Inventories and Preservation Plans	To identify treed resources	Draft Plan	All properties with trees > 10 cm in diameter
Monarch Habitat Surveys	Survey for Monarch habitat	Draft Plan	All



- All Units In Metric Unless Otherwise Noted.
- Detailed engineering/environmental work may result in further non-developable areas on Subject Lands
- Option 3 Gross area excludes Humber Station Road (1.80 ha. / 4.45 ac.) within the Subject Lands
- Aerial Photo: Google Earth, Approx. Fall 2016

GERRARD DESIGN

Caledon, Ontario

MACVILLE COMMUNITY PROPERTIES

MAY 9, 2023

SCALE 1:7500

ID	Owner	Gross Area (ha)	Gross Area (ac)	% of Gross Area	Net Area (ha)	Net Area (ac)	% of Net Area
1	ARGO MACVILLE I CORPORATION	39.62	97.90	21.9%	39.34	97.21	23.2%
2	SPEIRS, BRENDA-ESTATE; SPEIRS, ROBERT GEORGE; SPEIRS, ROBERT GEORGE	54.02	133.49	29.9%	46.95	116.02	27.7%
3	BASILE, FRANK; BASILE, NINO	2.00	4.94	1.1%	1.21	2.99	0.7%
4	TUNG, GIAN; BHULLAR, GURVARINDER	0.80	1.98	0.4%	0.79	1.95	0.5%
5	2870505 ONTARIO INC.	0.82	2.03	0.5%	0.81	2.00	0.5%
6	ARGO HUMBERKING CORPORATION	4.36	10.77	2.4%	4.31	10.65	2.5%
7	HUMBERKING (I) DEVELOPMENTS LIMITED	16.27	40.20	9.0%	14.39	35.56	8.5%
8	ARGO MACVILLE II CORPORATION	45.38	112.14	25.1%	45.38	112.14	26.7%
9	KIRBY, DAVID SCOTT	0.63	1.56	0.3%	0.63	1.56	0.4%
10	BUDGE, RONALD JOHN	1.27	3.14	0.7%	1.27	3.14	0.7%
11	ARGO HUMBER STATION LIMITED	1.59	3.93	0.9%	1.59	3.93	0.9%
12	BAINS, RUPINDER; DHILLON, BALWINDER; DHILLON, LAKHVIR	0.68	1.68	0.4%	0.68	1.68	0.4%
13	RENZETTI, MICHAEL PATRICK; RENZETTI, CHERYL LYNN	0.72	1.78	0.4%	0.72	1.78	0.4%
14	GILL, TARNPREET; GILL, GURPREET	0.41	1.01	0.2%	0.41	1.01	0.2%
15	ARGO HUMBER STATION LIMITED	4.02	9.93	2.2%	3.85	9.51	2.3%
16	HUMBERKING (IV) DEVELOPMENTS LIMITED	4.06	10.03	2.2%	4.04	9.98	2.4%
17	ARGO MACVILLE IV CORPORATION	0.41	1.01	0.2%	0.41	1.01	0.2%
18	LUBANA, NAVDEEP; SINGH, VARINDER	0.41	1.01	0.2%	0.41	1.01	0.2%
19	VENDITTI, ALEXANDER	0.41	1.01	0.2%	0.41	1.01	0.2%
20	QUADRINI, NANCY; QUADRINI, RICO	0.40	0.99	0.2%	0.40	0.99	0.2%
21	GILL, KULWINDER; SINGH, STIFEN	0.18	0.44	0.1%	0.16	0.40	0.1%
22	SPEIRS, BRENDA MARGARET· ESTATE; SPEIRS, ROBERT GEORGE	0.12	0.30	0.1%	0.00	0.00	0.0%
23	NELSON, JOYCE MARLENE	0.69	1.71	0.4%	0.36	0.89	0.2%
24	MIAN, NAZIR; MIAN, ABDUL	0.32	0.79	0.2%	0.25	0.62	0.1%
25	MIAN, SAIMA; WAHEED, ASIM	0.32	0.79	0.2%	0.31	0.77	0.2%
26	KAUR, GAGANDEEP; SINGH, RAVINDER	0.35	0.86	0.2%	0.32	0.79	0.2%
27	ZALEWSKI, WALDEMAR STANISLAW; ZALEWSKI, CAROLYN MAY;	0.41	1.01	0.2%	0.32	0.79	0.2%
		180.67	446.45	100%	169.72	419.39	100%

- All Units In Metric Unless Otherwise Noted.
- Detailed engineering/environmental work may result in further non-developable areas on Subject Lands
- Option 3 Gross area excludes Humber Station Road (1.80 ha. / 4.45 ac.) within the Subject Lands

GERRARD DESIGN

Caledon, Ontario

MAY 9, 2023

MACVILLE COMMUNITY PROPERTIES

10. Policy Conformity Assessment

The CEISMP TOR requires that the report addresses applicable environmental planning policies. It states that *the CEISMP is intended to clearly reference relevant policy, legislative and technical requirements and describe how the CEISMP meets or exceeds these requirements*.

A summary of applicable federal, provincial, and municipal environmental planning policies and regulations relevant to the LOPA application were discussed in **Section 2**. An evaluation of how the Caledon Station Land Use Plan and Framework Plan comply with the applicable environmental policies and legislation is summarized below in **Table 22**.

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Table 22. Policy Compliance Assessment

Applicable Policy / Legislation	Relevant Ceismp Findings	Compliance
Federal *Fisheries Act* (1985) and Fisheries Protection Policy Statement (2013)	HDF reaches WHT1-A, WHT1-B and WHT6-A provide direct fish habitat. HDF reaches WHT1-A and WHT1-B will be protected within the proposed NHS. Reach WHT-6-A will be enhanced and contained within the proposed enhanced corridor/greenway.	No impacts to direct fish habitat. HDF Reach WHT6-A to be enhanced. Potential indirect impacts to fish habitat will be mitigated by implementing a range of measures (see **Table 18**), including, but not limited to: • enhanced level treatment through stormwater management; • LIDs to sustain pre-development baseflows; • Develop and implement ESC and Spill Prevention plans at the draft plan stage; • riparian buffers of 10 m; and • naturalization of riparian buffers.
Federal *Species at Risk Act* (2002)	HDF reaches WHT1-A and WHT1-B in the Study Area could support contributing habitat of a Federally Endangered fish species: Redside Dace (*Clinostomus elongatus*).	See above and below as it relates to Redside Dace. If water is to be discharged directly to Contributing Redside Dace habitat, all plans must be approved by MECP.
Provincial *Endangered Species Act* (2007)	The Study Area potentially supports contributing habitat of one Provincially Endangered fish species (Redside Dace). Potentially suitable habitat for Provincially Endangered bats may also be present in the Study Area with the Organic Deciduous Swamp (ELC Unit 12) as well as anthropogenic structures. Eastern Meadowlark, a threatened species, has been confirmed on the Subject Lands within ELC Unit 3d.	See *Fisheries Act* and *Species at Risk Act* above. As agricultural landscape change seasonally, it is recommended that survey work for endangered and threatened species be periodically completed to ensure compliance with *Endangered Species Act*. Refer to **Section 9**.
Provincial Policy Statement (2020) Section 2.1 – Natural Heritage		
1. Habitat for Threatened and Endangered Species	Habitat for Provincially Endangered and Threatened species has been identified on the Subject Lands and has been addressed in accordance with the regulations of the *Endangered Species Act* (see above).	See *Endangered Species Act* above.
2. Significant Valleylands	There are no significant valleylands associated with the Study Area.	N/A
3. Significant Wetlands	There are no Provincially Significant Wetlands (PSW) on the Subject Lands, however, one PSW occurs in the Study Area. All other wetlands in the Study Area have been determined non-significant. All wetlands are subject to Town's Environmental Performance Measures policies. See Town of Caledon Policy Conformity below.	No impacts to significant wetlands.
4. Significant Woodlands	There are no significant woodlands associated with the Study Area.	N/A
5. Significant Wildlife Habitat (SWH)	The Subject Lands and Study Area could support the following Candidate SWH categories: seasonal wildlife concentration areas, specialized habitats for wildlife, habitat for species of conservation concern and animal movement corridors. This includes: • Snake hibernacula; • Overwintering and nesting turtles; • Habitat for species of conservation concern; and • Animal movement corridor.	Candidate SWH identified through this CEISMP is restricted to areas and features that will form part of the future NHS or EPA. While it is unlikely that the cropped lands outside support SWH, these areas should be screened as recommended in **Section 9**.
6. Significant Areas of Natural and Scientific Interest	There are no Areas of Natural of Scientific Interest associated with the Study Area	N/A
7. Fish Habitat	See text above re: *Federal Fisheries Act*	See text above re: *Federal Fisheries Act*
Provincial Policy Statement (2020) Section 2.2 - Water	No impacts to sensitive water features anticipated.	This CEISMP and companion reports have identified mitigation measures to be implemented to reduce impacts to surface water and groundwater resources.
Provincial Policy Statement (2020) Section 2.3 – Natural Hazards	The natural hazards in the Study Area are associated with the floodplain of Headwater Drainage Feature WHT6.	The proposed enhanced corridor/greenway for Tributary WHT6 has been designed to fully contain the regional floodline under future conditions. The natural hazards will not be in conflict with future development.
Region of Peel Official Plan	Region of Peel Official Plan Policy 2.14.15 prohibits development and site alteration within the Core Areas of the Greenlands System with some exceptions such as forest, fish and wildlife management or passive recreation.	• No impacts to significant wetlands. • Refer to *Endangered Species Act* section above. • Development will occur outside of floodplains.

Applicable Policy / Legislation	Relevant Ceismp Findings	Compliance
	Core Areas of the Regional Greenlands System that overlap with the Study Area include: • Significant Wetland (PSW east of Subject Lands in Study Area); • Significant Habitat of Threatened and Endangered Species (SAR Bats, Eastern Meadowlark, Redside Dace); and • Stream Corridors (HDF reaches WHT1-A, WHT1-B and WHT6-A). Natural Areas and Corridors (NACs) that overlap with the Study Area include: Evaluated Non-PSWs, Significant Wildlife Habitat, and Fish Habitat. Potential Natural Areas and Corridors that overlap with the Study Area include: Unevaluated wetland (ELC Unit 7h). NAC's and PNAC's represent natural features and areas that are considered locally important. Regional policies pertaining to NAC's and PNAC's defer their interpretation, protection, restoration, enhancement, proper management and stewardship to local municipalities.	• Refer to **Section 9**. • See text above re: *Federal Fisheries Act* • Most of the Evaluated Non-PSWs (Other Wetlands) will be protected with the exception of ELC Unit 5, 7e, 7f, 7l, 13 and 14a, which will be compensated for within the proposed enhanced corridor/greenway on the southeastern boundary of the Subject Lands.
	Region of Peel Official Plan Policy 5.6.20.14 relates to New Urban Areas such as Caledon Station. There are several policies that pertain to studies required in support of official plan amendments for new communities. Policies 5.6.20.14.16e and f relate to protection, restoration, and enhancement of a natural heritage system and water resource system informed by subwatershed study recommendations that integrate water and stormwater management. Policy 5.6.20.14.7f requires that a detailed subwatershed study or equivalent study that expands upon the Peel SABE Scoped Subwatershed Study be prepared in support of Secondary Plans. Policy 5.6.20.14.17h,i and j require identification, implementation, and designation of a natural heritage system consistent with the objectives and targets of a detailed subwatershed study.	• The CEISMP and FSR are considered equivalent to a detailed subwatershed study as per Caledon Policy 5.7.3.7.6 and ROP Policy 5.6.20.14.7f. • The CEISMP adopted study Terms of Reference prepared by the Region and TRCA as per ROP Policy 5.6.20.14.7f. • The CEISMP identifies a natural heritage system that builds upon objectives and target of the systems previously identified by the Town through the BRES process and more recently by the Region through the SABE Scoped Subwatershed Study. • The CEISMP identifies how the natural heritage and water systems will be protected, restored, and enhanced. • The companion FSR recommends how water resources and stormwater are to be integrated and managed. • The Caledon Station Land Use Plan designates the NHS as EPA.
Town of Caledon – Environmental Performance Measures	Town of Caledon's Performance Measures (Official Plan Section 3.2.5) deals with Environmental Performance Measures. As per the assessment in **Section 3.3.9**, the Study only supports 7 of 17 of the Performance Measures: • Wetlands; • Habitat of Threatened and Endangered Species; • Fisheries; • Wildlife Habitat; • Valley and Stream Corridors; • Groundwater; and • Soils. Policies for each of these performance Measures are found within the Town's Official Plan, and those applicable to this CEISMP have been summarized below: <u>Policy 3.2.5.4 - Wetlands</u> New development is prohibited in Wetland Core Areas, and new development will also not be permitted in Other Wetlands unless it can be demonstrated that the development will not degrade the ecosystem integrity. <u>Policy 3.2.5.9 - Habitat of Threatened and Endangered Species</u> New development is prohibited in Significant Habitat of Threatened and Endangered Species but may be permitted in accordance with provincial and federal legislation.	• No development will occur within a Wetland Core Area, and a majority of the Other Wetlands will be protected with the exception of ELC Unit 7e, 7f, 7l, 13 and 14a, which will be compensated for within the proposed enhanced corridor/greenway on the southeastern boundary of the Subject Lands; • No development will occur within the habitat of a Threatened or Endangered species without *Endangered Species Act* permitting (refer to *Endangered Species Act* above); • No development will occur within a Core Fishery Resource Area, and the potential indirect impacts to fish habitat will be mitigated by implementing a range of measures provided by this CEISMP (see **Table 18**); • Unevaluated Wildlife Habitat shall be studied and evaluated through site specific studies at the Draft Plan stage; • No development will occur within a Valley and Stream Corridor with the exception of the enhancement of HDF reach WHT6-A, and the development design will ensure that the quality and quantity of the water entering these areas, as well as riparian buffers, are protected, maintained and enhanced and restored where appropriate as provided in this CEISMP; • The development design will ensure that the quality and quantity of groundwater recharge and discharge and the flow distribution of ground water are protected, maintained and enhanced and restored where appropriate as provided in this CEISMP; and • The proposed development will strive to retain all native soils on site.

Applicable Policy / Legislation	Relevant Ceismp Findings	Compliance
	Policy 3.2.5.10 - Fisheries New development is prohibited in Core Fishery Resource Areas, and any development adjacent to these areas that will harmfully alter, disrupt or destroy fish habitat is prohibited. Additionally, quality and quantity of water entering these areas, and well as riparian buffers, shall be maintained and enhanced where appropriate. Policy 3.2.5.11 - Wildlife Habitat New development is prohibited with Significant Wildlife Habitat, and Unevaluated Significant Wildlife Habitat shall be studied. Other Wildlife Habitat may be developed with appropriate approvals. Policy 3.2.5.12 - Valleyland and Stream Corridors New development is prohibited in Valleyland and Stream Corridors and risk management of these resources must be examined through the planning process. Additionally, quality and quantity of water entering these areas, and well as riparian buffers, shall be maintained and enhanced where appropriate. Policy 3.2.5.13 - Groundwater New Development needs to ensure that the quality and quantity of groundwater recharge and discharge and the flow distribution are protected and maintained, and where appropriate, enhanced and restored. Restoration of degraded groundwater discharge and recharge zone may be a condition of development approval. Policy 3.2.5.14 - Soils The Town encourages the conservation and protection of productive soils and native soils vulnerable to erosion. Establishment of ecosystem linkages through the revegetation of erosion prone soils is encouraged and may be a condition of development.	
Toronto and Region Conservation Authority (TRCA) Regulations	The Subject Lands include drainage features, floodplains and fish habitat, all subject to TRCA policies and regulations.	Regulated natural heritage features (wetlands and HDFs) have been integrated within the proposed natural heritage system. These features and their functions protected, restored, or enhanced. Natural hazards will be contained within the proposed enhanced corridor/greenway for Tributary WHT6. Permits will be applied for as required.

11. Summary and Conclusions

This CEISMP report and the companion FSR (Urbantech Consulting 2023) and Hydrogeolocial Investigation (DS Consultants 2023) have been prepared in support of the proposed LOPA and Caledon Station Land Use Plan and Framework Plan.

This CEISMP was prepared in accordance with Terms of Reference (TOR) that were previously developed as part of the Bolton Residential Expansion Study (BRES) planning process. This CEISMP builds upon and integrated the findings of the various technical studies previously completed for the Study Area by the Town of Caledon between 2013 and 2016.

As per the CEISMP TOR, the objective of the study is to: “conduct an impact assessment and develop a management plan for the natural environment potentially affected by urban development associated with the expansion of the Bolton Rural Service Centre to accommodate future residential growth to 2031.” Also, the goal CEISMP is to provide a sufficient level of detail and clear direction for the development in accordance with the environmental protection policies of the PPS, Region of Peel Official Plan and Town of Caledon Official Plan, and TRCA regulations and policies.

The CEISMP summarizes the findings of detailed biophysical investigations and analyses that have been undertaken to date for the Subject Lands. This information was used to characterize the environment, identify constraints and opportunities to future development, as well as the environmental management systems that will be required to support future development while enhancing the environment and local natural heritage system.

The Land Use Plan for the Caledon Station Secondary Plan as well as a Framework Plan were developed by having consideration to the constraints and opportunities identified in this CEISMP. An iterative approach was used to ensure that key components of the natural heritage system are protected, restored, and enhanced in general accordance with the Town’s ecosystem framework and environmental performance measures and the Peel SABE Scoped Subwatershed Study. As the proposed Land Use Plan and Framework Plan have been developed to integrate most of the existing natural heritage features, potential impacts to natural features and their functions have been avoided. The proposed natural heritage system has been developed to include clusters of wetland features, certain headwater drainages features, as well as fish and wildlife habitat. Isolated wetland features are however proposed to be consolidated into a single enhanced corridor/greenway block that has been sized to ensure no wetland habitat or headwater functions are lost.

This CEISMP assesses the potential impact impacts of the proposed Land Use Plan and Framework Plan on the environment and provides recommendations for mitigation that will be implemented through the various environmental management plans that have been identified in the CEISMP, FSR (Urbantech Consulting 2023) and other technical studies. To ensure that the environmental protection and management measures outlined in these plans are performing as intended, the CEISMP includes Long-Term Monitoring Plan (LTEMP) and a Comprehensive Adaptive Management Plan (CAMP) to address refinements to the proposed environmental management systems.

This CEISMP demonstrates the Caledon Station Land Use Plan can be implemented which satisfying applicable environmental protection legislation, regulations, and policies, including the Town’s environmental performance measures. Additionally, the goals of this CEISMP are in line with Section 3.2.4.15 of the Town of Caledon’s Official Plan, which lists ways in which the Town assist’s in

implementing ecosystem principle, goal and objectives, such as identifying groundwater resources and participating in environmental studies.

This CEISMP has been prepared to be comprehensive and offer site-level detail to minimize the extent of future study during the draft plan stage. While some information gaps remain in the CEISMP that will be filled through future work, these gaps are relatively minor in scale and are not anticipated to affect the proposed Land Use Plan or Framework Plan or the limits of the proposed NHS established through this CEISMP. This future work is summarized and described in the CEISMP and it is anticipated that most can be completed at the draft plan/site plan stage supported by a Compliance Letter, or at the detailed design stage through conditions of approval or permitting.

In conclusion, it is the opinion of the project study team that the proposed Land Use Plan and Framework Plan will not adversely impact existing natural heritage features and functions associated with the Subject Lands, provided that the recommended environmental management plans are implemented.

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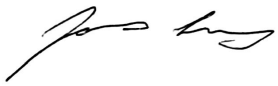

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Appendix A

Terms of Reference for BRES CEISMP

APPENDIX 1

Bolton Residential Expansion Study

Recommended Terms of Reference for Phase 3 Comprehensive Environmental Impact Study and Management Plan (CEISMP)

Prepared by TRCA and Region of Peel Staff

August 20, 2013

1.0 STUDY PURPOSE AND OBJECTIVE

The purpose of the Comprehensive Environmental Impact Study and Management Plan (CEISMP) is to conduct an impact assessment and develop a management plan for the natural environment potentially affected by urban development associated with the expansion of the Bolton Rural Service Centre to accommodate future residential growth to 2031. The management plan will inform planning and decision making so that changes in land use are compatible with natural systems and consistent with the Provincial Policy Statement (PPS) and applicable Region of Peel and Town of Caledon Official Plan policies.

The CEISMP shall include the completion of impact modeling based on land use scenario(s) developed and refined in the first phases of the Study (Parts A and B). The CEISMP will provide a sufficient level of detail and give clear direction for the implementation of development in accordance with the PPS, the Region of Peel Official Plan and the Town of Caledon Official Plan. The CEISMP study may be completed in a phased manner that will provide appropriate documentation of the municipal comprehensive review requirements for both the Regional and Town of Caledon Official Plan Amendments. The study will be completed in accordance with applicable Provincial, Conservation Authority, Regional and Municipal requirements.

1.1 Addressing Regional MCR Requirements in 7.9.2.12 e) and p)

The policy in 7.9.2.12 e) and p) requiring the demonstration of environmental protection shall be addressed through the completion of a CEISMP as outlined below. This study will address environmental and resource protection and enhancement including the identification of a conceptual natural heritage system, at a Regional scale, in accordance with the ROP policies. Requirements to enable a Regional Official Plan Amendment to proceed will be satisfied through:

1. Completion of all of the Part A Existing Conditions and Characterization;

2. Substantial completion of the Part B Impact Assessment and Detailed Studies components of the CEISMP terms of reference;
3. Identification of Core Areas of the Greenlands System, if any; and
4. Identification of a conceptual natural heritage system to the satisfaction of the Region and Town of Caledon, in consultation with the TRCA and other agency staff (e.g. Ministry of Natural Resources).

The substantial completion of the Part B component must **at a minimum** include setting the detailed targets for each discipline (e.g. ecology, surface water, groundwater, etc.) based on the detailed existing characterization of conditions completed in Part A; and establishing the conceptual plans/measures to meet those targets. For example, establishing a conceptual Low Impact Development (LID) plan that demonstrates mitigation measures that would be appropriate for meeting the site water balance targets would be required; and the detailed plan would be finalized through the completion of the CEISMP. Finalization of the CEISMP to the end of Part C and detailed refinement and finalization of natural heritage system boundaries will not be necessary for the purposes of satisfying Regional level approvals for a ROPA.

Additional direction to address Regional MCR requirements are outlined below:

- The CEISMP study component will identify a conceptual natural heritage system utilizing existing available inventories of natural features and areas supplemented by additional information collected through the completion of Parts A and B as outlined above. The identification of the conceptual natural heritage system will consider the natural heritage system policies contained in the Regional Official Plan and the Town of Caledon Official Plan.
- This study will apply the criteria for identification of the Core Areas of the Greenlands System and confirm, as appropriate, if any Core Areas exist in the recommended boundary expansion area. Spatial data and mapping of refined Core Areas of the Greenlands System boundaries shall be provided in a format satisfactory to the Region. Criteria for identifying Core Areas of the Greenlands System in Policy 2.3.2.2 of the Regional Official Plan should be applied for this purpose.
- The consultant should also utilize existing and ongoing studies and inventories and supplementary field work if necessary and appropriate.
- The Regional MCR environmental study results for the Regional ROPA shall be documented and submitted in a separate report in a format acceptable to the Region.

1.2 Preparation of a Detailed Workplan

These terms of reference provide overall guidance and a framework for carrying out a Comprehensive EIS and MP (CEISMP). It is intended that the Consultant(s) will prepare a detailed workplan with a proposed starting date of September 2013. The workplan should describe, in a more specific technical manner, how the Consultant(s) will fulfill the requirements of the terms of reference. The detailed workplan shall identify all necessary tasks, including but not limited to: a preliminary listing of all literature and background data to be relied upon; a detailed methodology for carrying out environmental characterization; monitoring and technical studies, including required technical expertise; the proposed approach to modeling urban land use scenarios and related impact assessments; the identification of anticipated deliverables; the methods of consulting with relevant agencies, stakeholders and the public; and, the timelines related to all key steps in the process. The detailed workplan is to be approved by the Town of Caledon, Region of Peel and TRCA.

TRCA will provide background data and information to the Town and consultant to inform the CEISMP. However, further consultation with the TRCA will be required to verify the extent and usability of the models/datasets, as well as to gather any additional data not initially provided.

1.3 Study Approach and Structure

To meet the objectives of Phase 1 of the Bolton Residential Expansion Study (BRES), TRCA will compile their existing environmental data (terrestrial and aquatic) related to the potential expansion area and produce screening mapping and GIS data. This will include a review of secondary sources, such as the South Albion-Bolton Boundary Expansion CEISMP. The consultant will be responsible for reviewing the mapping and data provided by the TRCA and provide a memorandum to the principle consultant setting out what known environmental features exists within the expansion areas and what constraints these features and their location may have on the potential for development.

To meet the objectives of Phase 3 and 4 of the BRES, a CEIMP will be required, which consists of fifteen (15) steps generally structured into three parts as outlined in Table 1 (these steps are described in more detail later in the terms of reference).

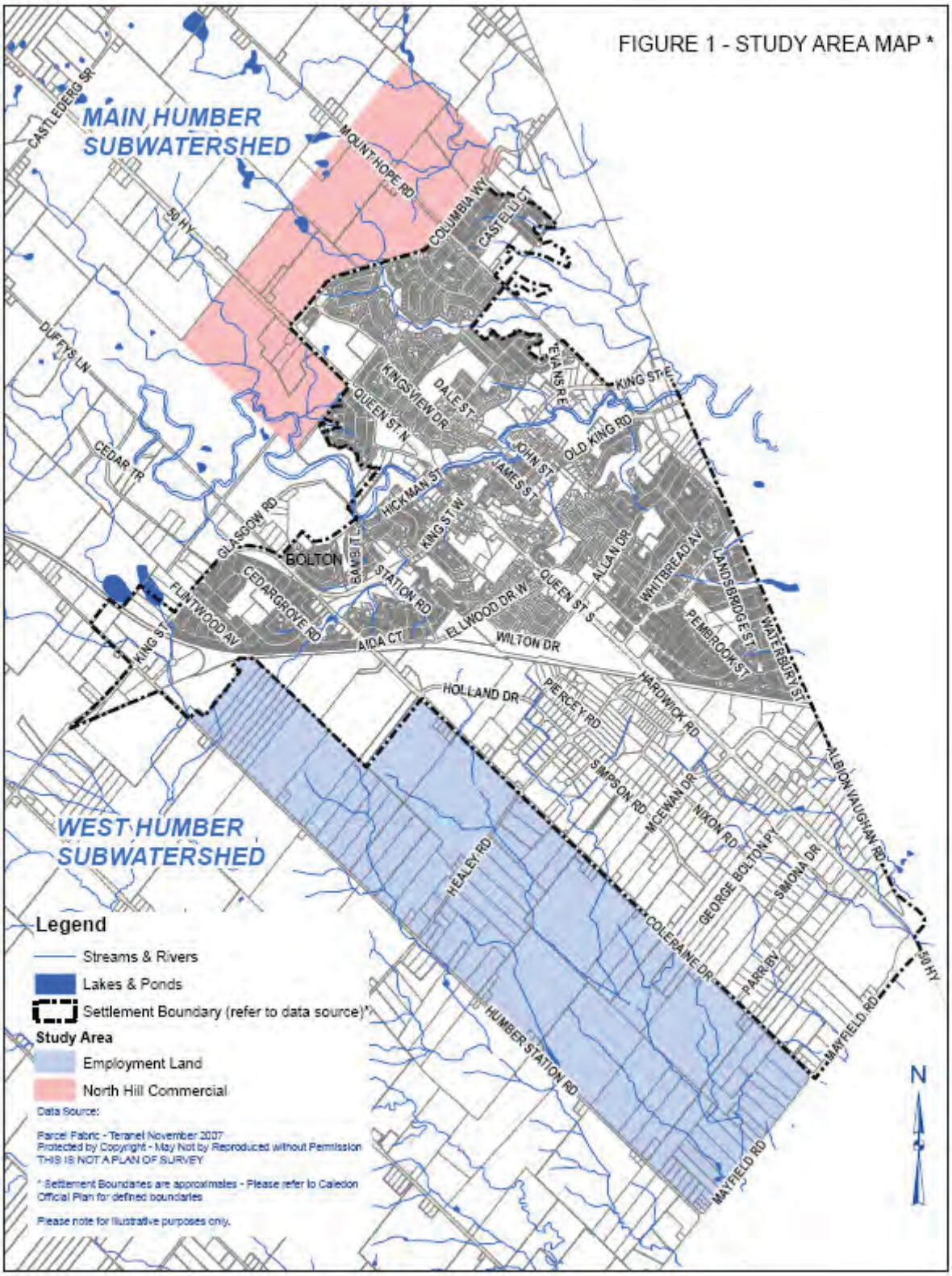
Part A characterizes the environmental resources of the study area. Background and supplemental field data is assessed within each discipline (hydrology/hydraulics, hydrogeology, water quality, stream morphology, aquatics and terrestrial and wildlife) and integrated across disciplines. Key deliverables of Part A include the identification of data gaps and resultant detailed studies required in Part B, and the establishment of initial goals and objectives.

Part B identifies and evaluates the potential impacts of urban land use scenarios within the study area. Required detailed studies identified in Part A will be carried out to fill data gaps. Goals and objectives will be finalized and key targets and strategies for meeting the finalized goals and objectives will be developed.

Based on the results of Parts A and B, Part C identifies all necessary components of an implementation strategy which will ensure that all goals, objectives, targets and other related recommendations and management measures are implemented. This will include the establishment of guidelines for the preparation of required site specific environmental studies, including but not limited to site specific Environmental Impact Study & Management Plans (EIS & MPs).

Table 1: Contents of a Comprehensive Environmental Impact Study and Management Plan

Part A **Existing Conditions and Characterization**	1. Introduction to the Study Area 2. Background Information 3. Baseline Monitoring 4. Existing Conditions Characterization and Initial Constraints and Opportunities Mapping 5. Part A Report
Part B **Impact Assessment and Detailed Studies**	6. Detailed Studies 7. Land Use Evaluation and Impact Assessment 8. Part B Report
Part C **Implementation**	9. Conclusions, Recommendations, Strategies and Management Measures 10. Long Term Monitoring Plan 11. Comprehensive Adaptive Management Plan 12. Policy Conformity Assessment and Recommendations 13. Guidelines for Site Specific Environmental Studies 14. Executive Summary 15. Final Report and Reporting Format



*Note: The study area boundary may be refined through the detailed workplan to incorporate other lands determined to be functionally connected to the study area through Parts A and B of the study.

2.0 PART A – EXISTING CONDITIONS AND CHARACTERIZATION

2.1 Introduction to the Study Area

The purpose of this section is to provide a general introduction and overview of the study area to provide context for readers of the document. This shall include but not be limited to textual description and relevant base mapping. Examining the impacts of the residential boundary expansion on the natural environment will require a sub-watershed approach, rather than only focusing on the boundaries of the preferred expansion options. Therefore, the broader study area must be defined and the assessment of impacts will apply to the full study area. The Town of Caledon, Region of Peel and TRCA will provide further guidance to the consultant regarding the delineation of the broader study area. If through the study process, other expansion area options are identified, the scope of the CEISMP may need to be revised to include any additional work.

2.2 Background Information

This section shall list all literature, background reports, mapping, technical data and all other information sources to be relied upon in the study.

2.3 Baseline Monitoring

The purpose of the baseline monitoring is to establish the baseline conditions within the study area and existing environmental trends against which future monitoring results will be compared. This will allow the projected impacts of future land uses to be monitored as land uses change over time and will link to the Adaptive Management Plan.

Information to be collected shall include but not be limited to:

(a) Surface water quality and quantity;
(b) Aquatic resources;
(c) Hydrology;
(d) Surface water - groundwater interconnections;
(e) Groundwater quality, quantity and flow patterns;
(f) Feature and Site Water budget/balance;
(g) Stream morphology; and

(h) Terrestrial resources – woodlots, wetlands, wildlife, Environmentally Sensitive Areas, Areas of Natural or Scientific Interest.

When preparing a baseline monitoring plan, it is important to ensure that many different disciplines are being monitored at the same sampling site where possible and appropriate. For example, fisheries and water quality monitoring should take place at the same site.
The monitoring plan should include an explanation of how the indicator parameters were established, e.g. what criteria were used when deciding what to monitor.

2.4 Existing Conditions Characterization and Initial Constraint & Opportunities Mapping

Field work should be carried out to better define the existing ecosystem forms, functions, and linkages within the study areas shown on Figure 1. Any areas identified as having potential functional connections that are outside the limits of the study areas shown on Figure 1 shall be addressed, as appropriate. Detailed constraint mapping (1:5,000 min. specified in step 15) will be prepared which highlights the environmental resources within the study area, as well as agency and municipal constraints (i.e. Fisheries Act, Official Plan designations, valley land setbacks). Initial objectives, which complement and build upon the subwatershed and related studies, will be developed based on the information and data inferences.

The mapping shall include but not be limited to:

(a) All hydrologic features including watercourses, swales, ponds, depression areas, springs, seepage areas and existing stormwater management facilities. Headwater features should be classified and mapped according to the CA's headwater drainage feature assessment guidelines;
(b) Existing hydrology, hydraulics, floodlines and floodline estimates as per TRCA Flood Plain Management Policies;
(c) Present day land use;
(d) Vegetation communities using Ecological Land Classification (ELC) mapping;
(e) Wildlife species locations and relative abundance (including amphibian and bird breeding);
(f) Terrestrial corridors (existing and potential), taking into consideration lands that have been targeted for the restoration of natural cover using TRCA's Terrestrial Natural Heritage System Strategy methodology and relevant subwatershed studies;
(g) Aquatic habitat, including water quality;
(h) Feature and Site Water balance/water budget assessment;

(i) Aquatic communities and habitat (with inventory sites), reach delineation, and appropriate setbacks;
(j) Valley slopes, top of bank, ecological considerations, geomorphic and geotechnical hazard areas, including stable slope lines, as per the CA's technical guidelines;
(k) Groundwater recharge and discharge areas, the linkages between them and existing condition groundwater recharge rates determined through a water budget assessment;
(l) Aquifer vulnerability to surface sources of contamination;
(m) Groundwatersheds (extending outside the study area – if applicable);
(n) Stream morphology, channel sensitivity and setbacks required to allow natural channel functions (migration, flooding, erosion);
(o) Preliminary channel classifications based on CA's technical guidelines;
(p) Refined municipal constraint limits (Town of Caledon EPA and Supportive Natural Systems and Linkages);
(q) Existing soils and geology;
(r) Significant landforms;
(s) Flora and Fauna species (based upon assessments using accepted protocols and seasonal sensitivities);
(t) Restoration or enhancement opportunity areas; and
(u) Ecological buffers.

Data deficiencies and information gaps need to be summarized and a workplan developed for filling gaps through detailed studies to be carried out in Part B. It is anticipated that this will include the review of regional groundwater models for the area (that will be provided by the TRCA), and extrapolate data from the models in combination with monitoring data to explain the groundwater conditions in the study area.

2.5 Part A Report

Once the requirements of steps 1 to 4 have been fulfilled, a Part A Report will be submitted in draft form to the Town of Caledon, Region of Peel and TRCA for review and approval prior to proceeding to Part B of the CEISMP.

3.0 PART B – IMPACT ASSESSMENT AND DETAILED STUDIES

3.1 Detailed Studies

It is anticipated that certain detailed studies will be required to complete the constraint mapping, confirm the areas functionally connected to the study area, carry out required detailed impact assessments and/or develop protection, restoration and enhancement plans for the area. In addition, the evaluation and refinement of land use options and impact assessment described in step 6 above may provide direction regarding detailed study requirements. A number of watershed and sub-watershed scale studies that are relevant to the study areas have been completed or are in progress. These studies provide strategies, guidance, targets and recommended actions to guide land use decisions and new development and should be considered when completing the detailed study components of the Comprehensive EIS and MP.

The EIS and MP must be completed in a manner such that the findings of each component study and analysis are integrated throughout the document. In addition, each aspect of the component studies must recognize the principle of adaptive management and incorporate an appropriate level of flexibility into the design. In doing this, interrelationships between components will be more fully considered and a proactive management approach may result. For example, the potential impacts of modifications to surface and/or groundwater on natural features and systems must be considered to determine the feasibility of the proposed land use changes and if/what mitigation and adaptive design measures may be required. In this regard, natural and built systems should not be considered in isolation but as integrated and adaptive units.

The need for, and scope of, the detailed studies are to be confirmed with the Town of Caledon, in consultation with the Region of Peel and TRCA, and they may include but are not limited to:

(a) Surface Water and Groundwater Resources studies;
(b) Aquatic Resources and Water Quality Study;
(c) Stream Morphology Study;
(d) Natural Heritage Study;
(e) Stormwater Management Study;
(f) Water Budget / Balance Study; and
(g) Geotechnical and Slope Stability Assessment.

The following subsections outline the potential contents of the above-referenced detailed studies, if it is determined they are required.

a) Surface Water and Groundwater Resources

The initial constraint mapping will have identified known hydrologic features within and adjacent to the study area, however, the overall hydrologic system must be described and features/functions confirmed. The components of the system to be addressed by the detailed studies include but are not limited to:

(i) Identification of flow characteristics of watercourses and swales, and a description of the feature and site water balance within the study area;
(ii) Characterization of all hydrologic features (watercourse, swales, natural areas providing flood storage/attenuation, depression storage, recharge areas, seepage areas and springs). Particular emphasis should be placed upon headwater tributaries and the functions that they perform within the system;
(iii) Identification of volume and distribution patterns of the major discharge areas and a representative location used for monitoring; and
(iv) Description of the relationship and dependencies between these features and the surrounding terrestrial, wetland and aquatic resources.

Since the study areas may include wetlands, watercourses, fishery resources and other features of potential sensitivity to changes to groundwater resources, a detailed hydrogeological impact assessment will likely be required. This may include but not be limited to:

(i) The general groundwater setting and linkages between the local and surrounding groundwater system;
(ii) Sensitivity of the natural environment and the function of the groundwater related to natural features such as the fishery, aquatic system, terrestrial resources, geomorphology, surface water, water quality and water quantity etc.;
(iii) Approximate high water table location;
(iv) Regional groundwater flow and direction and the general geologic setting;
(v) Potential recharge and discharge areas within the study areas;
(vi) Local groundwater resource usage within the study areas;
(vii) Projected post-development groundwater recharge rates including any anticipated deficits;

(viii) Location and usage of water wells within 1 km of the study areas;
(ix) Detailed description of the local geologic conditions and the function of the geologic units from a hydrogeologic perspective;
(x) Detailed assessment of the groundwater flow system, local flow direction, linkages to surface water and the regional groundwater flow system;
(xi) Delineate major and local aquifers in the area and interpret the connection to the study area;
(xii) Studies on springs, surface water courses or discharge to surface water that focus on groundwater/surface water interaction, determining linkages to recharge and discharge areas through baseflow assessment, vertical gradients, and water table location. This information should be incorporated into the water balance;
(xiii) Contamination risk assessment that considers aquifer vulnerability and proposed land use changes and identification of a risk management strategy; and,
(xiv) Assessment of potential impacts on groundwater flow and volume from required servicing.

b) Aquatic Resources and Water Quality

The initial constraint mapping will have identified fish habitat and water quality classification for the tributaries. The detailed study is to provide the following information in support of the habitat classifications and planned land use change conditions:

(i) Confirm the fish habitat and water quality classifications of all watercourses and fish habitat within the study area;
(ii) The direct and indirect physical and bio-physical impacts of the land use scenarios on water bodies, water quality and quantity;
(iii) The fish species present, and the direct and indirect biological impacts of the physical impacts;
(iv) The life stages of aquatic organisms supported by the impacted habitat; and
(v) Opportunities for maintaining and enhancing aquatic habitat and species through the land use scenarios.

c) Stream Morphology

The study will describe the physical form of the watercourse. The following information will be included:

(i) Characterization of geomorphic features including sensitive reaches, areas of erosion and aggradation, channel migration, etc;
(ii) Determine the relationship between hydrology of the stream and geomorphology, aquatic resources and water quality, using a continuous simulation modeling approach;
(iii) A meander belt width analysis and delineation of the 100 year erosion limit; and
(iv) Assessment of stream bank erosion and the potential for such erosion within the 100 year timeframe, with consideration for potential impacts on the morphology of the valley or stream corridor.

d) Natural Heritage

The study will describe the physical form and function of the ecological systems and features within the study area, and identify any functional relationships to broader systems (e.g. regional wildlife corridors), define what additional issues must be examined (i.e. opportunities for linkages) and demonstrate how the land use scenarios will affect the ecological features and functions of the study area. This shall include but not be limited to:

(i) Identification and design of a natural heritage system that enhances the form, function and integrity of ecological features within and surrounding the study area and maintains or enhances connectivity amongst ecological features. This will also include ecological buffers as well as enhancement and restoration opportunity areas;
(ii) Strategies to avoid and/or mitigate anticipated impacts of land use changes on the form and function of ecological features; and
(iii) Consideration of conservation authority 'target' natural heritage systems, and opportunities to (re)establish linkages between natural features and systems. This may include enhancing the form and maintaining the function of linkages that currently exist prior to development.

e) Stormwater Management

This study will address stormwater management considerations, including but not limited to:

(i) Evaluation of stormwater management options and selection of a preferred stormwater management strategy that includes lot level, conveyance, and end-of-pipe solutions, with emphasis placed on at source controls, and as per TRCA's Stormwater Management Criteria;

(ii) Identification of preliminary locations of stormwater management ponds and infrastructure outside of the natural system (including ecological buffers);
(iii) Identification of major and minor system flow routes;
(iv) Identification of proposed road crossing locations and criteria;
(v) Implementation strategy for inclusion on the overall Study Environmental Management Plan (e.g. phasing, interim works, roles, etc.);
(vi) Identification of erosion and sediment control requirements to be implemented, integrating conservation authority guidelines;
(vii) Methods for mitigating any projected groundwater recharge deficits associated with proposed land use changes;
(viii) Updating the CA's relevant hydrology models, based on the preferred stormwater management strategy and proposed land uses;
(ix) Methods for maintaining the seasonal water budget of hydrologically sensitive terrestrial features (i.e. wetlands and wet forests) affected by proposed land use changes; and,
(x) Updated floodplain mapping within the study area, as well as the surrounding area, if affected.

f) Water Budget / Balance

One component of achieving the sustainability and adaptive management objectives for the community is the integration of best management practices pertaining to maintaining as closely as possible, pre-development ground water conditions post-development. With changes in impervious areas, and potential changes to surface and ground water quality and quantity, best management practices which serve to promote post-development groundwater infiltration/recharge, and maintain pre-development water balance conditions to the greatest feasible extent are required. This report (to be completed by a Professional Engineer or Professional Geoscientist with expertise in this area of practice) should include the development of a detailed water balance on a catchment area basis under existing and post-development conditions.

The investigation should provide definitive, factual information that verifies the final recommendations and should include the components listed below:

1. Introduction.

(i) Background;

(ii) Hydrogeological setting, geological setting; and

(iii) Site location and proposed land use.

2. Methodology.

(i) Report and water balance objectives;

(ii) Background data studies and information utilized and considered; and

(iii) Data and considerations.

3. Water Balance Methodology.

(i) Provided on a catchment basis (existing and proposed);

(ii) Appropriate long-term water budget assessment (e.g. AES Thormewaite, minimum monthly); and

(iii) Groundwater recharge contributions to natural features must be quantified.

For preparing the Feature Based Water Balance study methodology, please refer to TRCA's Water Balance Guidelines for the Protection of Natural Features, which can be downloaded at: http://www.sustainabletechnologies.ca/Portals/_Rainbow/Documents/Water%20Balance%20for%20the%20Protection%20of%20Natural%20Features%20Guideline%20.pdf

4. Predevelopment water balance analysis.

5. Post-development water balance analysis.

(i) Land use considerations.

6. Comparison of pre- and post-development water balances.

(i) Proposed mitigation measures (if required);

(ii) Potential measures (above and beyond traditional lot level controls) that may be considered in the analysis include:

- Rain water harvesting from roof-top water collection on commercial or employment lands, which may be used for irrigation purposes;
- Infiltration galleries;
- Exfiltration galleries;
- Biofiltration measures;

- Green roofs;
- Porous pavement;
- Additional non-compacted topsoil;
- 'third pipe' systems; and
- Additional evapotranspiration measures.

(iii) Preliminary assessment based upon hydrogeological assessment of areas in which enhanced ground water recharge measures may be employed;
(iv) Establish specific targets, thresholds, and objectives for water balance in these areas;
(v) Provide alternative measures that may be employed to meet these objectives – utilizing best management practices;
(vi) Design (may consider interflow, baseflow contributions, downstream erosion and thermal impacts mitigation);
(vii) Provide locations in which these measures would be optimized;
(viii) Implementation (including funding, fiscal implications, technical feasibility, long-term maintenance, cost sharing and landownership considerations if applicable);
(ix) Maintenance; and
(x) Monitoring of water balance enhancement measures.

7. Conclusions and Recommendations.

g) Geotechnical and Slope Stability

A geotechnical investigation will be required to identify areas in which potential slope instability exists. Existing Top-of-Slope (ETOS) and the Long-Term-Stable Top-of-Slope (LTSTOS) should be assessed in areas where they are not coincident with the physical crest of slope. Because of the complexities of site development and soil conditions, comprehensive assessments are required for development projects close to major features, while less detail may be required for minor works near shallower slopes. The assessment of the LTSTOS is to be completed following the MNR's Technical Guide on River and Stream Systems: Erosion Hazard Limit (2002) and should be accompanied by a detailed slope stability analysis.

Where required, a solution based on sound technical data should be recommended to minimize or eliminate the impact of the development and associated activity, and at the same time ensure that the development will be safe for a design period of 100 years. Alternatives should be considered,

and a final solution recommended and justified by comparing it to the alternatives. The basic requirements are as follows (more specific components should be discussed with conservation authority and Town staff):

(i) Determine the existing subsoil conditions and pertinent geotechnical parameters for the entire height of the slope;
(ii) Model the slope conditions and assess its stability. Determine the stable slope inclination corresponding to a minimum Factor of Safety of 1.5; and
(iii) Provide and assess mitigation strategies, where required.

The TRCA will provide specific guidelines for the required structure of the assessment giving a general guide for the documentation and calculations required. The level of detail required for a specific submission will depend on factors such as:

(i) Slope characteristics (e.g., height, angle, and distance from watercourse);
(ii) Distance of development from the slope;
(iii) Local soil conditions; and
(iv) The type of development proposed.

3.2 Land Use Evaluation and Impact Assessment

Through an analysis of the dynamics and interrelationships of the ecosystem, the study will assess the potential environmental impacts of locating residential uses and the associated infrastructure within the respective study areas, and their compatibility with the Town's ecosystem goals, objectives, policies and performance measures.

The study will recommend environmental protection and enhancement measures for use in assessing the environmental impacts and enhancement opportunities of the residential land use options. The study will consider the impacts of development adjacent to the natural system and identified enhancement opportunities, and will discuss approaches to avoiding or minimizing impacts of adjacent land uses. The location of infrastructure, including roads adjacent to the natural system, will need to be considered with the design eliminating or minimizing any proposed crossings of the natural system.

The study will outline an environmental management strategy for the preferred development locations which will recommend measures for the management, enhancement, restoration and monitoring of the ecosystem.

It is expected that an iterative relationship will exist between steps 6 and 7.

3.3 Part B Report

Once the requirements of steps 6 and 7 have been fulfilled, a report on Part B will be submitted in draft form to the Town of Caledon, Region of Peel and TRCA for review and approval prior to proceeding to Part C of the CEISMP. Based on the results of Steps 6 and 7, the Part B report will recommend finalized goals and objectives and key targets and strategies for meeting the finalized goals and objectives.

4.0 PART C – IMPLEMENTATION

4.1 Conclusions, Recommendations, Strategies and Management Measures

This section will synthesize the results of Parts A and B of the study and provide all related conclusions, recommendations, and management/mitigation strategies. This shall include but not be limited to:

(a) A comparative evaluation of alternative management options leading to the selection of the preferred option;
(b) Conclusions and recommendations; and
(c) Strategies and Management Measures – if impacts are expected or may occur, what plans are in place to maintain ecosystem features and functions?

It is expected that key components of Part C will include a long term monitoring program, an adaptive management plan, policy recommendations and guidelines for site specific environmental studies, as generally outlined in Steps 10 to 13 below.

4.2 Long Term Monitoring plan

Monitoring is to continue after baseline conditions are established. The monitoring plan should be designed in such a way that impacts can be distinguished from natural trends at an early stage. If impacts are detected:

(a) A more aggressive type of monitoring should take place that determines where, why and how fast the change is occurring;
(b) Establish cause-effect relationships between environmental resources and land use change;
(c) Be able to deal with change by proposing appropriate mitigative measures (as per adaptive management plan); and
(d) Focus on evaluating ongoing or proposed management practices.

Items that should be monitored over the long term include but are not limited to:

(i) Water quality and quantity, including stormwater system performance (including any best management practice measures and/or designs used);
(ii) Fisheries and aquatic resources;
(iii) Hydrology and hydraulics;
(iv) Groundwater quality and quantity;
(v) Stream morphology and slope stability;
(vi) Terrestrial resources – woodlots, wetlands, flora and fauna, Environmentally Sensitive Areas, Areas of Natural or Scientific Interest, terrestrial linkages, buffer areas, invasive species, natural system encroachments, natural system edge management, and vernal pools; and
(vii) Feature Based and Site Water balance and the effectiveness of groundwater recharge enhancement measures.

It is essential that long term monitoring be included in the final study report, and that the costs and responsibilities for long term monitoring be addressed. The length of time for monitoring will be determined during the study, and may depend upon the feature to be monitored (i.e. different features may need different lengths of time).

4.3 Comprehensive Adaptive Management Plan

The broad objective of the Comprehensive Adaptive Management Plan (CAMP) is to provide direction for monitoring the performance of the recommended aquatic and terrestrial resource mitigation strategies, and to provide a flexible mitigation system that can be adjusted in response to monitoring results. For the CAMP to be effective, flexible measures must be accommodated at the initial stages of all aspects of the community design (e.g. stormwater management infrastructure, open space system, transportation network, landscaping etc.) to allow for an adaptive system that can react to required change. The CAMP is a management framework that encompasses and provides for the following:

(a) Identify key Study Area features and functions and associated protection goals and objectives;
(b) Management targets required to meet goals and objectives;
(c) Mitigation measures to address the performance targets;
(d) Monitoring requirements to monitor the success of the mitigation measures in relation to the targets;
(e) Evaluation of the monitoring results in relation to the management targets; and
(f) Long term adjustment of the overall Plan/CAMP as needed.

Specifically, the CAMP will include a framework for long-term environmental monitoring to measure the performance of the recommended mitigation/management strategies. Recommendations for long-term monitoring of surface water, groundwater, water quality, fisheries, stream morphology and terrestrial/wetland resources will be provided. The data collected as part of the Study will form a baseline for monitoring change over time and for evaluating proposed management practices. Monitoring frequency, parameters and responsibility will also be addressed. The monitoring program will be designed in a way that will help to distinguish between natural variation in ecosystem function and potential land use development impacts.

In keeping with the adaptive management plan approach, the CAMP will discuss responses to changing conditions or anticipated impacts. This might include more aggressive monitoring necessary to determine the cause and effect relationship associated with the change or anticipated impact as well as providing general directions for consideration of impact contingency measures that might be considered as adjustments to the plan where necessary after taking into account monitoring results.

The CAMP will provide the framework linking the site specific studies and CAMPs into the broad management plan or CAMP for the study area management, to ensure mitigation and monitoring plans, as well as enhancement and restoration, are consistent and integrated and address the identified resource protection targets, within the context of the broader ecological and water resources context as documented through the Study.

In areas of widespread development, the conservation authority may undertake long-term environmental monitoring (should funding be provided) to reduce overall costs and to achieve better consistency.

4.4 Policy Conformity Assessment and Recommendations

As previously stated, the CEISMP is required to not only address the policy requirements of the Caledon Official Plan, but also the applicable policies and requirements of other relevant agencies, including the Provincial Policy Statement, Provincial Acts, the Region of Peel and TRCA. Step 12 of the CEISMP is intended to clearly reference relevant policy, legislative and technical requirements and describe how the CEISMP meets or exceeds these requirements.

4.5 Guidelines for Site Specific Environmental Studies

It is anticipated that one of the products of the CEISMP will be guidelines for carrying out future site specific environmental studies, including site specific Environmental Impact Study & Adaptive Management Plans to be prepared by individual applicants in support of development proposals in the study area. These site specific studies will assess the merits of the application and will apply findings, recommendations and strategies contained in the CEISMP. Establishing guidelines for the preparation of site specific environmental studies will assist future applicants in determining the scope and content of such studies.

4.6 Executive Summary

Include a summary at the front of the final report (step 15 below) that summarizes the results of Parts A, B and C, highlighting key findings, recommendations and strategies.

4.7 Final Report and Reporting Format

A complete description of all the work and conclusions involved in the Comprehensive EIS & MP (Parts A, B, and C) is to be included in the final report.

Reports should be submitted in hard copy along with an electronic copy in Word for Windows 2007 Office and Portable Document Format (PDF) on a CD. Ten copies of all draft and final reports, each with a full set of graphics, artwork and maps shall be submitted to the Town of Caledon.

Graphics

Graphics should be submitted in Microsoft PowerPoint format on a CD separately from the main report as well as incorporated into the main report.

Artwork

Artwork should be submitted in JPG format on a CD separately from the main report as well as incorporated into the main report.

Mapping

Mapping should be in a scale of 1:5000 or less. It should be noted that Arc GIS 9.x is the GIS software currently used in the Town of Caledon, and as such, ArcView shape files are required. In general, digital graphic data:

(a) **must** be georeferenced in UTM using NAD 83;
(b) **must** be clean, i.e. polygons should be closed, dangles eliminated, polygons with common borders should not overlap, etc.;
(c) should be packaged/organized into logical layers, for example, a soils layer, a wetlands layer, etc.; and
(d) **must** be in vector as opposed to raster format, unless otherwise specified.

Tabular Attribute Data

Attribute data should be provided in Excel format files (preferred), dBase IV format files, or in formatted (i.e. with defined columns) ASCII files.

Textual Data for Graphics

Text should be provided in Word for Windows 2003 Office. Please be aware that any tabular data to be referenced to actual map features should **not** be provided as tables in a Word document.

Digital Photos

Digital photos, whether they are scanned photographs or computer-generated artwork, should be provided in JPG format.

Spatial Data Requirements

Spatial data provided by the Vendor to the Agency will be in ESRI Shapefile format. All spatial data will be geo-referenced and projected in 6 Degree Universal Transverse Mercator (UTM), Zone 17, North American Datum 1983 (NAD83). Mapping (cartographic) templates may be provided to the Vendor upon request.

Spatial data will be topologically correct. Polygon features will not overlap and gaps (slivers) will not be present (areas of no data accepted). Linear features will not have dangles, self intersects or self overlaps. Sample data may be provided to the Vendor upon request.

Metadata will be provided with all data. The metadata will include an abstract, purpose and process steps used to create the data. Attribute field definitions will also be provided. Metadata will be attached to the GIS data through a metadata record and/or as a Readme file. Sample metadata may be provided to the Vendor upon request.

The successful Vendor will be responsible for entering into a Digital Data Use Agreement (DDUA) with the Agency. A template of the DDUA is attached.

All data created by the Vendor will become the property of the Agency. Data may become available to the Public through open data initiatives.

Appendix B

Wetland Evaluation and Wetland Mapping Update

Memorandum

To: Mr. Carmine Caruso
Senior Planner
Town of Caledon

From: Ken Ursic, M.Sc.; Said Mohamed, B.Sc., Beacon Environmental Limited

Date: May 17, 2023

Ref.: Town of Caledon: POPA 2021-0002
Beacon Environmental Limited: 214476

Re: **Final Wetland Evaluation and Mapping Update for the Macville Area Wetlands, Town of Caledon, Region of Peel**

Beacon Environmental Limited ("Beacon") were retained by the Caledon Community Partners to evaluate previously unevaluated wetlands in the Caledon Station Community Secondary Plan Area in Bolton, Ontario. The Caledon Station Community Secondary Plan Area (herein referred to as the "Subject Lands") include approximately 182 hectares (450 acres) of primarily agricultural land that is generally located north of King Street, east of The Gore Road and west of the CP Railway tracks. The Subject Lands and surrounding 120-metre study area contain one (1) Provincially Significant Wetland ("PSW") and 16 unevaluated wetland units (**Figure 1**).

The Town of Caledon requires that unevaluated wetlands be studied and evaluated as per Official Plan Policy 3.2.4.4.4:

> *Unevaluated wetlands shall be studied and evaluated through joint initiatives potentially involving the Town, the Conservation Authority, the Ministry of Natural Resources and Forestry, the Region of Peel, a development proponent or other appropriate parties.*

To confirm the significance status of these previously unevaluated wetlands ("Subject Wetlands"), a Certified Wetland Evaluator has completed an evaluation in accordance with the Ontario Wetland Evaluation System (OWES) Southern Manual, 4th edition (MNRF 2022), as described in **Section 2**. Note that the PSW east of the Canadian Pacific Railway was not included as part of the current evaluation.

The Subject Wetlands have been studied between 2013 and 2020 by Beacon as well as the Ministry of Natural Resources and Forestry ("MNRF") and Dougan & Associates on behalf of the Town of Caledon ("Town"). These studies were conducted in accordance with various provincial standards, as outlined in the Comprehensive Environmental Impact Study and Management Plan (CEISMP) (Beacon 2023).

In addition, the boundaries of most of these wetlands were staked by MNRF staff in 2016. A listing of key studies and investigations that were relied upon for the wetland evaluation is presented in **Table 1**.

Table 1. Studies of the Subject Lands

Date	Study Type	Author/Party
2013 June 16	Preliminary Natural Heritage Study: Birds, Amphibians, and Flora	Dougan & Associates
2013 June 19	Headwater Drainage Feature Assessment	Aquafor Beech Limited
2013 August 23	Fish Habitat Assessment	C. Portt & Associates
2013 October 15	Fish Community Sampling	C. Portt & Associates
2014 April 25, May 27, and June 24	Amphibian Breeding Surveys	Dougan & Associates
2016 June 1	Wetland Boundary Delineation, Flora, and Fauna	MNRF (Steve Varga, Alex Kissel), Ontario Streams (Agneta Szabo), Beacon, Town of Caledon
2016 June 13	Fish Community Sampling	C. Portt & Associates
2020 October 5	Floristics in Subject Wetlands	Beacon
2020 April 27, May 27, and June 22	Amphibian Breeding Surveys	Beacon
2020 May 28, June 19, and July 4	Breeding Bird Surveys	Beacon
2020 October 22-23	Headwater Drainage Feature and Fish Habitat Confirmatory Assessment	Beacon
2023 April 25	Wetland #105 Mapping Update on properties south of King Street.	Beacon

OWES requires consideration of landscape context of the wetland, wetland area, form, hydrology, flora, and fauna, in evaluating whether the wetland is to be considered Provincially Significant or Other. The OWES manual provides instructions for evaluating wetlands. As the 4th edition of OWES has numerous changes relative to the 3rd edition, it is important to highlight the approach used for this evaluation:

- Under the current OWES, there are no criteria for complexing wetlands; therefore, unevaluated wetlands can not be complexed;
- Where wetlands are very closely grouped (e.g., 30 metres (m) from each other) and function together as one, such groups of wetlands can be evaluated as one wetland under OWES;
- Wetlands smaller than 2 hectares (ha) are generally not evaluated. A wetland smaller than 2 ha can be evaluated provided there is ecological, hydrological, hydrogeological, or social rationale for doing so; and
- To be Provincially Significant, a wetland must either achieve a total score 600 points or more or achieve a score of 200 or more in either the Biological component or the Special Features component.

Five (5) Subject Wetlands form a group of very close wetlands that function as one. This group, referred to as the “Macville Area Wetlands” cover a total area of 8.5 ha includes wetland units 105, 106, 107, 108, and 109, as per MNRF records, which correspond to the CEISMP wetlands W1 through W6. The Macville Area Wetlands were evaluated as one and scored as per **Table 2** and the Wetland Evaluation

Data and Scoring Record (**Attachment A**). The score for the Macville Area Wetlands does not exceed 200 points in the biological or special features categories, or a exceed a total score of 600 points; therefore, this wetland group is not Provincially significant.

Table 2. Wetland Evaluation Scoring Summary for the Macville Area Wetlands

Wetland Evaluation Scoring Component	Score
Biological	101.5
Social	74
Hydrological	208
Special Features	162
Total	**545.5**

Nine (9) of the remaining Subject Wetlands are either isolated from each other (i.e., far greater than 30 m spaced apart) or are smaller than 2 ha. Due to their location and being less than 2 ha, they do not qualify for evaluation under OWES, however for the purposes of satisfying policy 3.2.4.4.4, these wetlands have been studied and confirmed to be non-Provincially Significant. These wetlands are assigned a class of "Other" and are summarized in **Table 3**.

Mapping updates to MNRF wetlands were completed on five wetlands based on field observations and 2023 orthophotography. Three of these five wetlands were also evaluated and classified as "Other" in **Table 3**. It should be noted that three (3) wetlands that were previously mapped as being within 120 m of the Subject Lands were no longer present within the area: Wetland #131, Wetland 1-2023, and Wetland 210-2016.

Table 3. Evaluation and Mapping Update of Very Small Wetlands

Wetland ID (MNRF)	Wetland ID or ELC Unit (CEISMP)	Area (ha)	Evaluated Status	Mapping Update
131	—	0.28	Other	Yes
1-2020	7j, 7l, 7k, and 14	0.70	Other	No
2-2020	7i	0.03	Other	No
3-2020	8l	0.04	Other	No
4-2020	7f, 13	0.17	Other	Yes
88	W8	0.91	Other	No
3-2016	5, 14a	0.11	Other	Yes
6-2020	7g	0.24	Other	No
210-2016	—	0.00	Not present	Not present

The remaining two unevaluated wetlands (5-2020 and 1-2023) are associated with existing PSW #1 and will require further study to be evaluated as per OWES.

The OWES manual (MNRF 2022) provides the requirements for completion of a wetland evaluation or mapping update.

These requirements are as follows:

- The relevant planning authority (i.e., the Town of Caledon) receives the final evaluation, which includes wetland boundary mapping;
- The Certified Wetland Evaluator notifies the affected wetland owners of the final wetland boundary and wetland status (i.e., provincially significant or other); and
- The Certified Wetland Evaluator forwards a copy of the final digital wetland boundary mapping and wetland status to the MNRF within 30 days to be uploaded to Land Information Ontario (LIO).

To fulfill the above requirements, we are enclosing a copy the Macville Area Wetland Evaluation which was completed by an OWES certified wetland evaluator.

Beacon will also be submitting to MNRF digital mapping of the wetlands and their status and will notify landowners of properties with wetlands that are affected by the evaluation and remapping.

Should you have any questions, please contact the undersigned.

Prepared by:
Beacon Environmental

Said Mohamed, B.Sc., Cert. Env. Assessment
Ecologist

Reviewed by:
Beacon Environmental

Ken Ursic, B.Sc., M.Sc.
Principal, Senior Ecologist

References

Beacon Environmental Limited (Beacon). 2023.
Comprehensive Environmental Impact Study and Management Plan. May 2023.

Ministry of Natural Resources and Forestry (MNRF). 2022.
Ontario Wetland Evaluation System — Southern Manual. King's Printer for Ontario. (4th ed.).

Legend

- Wetland Evaluation Area
- Limit of Macville Area Wetlands
- Evaluated Wetlands - Not Provincially Significant (MNRF 2023; Beacon 2023)
- Wetland not Present (Beacon 2023)
- Unevaluated Wetland (MNRF 2023)
- Provincially Significant Wetland (MNRF 2023)
- Drainage Features
- Watercourse (MNRF 2023)

Wetland Boundaries | **Figure 1**

Macville Area Wetland Evaluation

BEACON ENVIRONMENTAL

Project: 214476
Last Revised: May, 2023

Client: Caledon Community Partners

Prepared by: BD
Checked by: JS

1:7,650

0 110 220 m

C:\ODB\OneDrive - Beacon Environmental\GeoSpatial\Geo Projects\2014\214476\MXD\2023-04-24_Figure01_WetlandBoundaries_214476.mxd

Attachment A

WETLAND EVALUATION DATA AND SCORING RECORD

Wetland Name: Macville Area Wetlands

Geographic Location (municipality, lot/concession, etc):

Town of Caledon; Lot 11/Concession 4

Map / Photo Locational Reference (e.g., latitude/longitude, NTS map, UTM):

See Figure 1 for location

Eco-District: 6E-7 (Oak Ridges)

Wetland Size (hectares): 8.54

Vegetation Form	FA
h	0.00
c	
dh	
dc	
ts	0.00
ls	
ds	
gc	0.18
m	
ne	0.24
be	
re	0.48
ff	0.01
f	
su	0.02
u	0.07

1.0 BIOLOGICAL COMPONENT

1.1 PRODUCTIVITY

1.1.1 Growing Degree-Days/Soils *(max: 30 pts)*

Refer to page 36 of manual for further explanation.

1. Determine the correct GDD value for your wetland (use Figure 5).
2. Circle the appropriate GDD value from the evaluation table below.
3. Determine the Fractional Area (FA) of the wetland for each soil type.
4. Multiply the fractional area of each soil type by the applicable score-factor in the evaluation table.
5. Sum the scores for each soil type to obtain the final score (maximum score is 30 points).

Growing Degree-Days	Clay-Loam	Silt-Marl	Lime-stone	Sand	Humic-Mesic	Fibric	Granite
<2800	15	13	11	9	8	7	5
2800-3200	18	15	13	11	9	8	7
3200-3600	**22**	18	15	13	11	9	7
3600-4000	26	21	18	15	13	10	8
>4000	30	25	20	18	15	12	8

Soil Type	FA of wetland in soil type	Enter appropriate score-factor from above table	
Clay/Loam	1.00	x 22	= 22
Silt/Marl:		x	=
Limestone:		x	=
Sand:		x	=
Humic/Mesic:		x	=
Fibric:		x	=
Granite:		x	=
Total			22

GDD/Soils Score *(maximum 30 points)* 22

Loam was observed by OWES evaluators despite geotechnical studies classifying the presence of silt

1.1.2 Wetland Type

(Fractional Areas = area of wetland type/total wetland area)

	Fractional Area		Score
Bog		x 3 =	
Fen		x 6 =	
Swamp	0.00	x 8 =	0
Marsh	1.00	x 15 =	15
Total		=	15

Wetland Type Score *(maximum 15 points)* 15

1.1.3 Site Type

(Fractional Area = area of site type/total wetland area)

	Fractional Area		Score
Isolated	0.00	x 1 =	
Palustrine (permanent or intermittent flow)	1.00	x 2 =	2
Riverine		x 4 =	
Riverine (at rivermouth)		x 5 =	
Lacustrine (at rivermouth)		x 5 =	
Lacustrine (with barrier beach)		x 3 =	
Lacustrine (exposed to lake)		x 2 =	
Total		=	2

Site Type Score *(maximum 5 points)* 2

1.2 BIODIVERSITY

1.2.1 Number of Wetland Types

(Check only one)

✓	One	=	9 points
	Two	=	13
	Three	=	20
	Four	=	30

Number of Wetland Types Score
(maximum 30 points) 9

1.2.2. Vegetation Communities

Use the data sheet provided in Appendix 4 to record and score vegetation communities (the completed form must be attached to this data record)

Scoring *(circle only one option for each of the columns below):*

Total # of communities with **1-3 forms**	
1 =	1.5 pts
2 =	2.5
3 =	3.5
4 =	4.5
5 =	5
6 =	5.5
7 =	6
8 =	6.5
9 =	7
10 =	7.5
11 =	8
+ 0.5 *for each additional community*	
11 =	8.5

Total # of communities with **4-5 forms**	
1 =	2 pts
2 =	3.5
3 =	5
4 =	6.5
5 =	7.5
6 =	8.5
7 =	9.5
8 =	10.5
9 =	11.5
10 =	12.5
11 =	13
+ 0.5 *for each additional community*	
1 =	2

Total # of communities with **6 or more forms**	
1 =	3 pts
2 =	5
3 =	7
4 =	9
5 =	10.5
6 =	12
7 =	13.5
8 =	15
9 =	16.5
10 =	18
11 =	19
+ 1.0 *for each additional community*	
=	0

Vegetation community mapping can be provided upon request

Vegetation Communities Score
(maximum 45 points) 10.5

1.2.3 Diversity of Surrounding Habitat

Check all appropriate items. Only habitat within 1.5 km of the wetland boundary and at least 0.5 ha in size are to be scored.

✓	row crop
	pasture
	abandoned agricultural land
✓	deciduous forest
✓	coniferous forest
✓	mixed forest*
	abandoned pits and quarries
	open lake or deep river
✓	fence rows with deep cover, or shelterbelts
	terrain appreciably undulating, hilly or with ravines
	creek flood plain

* *"Mixed forest" is defined as either 25% coniferous trees distributed singly or in clumps in deciduous forest, or 25% deciduous trees distributed singly or in clumps in coniferous forest. Note that Forest Resource Inventory (FRI) maps can be misleading since 25% conifer within a unit could be entirely concentrated around a lake.*

Score 1 point for each feature checked, up to a maximum of 7 points.

Diversity of Surrounding Habitat Score
(maximum 7 points) 5

1.2.4 Proximity to Other Wetlands

Check highest appropriate category. (Note: if the wetland is lacustrine, score option #1 at 8 points).

✓		Points
✓	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or to open lake or deep river within 1.5 km	8
	Hydrologically connected by surface water to other wetlands (same dominant wetland type) within 0.5 km	8
	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or to open lake or deep river from 1.5 to 4 km away	5
	Hydrologically connected by surface water to other wetlands (same dominant wetland type) from 0.5 to 1.5 km away	5
	Within 0.75 km of other wetlands (different dominant wetland type) or open water body, but not hydrologically connected by surface water	5
	Within 1 km of other wetlands, but not hydrologically connected by surface water	2
	No wetland within 1 km	0

Name and distance (from wetland) of wetlands/waterbodies scored above:
Downstream swamp (unevaluated), 800 m away, west of Gore Road

Proximity to other Wetlands Score
(maximum 8 points) 8

1.2.5 Interspersion

Number of Intersections = 99

✓	Number of Intersections *(Check one only)*	Points
	26 or less	= 3
	27 to 40	= 6
	41 to 60	= 9
	61 to 80	= 12
✓	81 to 100	= 15
	101 to 125	= 18
	126 to 150	= 21
	151 to 175	= 24
	176 to 200	= 27
	>200	= 30

Interspersion Score *(maximum 30 points)* 15

1.2.6 Open Water Types

NOTE: *this attribute is only to be scored for permanently flooded open water within the wetland (adjacent lakes do not count). Check one option only.*

Open water occupies 3.6% of wetland area

✓	Open Water Type	Characteristic	Points
✓	Type 1	Open water occupies < 5 % of wetland area	= 8
	Type 2	Open water occupies 5-25% of wetland (occurring in central area)	= 8
	Type 3	Open water occupies 5-25% (occurring in various-sized ponds, dense patches of vegetation or vegetation in diffuse stands)	= 14
	Type 4	Open water occupies 26-75% of wetland (occurring in a central area)	= 20
	Type 5	Open water occupies 26-75% of wetlands (small ponds and embayments are common)	= 30
	Type 6	Open water occupies 76%-95% of wetland (occurring in large central area; vegetation is peripheral)	= 8
	Type 7	Open water occupies 76-95% of wetland (vegetation in patches or diffuse open stands)	= 14
	Type 8	Open water occupies more than 95% of wetland area	= 3
	No open water		= 0

Open Water Type Score *(maximum 30 points)* 8

1.3 SIZE (BIOLOGICAL COMPONENT)

Total Size of Wetland = 8.5 ha

Sum of scores from Biodiversity Subcomponent

1.2.1	9
+ 1.2.2	10.5
+ 1.2.3	5
+ 1.2.4	8
+ 1.2.5	15
+ 1.2.6	8
	55.5

Circle the appropriate score from the table below.

Wetland size (ha)	Total Score for Biodiversity Subcomponent									
	<37	37-47	48-60	61-72	73-84	85-96	97-108	109-120	121-132	>132
<20 ha	1	5	7	8	9	17	25	34	43	50
20-40	5	7	8	9	10	19	28	37	46	50
41-60	6	8	9	10	11	21	31	40	49	50
61-80	7	9	10	11	13	23	34	43	50	50
81-100	8	10	11	13	15	25	37	46	50	50
101-120	9	11	13	15	18	28	40	49	50	50
121-140	10	13	15	17	21	31	43	50	50	50
141-160	11	15	17	19	23	34	46	50	50	50
161-180	13	17	19	21	25	37	49	50	50	50
181-200	15	19	21	23	28	40	50	50	50	50
201-400	17	21	23	25	31	43	50	50	50	50
401-600	19	23	25	28	34	46	50	50	50	50
601-800	21	25	28	31	37	49	50	50	50	50
801-1000	23	28	31	34	40	50	50	50	50	50
1001-1200	25	31	34	37	43	50	50	50	50	50
1201-1400	28	34	37	40	46	50	50	50	50	50
1401-1600	31	37	40	43	49	50	50	50	50	50
1601-1800	34	40	43	46	50	50	50	50	50	50
1801-2000	37	43	47	49	50	50	50	50	50	50
>2000	40	46	50	50	50	50	50	50	50	50

Size Score (Biological Component)
(maximum 50 points) 7

2.0 SOCIAL COMPONENT

2.1 ECONOMICALLY VALUABLE PRODUCTS

2.1.1 Wood Products

Check the option that best reflects the total area (ha) of forested wetland (i.e., areas where the dominant vegetation form is h or c). Note that this is the area of all the forested vegetation communities, not total wetland size. Do not include areas where harvest is not permitted. Check only one option.

Area of wetland used for scoring 2.1.1: 0 ha

✓	< 5 ha	=	0 pts
	5 - 25 ha	=	3
	26 – 50 ha	=	6
	51 – 100 ha	=	9
	101 – 200 ha	=	12
	> 200 ha	=	18

Source of information:
Wetland staking with Town, MNRF, Beacon

Wood Products Score *(maximum 18 points)* 0

2.1.2 Wild Rice

Check only one.

	Present (min. size 0.5 ha)	=	6 pts
✓	Absent	=	0
	Harvest not permitted	=	0

Source of information:
Comprehensive Environmental Impact Study and Management Study (CEISMP) by Beacon for Macville Community Secondary Plan

Wild Rice Score *(maximum 6 points)* 0

2.1.3 Commercial Baitfish

Check only one.

✓	Present	=	12 pts
	Absent	=	0
	Fishing not permitted	=	0

Source of information:
C. Portt & Associates (2013, 2016) fish community sampling in Wetland #107, Community reM18-B (Brook Stickleback and Fathead Minnow)

Commercial Fish Score *(maximum 12 points)* 12

2.1.4 Furbearers

Only species recognized as furbearers under the Fish & Wildlife Conservation Act may be scored here. Score 3 *points for each furbearer species listed, up to a maximum of 12 points. Score 0 points if trapping is prohibited.*

	Name of furbearer	Source of information
1.	Coyote	Scat observed during field surveys
2.		
3.		
4.		
5.		
6.		

Furbearer Score *(maximum 12 points)* 3

2.2 RECREATIONAL ACTIVITIES

Sources of information and reasons for scoring a wetland under high or moderate use below, must be included below.

Circle one score for each of the activities listed. Score is cumulative – add score for hunting, nature enjoyment and fishing together for final score.

Intensity of Use	Type of Wetland-Associated Use: Hunting	Nature Enjoyment/ Ecosystem Study	Fishing
High	40 points	40 points	40 points
Moderate	20	20	20
Low	8	8	8
Not Possible/ No evidence	(0)	(0)	(0)

Sources of information (include evidence/criteria forming basis for score and any relevant reference used to obtain that information):

Hunting: Land privately owned; no evidence of this activity

Nature: Land privately owned; no evidence of this activity

Fishing: Land privately owned; no evidence of this activity

Recreational Activities Score
(maximum 80 points) 0

2.3 LANDSCAPE AESTHETICS

2.3.1 Distinctness

Check only one.

✓	Clearly Distinct	=	3 pts
	Indistinct	=	0

Landscape Distinctness Score
(maximum 3 points) 3

2.3.2 Absence of Human Disturbance

Check only one.

	Human disturbances absent or nearly so	=	7 pts
	One or several localized disturbances	=	4
	Moderate disturbance; localized water pollution	=	2
✓	Wetland intact but impairment of ecosystem quality intense in some areas	=	1
	Extreme ecological degradation, or water pollution severe and widespread	=	0

Details regarding type, extent and location of disturbance scored:
Agricultural tiling in some areas. An old rail bed bisects the wetland north of King Street and is associated with several culverts. Proximal to highways and agricultural runoff. Ponds in the wetland are artificial and historically dug-out

Source of information:
CEISMP studies by Beacon

Absence of Human Disturbance Score
(maximum 7 points) 1

2.4 EDUCATION AND PUBLIC AWARENESS

2.4.1 Educational Uses

Check highest appropriate category.

	Frequent	=	20 pts
	Infrequent	=	12
✓	No visits	=	0

Details regarding the type and frequency of education uses scored above:
Land is privately owned

Source of information:
CEISMP field studies

Educational Uses Score *(maximum 20 points)* 0

2.4.2 Facilities and Programs

Check all appropriate options, score highest category checked.

	Staffed interpretation centre	=	8 pts
	No interpretation centre or staff, but a system of self-guiding trails or brochures available	=	4
	Facilities such as maintained paths (e.g., woodchips), boardwalks, boat launches or observation towers, but no brochures or other interpretation	=	2
✓	No facilities or programs	=	0

Additional Notes/Comments:
No maintained trails or public facilities

Source of information:
CEISMP field studies

Facilities and Programs Score
(maximum 8 points) 0

2.4.3 Research and Studies

Check all that apply; score highest category checked.

	Long term research has been done	=	12 pts
	Research papers published in refereed scientific journal or as a thesis	=	10
✓	One or more (non-research) reports have been written on some aspect of the wetland's flora, fauna, hydrology, etc.	=	5
	No research or reports	=	0

List of reports, publications, research studies etc. scored above:

Aquafor Beech Limited. June 16, 2013. Headwater Drainage Features Assessment: In Support of the Bolton Residential Expansion Study.

Dougan & Associates. June 19, 2013. Bolton Residential Expansion Study: Phase 2, Technical Memorandum - Natural Heritage. Prepared for the Town of Caledon.

Dougan & Associates, Aquafor Beech Ltd., Cam Portt & Associates, BluePlan Engineering Consultants Ltd. and Meridian Planning. June 16, 2014. Bolton Residential Expansion Study: Phase 3, Technical Memorandum - Development of a Preliminary Natural Heritage System. Revised . Prepared for the Town of Caledon.

DS Consultants Ltd. February 3, 2021. Preliminary Hydrogeological Investigation Proposed Development Macville Community in Connection with LOPA Application to Establish the Macville Community Secondary Plan Area, Bolton, Ontario. Prepared for Bolton Option 3 Landowners Group.

CEISMP by Beacon in support of Macville Community Secondary Plan

Research and Studies Score
(maximum 12 points) 5

2.5 PROXIMITY TO AREAS OF HUMAN SETTLEMENT

Name of Settlement: Bolton

Distance of wetland from settlement: Approximately 300 m

Population of settlement: 26,000 (Source: Town of Caledon Population Distribution (June 30, 2006))

Circle only the highest score applicable

Distance of wetland to settlement	population >10,000	population 2,500-10,000	population <2,500 or cottage community
within or adjoining settlement	40 points	26 points	16 points
0.5 to 10 km from settlement	26	16	10
10 to 60 km from settlement	12	8	4
>60 km from nearest settlement	5	2	0

Proximity to Human Settlement Score
(maximum 40 points) 40

2.6 OWNERSHIP

FA of wetland held by or held under a legal contract by a conservation body (as defined by the *Conservation Land Act*) for wetland protection	_____ x 10 = _____
FA of wetland occurring in provincially or nationally protected areas (e.g., parks and conservation reserves)	_____ x 10 = _____
FA of wetland area in Crown/public ownership, not as above	_____ x 8 = _____
FA of wetland area in private ownership, not as above	1.00 x 4 = 4

Source of information:
CEISMP studies

Ownership Score *(maximum 10 points)* 4

2.7 SIZE (SOCIAL COMPONENT)

Total Size of Wetland = 8.5 ha Sum of scores from Subcomponents 2.1, 2.2, and 2.5 = 55

Circle the appropriate score from the table below.

	Total for Size Dependent Social Features									
	<31	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	>150
<2 ha	1	2	4	8	10	12	14	14	14	15
2-4	1	2	4	8	12	13	14	14	15	16
5-8	2	2	5	9	13	14	15	15	16	16
9-12	3	3	6	10	14	15	15	16	17	17
13-17	3	4	7	10	14	15	16	16	17	17
18-28	4	5	8	11	15	16	16	17	17	18
29-37	5	7	10	13	16	17	18	18	19	19
38-49	5	7	10	13	16	17	18	18	19	20
50-62	5	8	11	14	17	17	18	19	20	20
63-81	5	8	11	15	17	18	19	20	20	20
82-105	6	9	11	15	18	18	19	20	20	20
106-137	6	9	12	16	18	19	20	20	20	20
138-178	6	9	13	16	18	19	20	20	20	20
179-233	6	9	13	16	18	20	20	20	20	20
234-302	7	9	13	16	18	20	20	20	20	20
303-393	7	9	14	17	18	20	20	20	20	20
394-511	7	10	14	17	18	20	20	20	20	20
512-665	7	10	14	17	18	20	20	20	20	20
666-863	7	10	14	17	19	20	20	20	20	20
864-1123	8	12	15	17	19	20	20	20	20	20
1124-1460	8	12	15	17	19	20	20	20	20	20
1461-1898	8	13	15	18	19	20	20	20	20	20
1899-2467	8	14	16	18	20	20	20	20	20	20
>2467	8	14	16	18	20	20	20	20	20	20

Total Size Score (Social Component) 6

2.8 ABORIGINAL VALUES AND CULTURAL HERITAGE

Either or both Aboriginal or Cultural Values may be scored. However, the maximum score permitted for 2.8 is 30 points.

Full documentation of sources must be attached to the data record.

2.8.1 Aboriginal Values

	Significant	=	30 pts
	Not Significant	=	0
✓	Unknown	=	0

Additional Comments/Notes:
No known significance based on Stage 1 Archaeological Assessment of The Region of Peel Settlement Area Boundary Expansion Study, by ASI services, and dated August 24, 2020. This report has been shared with the First Nations communities whose traditional territories include this wetland.

2.8.2 Cultural Heritage

	Significant	=	30 pts
✓	Not Significant	=	0
	Unknown	=	0

Additional Comments/Notes:
No significant heritage features identified in Stage 1 Archaeological Assessment (ASI services, 2020)

Aboriginal Values/Cultural Heritage Score
(maximum 30 points) 0

3.0 HYDROLOGICAL COMPONENT

3.1 FLOOD ATTENUATION

Check one of the following options.

	If wetland is a coastal wetland, ➡ score 0 points for this section.
	If wetland is entirely isolated in site type, ➡ score 100 points automatically.
✓	Wetland not as above – proceed through 'steps' A through F below.

(A) Total wetland area = 8.54 ha

(B) Size of wetland's catchment = 133.23 ha

(C) Size of other detention areas in catchment = 0 ha

(D) Total area of upstream detention areas = {A + C } = 8.54 ha

(E) Upstream Detention Factor = {(A/D) x 2} = 1.0 (maximum 1.0)

(F) Attenuation Factor = {(A/B) x 10} = 0.64 (maximum 1.0)

Flood Attenuation Final Score = {(E + F) /2) x 100 = 82

Wetland catchment mapping can be provided upon request

Flood Attenuation Score *(maximum 100 points)* 82

3.2 WATER QUALITY IMPROVEMENT

3.2.1 Short Term Water Quality Improvement

Step 1: Determination of maximum initial score

	Wetland on one of the 5 defined large lakes or 5 major rivers (Go to Step 5A)
✓	All other wetlands (Go through Steps 2, 3, 4, and 5B)

Step 2: Determination of Watershed Improvement Factor (WIF)

Calculation of WIF is based on the fractional area (FA) of each site type that makes up the total area of the wetland.

(FA = area of site type/total area of wetland)

FA of isolated wetland	=		x 0.5 =	
FA of riverine wetland	=		x 1.0 =	
FA of palustrine wetland with no inflow	=	0.07	x 0.7 =	0.049
FA of palustrine wetland with inflows	=	0.93	x 1.0 =	0.93
FA of lacustrine on lake shoreline	=		x 0.2 =	
FA of lacustrine at lake inflow or outflow	=		x 1.0 =	

Sum (*WIF cannot exceed 1.0)* 0.979

Step 3: Determination of Catchment Land Use Factor (LUF)

(Choose the first category that fits upstream land use in the catchment.)

✓	Over 50% agricultural and/or urban	=	1.0
	Between 30 and 50% agricultural and/or urban	=	0.8
	Over 50% forested or other natural vegetation	=	0.6

LUF *(maximum 1.0)* 1

Step 4: Determination of Pollutant Uptake Factor (PUF)

Calculation of PUF is based on the fractional area (FA) of each vegetation type that makes up the total area of the wetland. Base assessment on the dominant vegetation form for each community except where dead trees or shrubs dominate. In that case base assessment on the dominant live vegetation type.

(FA = area of vegetation type/total area of wetland)

FA of wetland with live trees, shrubs, herbs or mosses (c, h, ts, ls, gc, m)	= 0.18	x	0.75 =	0.135
FA of wetland with emergent, submergent or floating vegetation (re, be, ne, su, f, ff)	= 0.75	x	1.0 =	0.75
FA of wetland with little or no vegetation (u)	= 0.07	x	0.5 =	0.035

Sum *(PUF cannot exceed 1.0)* 0.92

Step 5: Calculation of final score

☐	Wetland on defined 5 major lakes or 5 major rivers	0
✓	All other wetlands – calculate as follows	
	Initial score	60
	Watershed Improvement Factor (WIF)	0.979
	Land Use Factor (LUF)	1
	Pollutant Uptake Factor (PUF)	0.92
	Final score: 60 x WIF x LUF x PUF =	54.0

Short Term Water Quality Improvement Score
(maximum 60 points) 54

3.2.2 Long Term Nutrient Trap

Step 1:

☐	Wetland on defined 5 major lakes or 5 major rivers = 0 points
✓	All other wetlands (Proceed to Step 2)

Step 2: Choose only one of the following settings that best describes the wetland being evaluated

	Wetland located in a river mouth	=	10 pts
	Wetland is a bog, fen, or swamp with more than 50% of the wetland being covered with organic soil	=	10
	Wetland is a bog, fen, or swamp with less than 50% of the wetland being covered with organic soil	=	3
	Wetland is a marsh with more than 50% of the wetland covered with organic soil	=	3
✓	None of the above	=	0

0.88 ha of wetland with organic soil (11% total wetland area)

Long Term Nutrient Trap Score
(maximum 10 points) 0

3.2.3 Groundwater Discharge

Circle the characteristics that best describe the wetland being evaluated and then sum the scores. If the sum exceeds 30 points, assign the maximum score of 30). Note: for wetland type, wetland type scored does not have to the dominant type in the wetland.

Wetland Characteristics	Potential for Discharge		
	None to Little	Some	High
Wetland type	Bog = 0	Swamp/Marsh = 2	Fen = 5
Topography	Flat/rolling = 0	Hilly = 2	Steep = 5
Wetland area: Upslope catchment area	Large (>50%) = 0	Moderate (5-50%) = 2 (6.4%)	Small (<5%) = 5
Lagg development	None found = 0	Minor = 2	Extensive = 5
Seeps	None = 0	≤ 3 seeps = 2	> 3 seeps = 5
Surface marl deposits	None = 0	≤ 3 sites = 2	> 3 sites = 5
Iron precipitates	None = 0	≤ 3 sites = 2	> 3 sites = 5
Located within 1 km of a major aquifer	N/A = 0	N/A = 0	Yes = 10 No = 0

Additional Comments/Notes:

Gently sloping topography; several wells in the area that do not produce drinkable water. Area mapped as highly vulnerable aquifer in Schedule A-2 of Peel Region Official Plan (ROP). Not mapped as a wellhead protection area in Schedule A-5 of the ROP

Groundwater Discharge Score
(maximum 30 points) 18

3.3 CARBON SINK

Check only one of the following:

	Bog, fen or swamp with more than 50% coverage by organic soil	=	5 pts
	Bog, fen or swamp with between 10 to 50% coverage by organic soil	=	2
	Marsh with more than 50% coverage by organic soil	=	3
✓	Wetlands not in one of the above categories	=	0

Source of information:
Various studies

Carbon Sink Score
(maximum 5 points) 0

3.4 SHORELINE EROSION CONTROL

From the wetland vegetation map determine the dominant vegetatino type within the erosion zone for lacustrine and riverine site type areas only. Score according to the factors listed below.

Step 1:

✓	Wetland entirely isolated or palustrine	=	0 pts
	Any part of the wetland is riverine or lacustrine	=	Go to step 2

Step 2: *Choose the one characteristic that best describes the shoreline vegetation (see page 109 for description of "shoreline".)*

	Trees and shrubs	=	15 pts
	Emergent vegetation	=	8
	Submergent vegetation	=	6
	Other shoreline vegetation	=	3
	No vegetation	=	0

N/A - wetland not coastal

Shoreline Erosion Control Score
(maximum 15 points) 0

3.5 GROUNDWATER RECHARGE

3.5.1 Site Type

Wetland > 50% lacustrine (by area) or located on one of the five major rivers			= 0 pts	
Wetland not as above. Calculate final score as follows:				
■ FA of isolated or palustrine wetland	=	1.00	x 50 =	50
■ FA of riverine wetland	=		x 20 =	
■ FA of lacustrine wetland (not dominant site type)	=		x 0 =	

Groundwater Recharge/Wetland Site Type Score *(maximum 50 points)* 50

3.5.2 Soil Recharge Potential

*Circle only one choice that **best** describes the soils in **the area surrounding the wetland** being evaluated (the soils within the wetland are not scored here).*

Silt soils are identified in the geotechnical study

Dominant Wetland Type	Group A, B, C (sands, gravels, loams)	Group D (clays, substrates in high water tables, shallow substrates over impervious materials such as bedrock)
Lacustrine or major river	0	0
Isolated	10	5
Palustrine	7	**4**
Riverine (not on a major river)	5	2

Groundwater Recharge/Wetland Soil Recharge Potential Score *(maximum 10 points)* 4

4.0 SPECIAL FEATURES COMPONENT

4.1 RARITY

4.1.1 Wetland Types

Ecodistrict	Rarity within the Landscape (4.1.1.1)	Rarity of Wetland Type (4.1.1.2)			
		Marsh	Swamp	Fen	Bog
6E-1	60	40	0	80	80
6E -2	60	40	0	80	80
6E-4	60	40	0	80	80
6E-5	20	40	0	80	80
6E-6	40	20	0	80	80
6E-7	60	10	0	80	80
6E-8	20	20	0	80	80
6E-9	0	20	0	80	80
6E-10	20	0	20	80	80
6E-11	0	30	0	80	80
6E-12	0	30	0	60	80
6E-13	60	10	0	80	80
6E-14	40	20	0	40	80
6E-15	40	0	0	80	80
6E-16	60	20	0	80	60
6E-17	40	10	0	30	80
7E-1	60	0	60	80	80
7E-2	60	0	0	80	80
7E-3	60	00	0	80	80
7E-4	80	0	0	80	80
7E-5	60	20	0	80	80
7E-6	80	30	0	80	80

4.1.1.1 Rarity within the Landscape

Choose appropriate score from 2nd column above.

Score *(maximum 80 points)* 60

4.1.1.2 Rarity of Wetland Type

Score is cumulative, based on presence/absence. Circle all appropriate scores from above table and sum.

Score *(maximum 80 points)* 10

4.1.2 Species

4.1.2.1 Provincially Significant Animal Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
Digger Crayfish	Creaserinus fodiens	Burrow in W106 neM5-A	2016-06-01	Field survey by MNRF and Beacon

Additional Notes/Comments:

Barn Swallow, Bobolink, and Peregrine Falcon have been found adjacent to the wetland in 2015, 2016, and 2020 surveys by Beacon

As per OWES 4, wildlife species can only be scored if they are found within the wetland boundaries or depend on the wetland to complete life processes.

Bluet damselfy species - status unknown

One species = 50 pts	9 species = 140 pts	17 species = 160 pts
2 species = 80	10 species = 143	18 species = 162
3 species = 95	11 species = 146	19 species = 164
4 species = 105	12 species = 149	20 species = 166
5 species = 115	13 species = 152	21 species = 168
6 species = 125	14 species = 154	22 species = 170
7 species = 130	15 species = 156	23 species = 172
8 species = 135	16 species = 158	24 species = 174
		25 species = 176

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

Provincially Significant Animal Species
(no maximum) 50

4.1.2.2 Provincially Significant Plant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
None				

Additional Notes/Comments:

No provincially tracked species observed

One species	=	50 pts	9 species	=	140 pts	17 species	=	160 pts
2 species	=	80	10 species	=	143	18 species	=	162
3 species	=	95	11 species	=	146	19 species	=	164
4 species	=	105	12 species	=	149	20 species	=	166
5 species	=	115	13 species	=	152	21 species	=	168
6 species	=	125	14 species	=	154	22 species	=	170
7 species	=	130	15 species	=	156	23 species	=	172
8 species	=	135	16 species	=	158	24 species	=	174
						25 species	=	176

Add one point for every species past 25 (for example, 26 species = 177 points, 27 species = 178 points etc.)

Provincially Significant Plant Species
(no maximum) 0

4.1.2.3 Regionally Significant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
None				

One species= 20 pts	4 species = 45 pts	7 species = 58 pts
2 species = 30	5 species = 50	8 species = 61
3 species = 40	6 species = 55	9 species = 64
		10 species = 67

For each significant species over 10 in wetland, add 1 point.

Regionally Significant Species Score
(no maximum score) 0

4.1.2.4 Locally Significant Species

Common Name	Scientific Name	Activity	Dates Observed	Info Source
Grey Treefrog	Hyla versicolor	Males calling	2022-05-27, 2022-06-22	Field surveys by Beacon

One species= 10 pts	4 species = 31 pts	7 species = 43 pts
2 species = 17	5 species = 38	8 species = 45
3 species = 24	6 species = 41	9 species = 47
		10 species = 49

For each significant species over 10 in wetland, add 1 point.

Locally Significant Species Score
(no maximum score) 10

Local Significance of Flora species were evaluated using the Ecodistrict 6E-7 list from Varga et al. (2005).
Local Significance of Fauna were taken from TRCA rankings.

Although Great Blue Heron is ranked as L3 by TRCA (locally significant species), it was only observed flying over the area

4.2 SIGNIFICANT FEATURES AND HABITATS

4.2.1 Colonial Waterbirds

Record all available information. Score the highest applicable category. Include additional information as possible (e.g., nest locations, etc).

Activity	Species	Info Source	Points
Currently nesting			= 50
Known to have nested within the past 5 years			= 25
Active feeding area (great blue heron excluded)			= 15
None known	✓	Various field surveys	= 0

Additional Notes/Comments:

There is a LIO record of a mixed wader colony within the 1 km grid, and this is assumed to be associated with the wetland east of the Canada Pacific Railway (out of study area). Avifaunal surveys conducted by Beacon in 2015, 2016, and 2020 have not found evidence of colonial waterbird nesting or feeding.

Colonial Waterbird Nesting Score
(maximum 50 points) 0

4.2.2 Winter Cover for Wildlife

Score highest appropriate category. Include rationale/sources of information.

	Provincially significant	=	100 pts
	Significant in Ecoregion	=	50
	Significant in Ecodistrict	=	25
	Locally significant	=	10
✓	Little or poor winter cover	=	0

Species/habitat/vegetation community scored *(e.g., winter deer cover in hemlock swamp, S3 and S4b)*:

No evidence suggesting winter cover use

Source of information:

Various field surveys

Winter Cover for Wildlife Score
(maximum 100 points) 0

4.2.3 Waterfowl Staging and/or Moulting Areas

Check highest level of significance for both staging and moulting; add scores for staging and for moulting together for final score. However, maximum score for evaluation under this section is 150 points.

	Staging	Moulting
Nationally/internationally significant	= 150 pts	= 150 pts
Provincially significant	= 100	= 100
Significant in the Ecoregion	= 50	= 50
Significant in Ecodistrict	= 25	= 25
Known to occur	= [10]	= 10
Not possible/Unknown	= 0	= [0]

Species/habitat/vegetation community scored *(e.g., approx 20 mallards in W3)*:
2 Mallards and 2 Canada Geese staging in Wetland 107, Community reM15-C

Source of information:
Site visit by evaluators

Waterfowl Staging/Moulting Score
(maximum 150 points) 10

4.2.4 Waterfowl Breeding

Check highest level of significance.

	Nationally/internationally significant	= 150 pts
	Provincially significant	= 100
	Significant in the Ecoregion	= 50
	Significant in Ecodistrict	= 25
✓	Habitat Suitable	= 10
	Habitat not suitable	= 0

Species/habitat/vegetation community scored *(e.g., mallard in W3)*:
Habitat suitable for nesting; however, waterfowl were not observed within 120 m of the wetland

Source of information:
Breeding bird surveys by Beacon

Waterfowl Breeding Score
(maximum 150 points) 10

4.2.5 Migratory Passerine, Shorebird or Raptor Stopover Area

Check highest level of significance.

	Nationally / internationally significant	= 150 pts
	Provincially significant	= 100
	Significant in Ecoregion	= 50
	Significant in Ecodistrict	= 25
✓	Known to occur	= 10
	Not possible / Unknown	= 0

Species/habitat/vegetation community scored:
Peregrine Falcon have been observed 120 m from the wetland; however, their use of the wetland was not observed

Dozens of Redwing Blackbirds observed migrating

Source of information:
Breeding bird surveys by Beacon, particularly on June 19, 2020

Passerine, Shorebird or Raptor Stopover Score
(maximum 100 points) 10

4.2.6 Fish Habitat

4.2.6.1 Spawning and Nursery Habitat

Area Factors for Low Marsh, High Marsh and Swamp Communities.

No. of ha of Fish Habitat	Area Factor
< 0.5 ha	0.1
0.5 – 4.9	0.2
5.0 – 9.9	0.4
10.0 – 14.9	0.6
15.0 – 19.9	0.8
20.0 +	1.0

0.35 ha associated with Wetland 107, Community reM18-B

Step 1:

	Fish habitat is not present within the wetland	Go to Step 7, Score 0 points
✓	Fish habitat is present within the wetland	Go to Step 2

Step 2: *Choose only one option*

	Significance of the spawning and nursery habitat within the wetland is known	Go to Step 3
✓	Significance of the spawning and nursery habitat within the wetland is not known	Go through Steps 4, 5 and 6

Step 3: *Select the highest appropriate category below, attach documentation:*

Significant in Ecoregion	Go to Step 7, Score 100 points
Significant in Ecodistrict	Go to Step 7, Score 50 points
Locally Significant Habitat (5.0+ ha)	Go to Step 7, Score 25 points
Locally Significant Habitat (<5.0 ha)	Go to Step 7, Score 15 points

Source of information:

Step 4: Low Marsh = the '**permanent**' marsh area, from the existing water line out to the outer boundary of the wetland.

	Low marsh not present	Go to Step 5
✓	Low marsh present	Continue through Step 4, scoring as noted below

Scoring of Low Marsh:

1. Check the appropriate **Vegetation Group** (see Appendix 7) for each Low Marsh community. (Based on the one most clearly dominant plant species of the dominant form in each Low Marsh vegetation community.)
2. Sum the areas (ha) of the vegetation communities assigned to each **Vegetation Group**.
3. Use these areas to assign an **Area Factor** (from Table 7) for each checked **Vegetation Group**.
4. Multiply the **Area Factor** by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for Low Marsh**.

Scoring for Presence of Key Vegetation Groups – Low Marsh

Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
1	Tallgrass				6	
2	Shortgrass-Sedge				11	
3	Cattail-Bulrush-Burreed	✓	0.14	0.1	5	0.5
4	Arrowhead-Pickerelweed				5	
5	Duckweed				2	
6	Smartweed-Waterwillow				6	
7	Waterlily-Lotus				11	
8	Waterweed-Watercress				9	
9	Ribbongrass				10	
10	Coontail-Naiad-Watermilfoil				13	
11	Narrowleaf Pondweed	✓	0.23	0.1	5	0.5
12	Broadleaf Pondweed				8	
	Total Score for Low Marsh (*maximum 75 points*)					1

Continue to Step 5

Step 5: High Marsh = the 'seasonal' marsh area, from the water line to the inland boundary of marsh wetland type. This is essentially what is commonly referred to as a wet meadow, in that there is insufficient standing water to provide fisheries habitat except during flood or high water conditions.

	High marsh not present	Go to Step 6
✓	High marsh present	Continue through Step 5, scoring as noted below

Scoring of High Marsh:

1. Check the appropriate **Vegetation Group** (see Appendix 7) for each High Marsh community. (Based on the one most clearly dominant plant species of the dominant form in each High Marsh vegetation community.)
2. Sum the areas (ha) of the vegetation communities assigned to each **Vegetation Group**.
3. Use these areas to assign an **Area Factor** (from Table 7) for each checked **Vegetation Group**.
4. Multiply the **Area Factor** by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for High Marsh**.

Scoring for Presence of Key Vegetation Groups – High Marsh

Vegetation Group Number	Vegetation Group Name	Present as a Dominant Form (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
1	Tallgrass				6	
2	Shortgrass-Sedge				11	
3	Cattail-Bulrush-Burreed	✓	0.03	0.1	5	0.5
4	Arrowhead-Pickerelweed				5	
	Total Score for High Marsh (*maximum 25 points*)					1

Continue to Step 6

Step 6:

✓	Swamp containing fish habitat not present	Go to Step 7
	Swamp containing fish habitat present	Continue through Step 6, scoring as follows

Scoring of Swamp:

1. Determine the total area (ha) of seasonally flooded swamp communities within the wetland containing fish habitat and record below.
2. Determine the total area (ha) of permanently flooded swamp communities within the wetland containing fish habitat and record below.
3. Use these areas to assign an **Area Factor** (from Table 7).
4. Multiply the Area Factor by the **Multiplication Factor** for each row to calculate **Score**.
5. Sum all numbers in Score column to get **Total Score for Swamp**.

Scoring Swamps for Fish Habitat (Seasonally flooded; Permanently flooded)

Swamp Containing Fish Habitat	Present (check)	Total Area (ha)	Area Factor (from Table 7)	Multiplication Factor	Score
Seasonally Flooded Swamp				10	
Permanently Flooded Swamp				10	
			Total Score for Swamp (*maximum 20 points*)		

Continue to Step 7

Step 7: CALCULATION OF FINAL SCORE

NOTE: Scores for Steps 4, 5 and 6 are only recorded if Steps 1 and 3 have not been scored.

A. Score from Step 1 (fish habitat not present) = 0
B. Score from Step 3 (significance known) = 0
C. Score from Step 4 (Low Marsh) = 1
D. Score from Step 5 (High Marsh) = 1
E. Score from Step 6 (Swamp) = N/A

Calculation of Final Score for Spawning and Nursery Habitat = A or B or Sum of C, D, and E

Score for Spawning and Nursery Habitat
(maximum 100 points) 2

4.2.6.2 Migration and Staging Habitat

Step 1:

✓	Staging or Migration Habitat is not present in the wetland	Go to Step 4, Score 0 points
	Staging or Migration Habitat is present in the wetland, significance of the habitat is known	Go to Step 2
	Staging or Migration Habitat is present in the wetland, significance of the habitat is not known	Go to Step 3

Step 2: Select the highest appropriate category below. Ensure that documentation is attached to the data record.

	Significant in Ecoregion	Score 25 points in Step 4
	Significant in Ecodistrict	Score 15 points in Step 4
	Locally Significant	Score 10 points in Step 4
	Fish staging and/or migration habitat present, but not as above	Score 5 points in Step 4

Source of information:
Aquatic habitat surveys by Beacon and C. Portt

Step 3: Select the highest appropriate category below based on presence of the designated site type (i.e. does not have to be the dominant site type). Refer to Site Types recorded earlier (section 1.1.3). Attach documentation.

	Wetland is riverine at rivermouth or lacustrine at rivermouth	Score 25 points in Step 4
	Wetland is riverine, within 0.75 km of rivermouth	Score 15 points in Step 4
	Wetland is lacustrine, within 0.75 km of rivermouth	Score 10 points in Step 4
	Fish staging and/or migration habitat present, but not as above	Score 5 points in Step 4

Step 4: Enter a score from only one of the three above Steps.

Score for Staging and Migration Habitat
(maximum 25 points) 0

4.3 ECOSYSTEM AGE

		Fractional Area		Score
Bog	=		x 25 =	
Fen, on deeper soils; floating mats or marl	=		x 20 =	
Fen, on limestone rock	=		x 5 =	
Swamp	=		x 3 =	
Marsh	=	1.00	x 0 =	0
	Total		=	0

Ecosystem Age Score *(maximum 25 points)* 0

4.4 GREAT LAKES COASTAL WETLANDS

Choose one only.

	Wetland < 10 ha	=	10 pts
	Wetland 10-50 ha	=	25
	Wetland 51-100 ha	=	50
	Wetland > 100 ha	=	75

N/A - wetland not coastal

Great Lakes Coastal Wetland Score
(maximum 75 points) 0

GENERAL INFORMATION

Wetland Evaluator(s)

Name: Ken Ursic, M.Sc. Affiliation: Beacon Environmental Limited

Signature: 

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition ~~/ Northern Manual 2nd Edition~~)

Name: Said Mohamed, B.Sc. Affiliation: Beacon Environmental Limited

Signature: 

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition ~~/ Northern Manual 2nd Edition~~)

Name: _____ Affiliation: _____

Signature: _____

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Name: _____ Affiliation: _____

Signature: _____

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

Name: _____ Affiliation: _____

Signature: _____

(by signing, I confirm that this evaluation has been undertaken and completed in accordance with the Ontario Wetland Evaluation System Southern Manual 4th Edition / Northern Manual 2nd Edition)

2013.10.15, 2013.11.29, 2014.04.25, 2014.04.28, 2014.05.27, 2014.06.24, 2015.04.16, 2015.05.05, 2015.05.26, 2015.06.05, 2016.04.16, 2016.05.06, 2016.06.04, 2016.06.14, 2016.06.15, 2016.10.07, 2020.04.27, 2020.05.02, 2020.05.20, 2020.05.27, 2020.05.28, 2020.06.01, 2020.06.08, 2020.06.12, 2020.06.18, 2020.06.19, 2020.06.22, 2020.07.04, 2020.08.20, 2023.04.25

Date(s) wetland visited (in field): _____

Date evaluation completed: 2023.04.25

Estimated time devoted to completing the field survey in person hours: 71

Weather Conditions

i) at time of field work: Cloudy-sunny, above freezing temperatures, no precipitation

ii) summer conditions in general: Cloudy-sunny, warm-hot

WETLAND EVALUATION SCORING RECORD

WETLAND NAME: Macville Area Wetlands

1.0 BIOLOGICAL COMPONENT

	1.1 PRODUCTIVITY
22	1.1.1 Growing Degree-Days/Soils
15	1.1.2 Wetland Type
2	1.1.3 Site Type
39	

	1.2 BIODIVERSITY
9	1.2.1 Number of Wetland Types
10.5	1.2.2 Vegetation Communities
5	1.2.3 Diversity of Surrounding Habitat
8	1.2.4 Proximity to Other Wetlands
15	1.2.5 Interspersion
8	1.2.6 Open Water Type
55.5	

7	1.3 SIZE (Biological Component)
101.5	TOTAL (Biological Component)

2.0 SOCIAL COMPONENT

	2.1 ECONOMICALLY VALUABLE PRODUCTS
0	2.1.1 Wood Products
0	2.1.2 Wild Rice
12	2.1.3 Commerical Baitfish
3	2.1.4 Furbearers
15	Total for Economically Valuable Products
0	2.2 RECREATIONAL ACTIVITIES
	2.3 LANDSCAPE AESTHETICS
3	2.3.1 Distinctness
1	2.3.2 Absence of Human Disturbance
4	Total for Landscape Aesthetics
	2.4 EDUCATION AND PUBLIC AWARENESS
0	2.4.1 Educational Uses
0	2.4.2 Facilities and Programs
5	2.4.3 Research and Studies
5	Total for Education and Public Awareness
40	2.5 PROXIMITY TO AREAS OF HUMAN SETTLEMENT
4	2.6 OWNERSHIP
6	2.7 SIZE (Social Component)
	2.8 ABORIGINAL VALUES AND CULTURAL HERITAGE
0	2.8.1 Aboriginal Values
0	2.8.2 Cultural Heritage
74	TOTAL (Social Component)

3.0 HYDROLOGICAL COMPONENT

82	3.1 FLOOD ATTENUATION
	3.2 WATER QUALITY IMPROVEMENT
54	3.2.1 Short Term Water Quality Improvement
0	3.2.2 Long Term Nutrient Trap
18	3.2.3 Groundwater Discharge
72	Total for Water Quality Improvement
0	3.3 CARBON SINK
0	3.4 SHORELINE EROSION CONTROL
	3.5 GROUNDWATER RECHARGE
50	3.5.1 Site Type
4	3.5.2 Soil Recharge Potential
54	Total for Groundwater Recharge
208	TOTAL (Hydrological Component)

4.0 SPECIAL FEATURES COMPONENT

4.1 RARITY

4.1.1 Wetlands

60	4.1.1.1 Rarity within the Landscape
10	4.1.1.2 Rarity of Wetland Type
70	Total for Wetland Rarity

4.1.2 Species

50	4.1.2.1 Provincially Significant Animals
0	4.1.2.2 Provincially Significant Plants
0	4.1.2.3 Regionally Significant Species
10	4.1.2.4 Locally Significant Species
60	Total for Species Rarity

4.2 SIGNIFICANT FEATURES AND HABITATS

0	4.2.1 Colonial Waterbirds
0	4.2.2 Winter Cover for Wildlife
10	4.2.3 Waterfowl Staging and/or Moulting Areas
10	4.2.4 Waterfowl Breeding
10	4.2.5 Migratory Passerine, Shorebird or Raptor Stopover Area
	4.2.6 Fish Habitat
2	4.2.6.1 Spawning and Nursery Habitat
0	4.2.6.2 Migration and Staging Habitat
32	Total for Significant Features and Habitats

0	4.3 ECOSYSTEM AGE
0	4.4 GREAT LAKES COASTAL WETLANDS
162	TOTAL FOR SPECIAL FEATURES COMPONENT (*not to exceed 250*)

SUMMARY OF EVALUATION RESULT

Wetland Macville Area Wetlands

101.5	1.0 TOTAL FOR BIOLOGICAL COMPONENT
74	2.0 TOTAL FOR SOCIAL COMPONENT
208	3.0 TOTAL FOR HYDROLOGICAL COMPONENT
162	4.0 TOTAL FOR SPECIAL FEATURES COMPONENT
545.5	TOTAL WETLAND SCORE

APPENDIX 4 – WETLAND DATA SUMMARY FORM

Complete versions of the data form in this appendix should be attached to the wetland data record and included within the wetland evaluation file.

Wetland Name Macville Area Wetlands Page 1 of 2

Wetland #	Map Code	Field Code	GPS Coordinate (UTM Zone 17)	Dominant Form	Forms	# Forms	Dominant Species	Area (ha)	% Open Water			Open Water (ha)	Soil (ha)	Site Type	Fish Habitat			
									Low (ha)	High Est.	Mean Est.				% Fish Habitat	Area (ha)	Habitat Type	Key Veg Group
105	reM7-E	14-2016	598 030 mE; 4 857 380 mN	re	gc, re, ne	3	Typha angustifolia	0.45				0	L	Pi				
105	reM5-A	15-2016	598 130 mE; 4 857 310 mN	re	gc, ne	2	Phalaris arundinacea	0.44				0	L	Pi				
105	neM10-A	16-2016	598 140 mE; 4 857 360 mN	ne	gc, re, ne	3	Phalaris arundinacea	0.18				0	L	Pi				
105	reM23-A	17-2016	598 100 mE; 4 857 430 mN	re	gc, re, ne, ff, su	5	Typha latifolia	0.23			30	0.07	L	Pi				
105	reM15-A	136-2016	598 360 mE; 4 857 230 mN	re	re, ne	1	Typha x glauca	0.52				0	L	Pi				
106	ffW16-B	5-2016	597 615 mE; 4 857 330 mN	ff	re, ff	2	Lemna minor	0.03			90	0.027	Om	I				
106	gcM3-A	7-2016	597 770 mE; 4 857 340 mN	gc	gc, ne	2	Symphyotrichum lanceolatum	1.25				0	L	Pi				
106	reM17	8-2016	597 720 mE; 4 857 390 mN	re	re, gc	2	Typha x glauca	0.44				0	Om	P				
106	tsS15-A	9-2016	597 655 mE; 4 857 335 mN	ts	h, ts, gc	3	Cornus sericea, Thuja occidentalis	0.04				0	Om	Pi				
106	reM15-A	134-2016	598 130 mE; 4 857 190 mN	re	re	1	Typha x glauca	0.08				0	L	Pi				
106	neM5-A	13-2016	597 950 mE; 4 857 270 mN	ne	gc, ne	2	Phalaris arundinacea	0.54				0	L	Pi				
107	reM15-C	10-2016	597 740 mE; 4 857 250 mN	re	re	1	Typha latifolia, Typha x glauca	0.14				0	Om	Pi	100	0.14	LM	3
107	suW27-D	11-2016	597 700 mE; 4 857 250 mN	su	su	1	Potamogeton foliosus	0.23			100	0.23	Om	Pi	100	0.23	LM	11

APPENDIX 4 – WETLAND DATA SUMMARY FORM

Complete versions of the data form in this appendix should be attached to the wetland data record and included within the wetland evaluation file.

Wetland Name Macville Area Wetlands Page 2 of 2

Wetland #	Map Code	Field Code	GPS Coordinate (UTM Zone 17)	Dominant Form	Forms	# Forms	Dominant Species	Area	% Open Water			Open Water	Soil	Site Type	Fish Habitat			
									Low (ha)	High Est.	Mean Est.		(ha)		% Fish Habitat	Area (ha)	Habitat Type	Key Veg Group
107	reM18-B	12-2016	597 810 mE; 4 857 115 mN	re	re, ne	2	Typha angustifolia	1.10				0	L	Pi	3	0.03	HM	3
107	reM15-A	133-2016	598 310 mE; 4 856 910 mN	re	re	1	Typha x glauca	2.84				0	L	Pi				
108	neM5-A	6-2016	597 610 mE; 4 857 300 mN	ne	gc, ne	2	Phalaris arundinacea	0.02				0	L	Pi				
109	reM18-B	4-2016	597 555 mE; 4 857 370 mN	re	re, ne	2	Typha angustifolia	0.15			30	0.05	L	Pi				

Appendix C

Headwater Drainage Feature Assessment Photolog

Appendix C

HDFA Photolog

Photograph 1.
Reach WHT6-A (June 8, 2020)
Facing west (upstream). Feature flowing at time of assessment. Wetland riparian vegetation.

Photograph 2.
Reach WHT6-B (June 8, 2020)
Facing north east (downstream). Feature was dry at the time of assessment. Wetland riparian vegetation.

Photograph 3.
Reach WHT6-C (June 8, 2020)
Facing east (upstream). Feature was dry at the time of assessment. Wetland riparian vegetation.

Photograph 4.
Reach WHT6-D (June 8, 2020)
Facing east (downstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 5.
Reach WHT6-E (June 8, 2020)
Facing west (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 6.
Reach WHT6-F (June 8, 2020)
Facing north west (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 7.
Reach WHT6-G (June 8, 2020)
Facing south west (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 8.
Reach WHT6-H (June 8, 2020)
Facing north west (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 9.
Reach WHT6-I (June 8, 2020)
Facing west (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 10.
Reach WHT-J (June 8, 2020)
Facing north east (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 11.
Reach WHT6-K (June 8, 2020)
Facing south west (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 12.
Reach WHT6-L (June 8, 2020)
Facing north west (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 13.
Reach WHT6-M (June 8, 2020)
Facing west (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 14.
Reach WHT6-N (June 8, 2020)
Facing north east (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 15.
Reach MHT7-C (June 8, 2020)
Facing north east (downstream). Feature was dry at the time of assessment. Meadow riparian vegetation.

Photograph 16.
Reach MHT7-D (June 8, 2020)
Facing east (downstream). Feature was dry at the time of assessment. Meadow riparian vegetation.

Photograph 17.
Reach MHT8-A (June 8, 2020)
Facing north east (downstream). Feature was dry at the time of assessment. Meadow riparian vegetation.

Photograph 18.
Reach WHT5-A (June 8, 2020)
Facing south west (upstream). Feature was dry at the time of assessment. Meadow riparian vegetation.

Photograph 19.
Reach WHT2-A (June 8, 2020)
Facing north west (upstream). Feature was dry at the time of assessment. Meadow marsh riparian vegetation.

Photograph 20.
Reach WHT2-B (June 8, 2020)
Facing north west (upstream). Feature was dry at the time of assessment. Meadow marsh riparian vegetation.

Photograph 21.
Reach WHT2-C (June 8, 2020)
Facing north west (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 22.
Reach WHT2-E (June 8, 2020)
Facing south west (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation

Photograph 23.
Reach WHT2-G (June 8, 2020)
Facing north (upstream). Feature was dry at the time of assessment. Agricultural riparian vegetation.

Photograph 24.
Reach WHT3-A (June 8, 2020)
Facing north east (downstream). Feature was dry at the time of assessment. Wetland riparian vegetation.

Photograph 25.
Reach WHT3-B (June 8, 2020)
Facing north west (upstream). Feature was dry at the time of assessment. Wetland riparian vegetation.

Photograph 26.
Reach WHT3-C June 8, 2020
Facing north west (upstream). Feature was dry at the time of assessment. Meadow riparian vegetation.

Photograph 27.
Reach WHT1-A (June 8, 2020)
Facing north west (upstream). Feature was flowing at the time of assessment. Wetland riparian vegetation.

Photograph 28.
Reach WHT1-B (June 8, 2020)
Facing north east (upstream). Feature was flowing at the time of assessment. Wetland riparian vegetation.

Appendix D

Flora Checklist for Caledon Station Secondary Plan

Appendix D

Flora Checklist for Caledon Station Secondary Plan

Common Name	Scientific Name	S-Rank [a]	TRCA Rank [b]	Native Status
Abies balsamea	Balsam Fir	S5	L3	N
Abutilon theophrasti	Velvetleaf	SE5	L+	I
Acer negundo	Manitoba Maple	S5	L+?	N
Acer platanoides	Norway Maple	SE5	L+	I
Acer x freemanii	Freeman Maple	SNA	L4	N
Aesculus hippocastanum	Horse Chestnut	SE2	L+	I
Agrostis gigantea	Redtop	SE5	L+	I
Agrostis stolonifera	Creeping Bentgrass	SE5	L+?	I
Alisma triviale	Northern Water-plantain	S5	L5	N
Alliaria petiolata	Garlic Mustard	SE5	L+	I
Alnus glutinosa	European Black Alder	SE4	L+	I
Alnus incana ssp. rugosa	Speckled Alder	S5	L3	N
Arctium lappa	Great Burdock	SE5	L+	I
Asclepias syriaca	Common Milkweed	S5	L5	N
Betula alleghaniensis	Yellow Birch	S5	L4	N
Betula papyrifera	Paper Birch	S5	L4	N
Betula pendula	Weeping Birch	SE4	L+	I
Bidens frondosa	Devil's Beggarticks	S5	L5	N
Bromus inermis	Smooth Brome	SE5	L+	I
Caltha palustris	Yellow Marsh Marigold	S5	L4	N
Calystegia sepium	Hedge False Bindweed	S5	L5	N
Carex bebbii	Bebb's Sedge	S5	L5	N
Carex hystericina	Porcupine Sedge	S5	L4	N
Carex laevivaginata	Smooth-sheathed Sedge	S4	L3	N
Carex pseudocyperus	Cyperus-like Sedge	S5	L5	N
Carex stipata	Awl-fruited Sedge	S5	L5	N
Carex vulpinoidea	Fox Sedge	S5	L5	N
Catalpa speciosa	Northern Catalpa	SE1	L+	I

Common Name	Scientific Name	S-Rank [a]	TRCA Rank [b]	Native Status
Ceratophyllum demersum	Common Hornwort	S5	L4	N
Cichorium intybus	Wild Chicory	SE5	L+	I
Cicuta bulbifera	Bulbous Water-hemlock	S5	L5	N
Circaea canadensis ssp. canadensis	Canada Enchanter's Nightshade	S5	L5	N
Cirsium arvense	Canada Thistle	SE5	L+	I
Clematis virginiana	Virginia Clematis	S5	L5	N
Cornus sericea	Red-osier Dogwood	S5	L5	N
Crataegus monogyna	English Hawthorn	SE4	L+	I
Crataegus punctata	Dotted Hawthorn	S5	L5	N
Dactylis glomerata	Orchard Grass	SE5	L+	I
Daucus carota	Wild Carrot	SE5	L+	I
Digitaria sanguinalis	Hairy Crabgrass	SE5	L+	I
Echinochloa crus-galli	Large Barnyard Grass	SE5	L+	I
Echinocystis lobata	Wild Cucumber	S5	L5	N
Eleocharis erythropoda	Red-stemmed Spikerush	S5	L5	N
Elymus repens	Quackgrass	SE5	L+	I
Epilobium ciliatum ssp. ciliatum	Northern Willowherb	S5	L5	N
Epilobium coloratum	Purple-veined Willowherb	S5	L5	N
Epilobium hirsutum	Hairy Willowherb	SE5	L+	I
Epilobium leptophyllum	Narrow-leaved Willowherb	S5	L3	N
Epilobium parviflorum	Small-flowered Hairy Willowherb	SE4	L+	I
Equisetum arvense	Field Horsetail	S5	L5	N
Equisetum sylvaticum	Woodland Horsetail	S5	L3	N
Erigeron philadelphicus var. philadelphicus	Philadelphia Fleabane	S5	L5	N
Eupatorium perfoliatum	Common Boneset	S5	L5	N
Euthamia graminifolia	Grass-leaved Goldenrod	S5	L5	N
Eutrochium maculatum var. maculatum	Spotted Joe Pye Weed	S5	L5	N
Fraxinus pennsylvanica	Red Ash	S4	L5	N
Galium palustre	Common Marsh Bedstraw	S5	L5	N
Galium verum	Yellow Bedstraw	SE4	L+	I
Geum aleppicum	Yellow Avens	S5	L5	N
Geum canadense	Canada Avens	S5	L5	N
Geum urbanum	Wood Avens	SE3	L+	I
Glechoma hederacea	Ground-ivy	SE5	L+	I
Glyceria grandis	Tall Mannagrass	S5	L5	N

Common Name	Scientific Name	S-Rank [a]	TRCA Rank [b]	Native Status
Glyceria striata	Fowl Mannagrass	S5	L5	N
Hesperis matronalis	Dame's Rocket	SE5	L+	I
Impatiens capensis	Spotted Jewelweed	S5	L5	N
Inula helenium	Elecampane	SE5	L+	I
Juglans nigra	Black Walnut	S4?	L5	N
Juncus dudleyi	Dudley's Rush	S5	L5	N
Juncus effusus	Soft Rush	S5	L5	N
Juniperus virginiana	Eastern Red Cedar	S5	L5	N
Larix laricina	Tamarack	S5	L3	N
Leersia oryzoides	Rice Cutgrass	S5	L5	N
Lemna minor	Small Duckweed	S5?	L5	N
Lemna trisulca	Star Duckweed	S5	L3	N
Leonurus cardiaca ssp. cardiaca	Common Motherwort	SE5	L+	I
Leucanthemum vulgare	Oxeye Daisy	SE5	L+	I
Lolium perenne	Perennial Ryegrass	SE4	L+	I
Lolium pratense	Meadow Ryegrass	SE5	L+	I
Lonicera tatarica	Tatarian Honeysuckle	SE5	L+	I
Lotus corniculatus	Garden Bird's-foot Trefoil	SE5	L+	I
Lycopus americanus	American Water-horehound	S5	L4	N
Lycopus uniflorus	Northern Water-horehound	S5	L5	N
Lysimachia arvensis	Scarlet Pimpernel	SE4	L+	I
Lysimachia nummularia	Creeping Yellow Loosestrife	SE5	L+	I
Lythrum salicaria	Purple Loosestrife	SE5	L+	I
Malus pumila	Common Apple	SE4	L+	I
Malva neglecta	Common Mallow	SE5	L+	I
Matteuccia struthiopteris var. pensylvanica	Ostrich Fern	S5	L5	N
Medicago lupulina	Black Medick	SE5	L+	I
Medicago sativa ssp. sativa	Alfalfa	SE5	L+	I
Melilotus albus	White Sweet-clover	SE5	L+	I
Mentha aquatica	Water Mint	SE1	L+	I
Morus alba	White Mulberry	SE5	L+	I
Nepeta cataria	Catnip	SE5	L+	I
Onoclea sensibilis	Sensitive Fern	S5	L5	N
Panicum capillare	Common Panicgrass	S5	L5	N
Parthenocissus vitacea	Thicket Creeper	S5	L5	N

Common Name	Scientific Name	S-Rank [a]	TRCA Rank [b]	Native Status
Phalaris arundinacea	Reed Canarygrass	S5	L+?	N
Phleum pratense	Common Timothy	SE5	L+	I
Phragmites australis ssp. australis	European Reed	SE5	L+	I
Picea abies	Norway Spruce	SE3	L+	I
Picea glauca	White Spruce	S5	L3	N
Picea pungens	Blue Spruce	SE1	L+	I
Pilosella caespitosa	Meadow Hawkweed	SE5	L+	I
Pinus nigra	Austrian Pine	SE3	L+	I
Pinus sylvestris	Scots Pine	SE5	L+	I
Poa palustris	Fowl Bluegrass	S5	L5	N
Poa pratensis ssp. pratensis	Kentucky Bluegrass	SE5	L+	I
Polygonum aviculare ssp. aviculare	Prostrate Knotweed	SE5	L+	I
Populus deltoides	Eastern Cottonwood	S5	L5	N
Populus tremuloides	Trembling Aspen	S5	L5	N
Potamogeton foliosus	Leafy Pondweed	S5	L4	N
Potentilla recta	Sulphur Cinquefoil	SE5	L+	I
Prunella vulgaris ssp. lanceolata	Lance-leaved Self-heal	S5	L5	N
Prunus avium	Sweet Cherry	SE4	L+	I
Prunus virginiana var. virginiana	Chokecherry	S5	L5	N
Pyrus communis	Common Pear	SE4	L+	I
Quercus rubra	Northern Red Oak	S5	L4	N
Ranunculus acris	Common Buttercup	SE5	L+	I
Ranunculus sceleratus	Cursed Buttercup	S5	L5	N
Rhamnus cathartica	European Buckthorn	SE5	L+	I
Ribes americanum	American Black Currant	S5	L5	N
Ribes rubrum	European Red Currant	SE5	L+	I
Ribes triste	Swamp Red Currant	S5	L3	N
Robinia pseudoacacia	Black Locust	SE5	L+	I
Rubus idaeus ssp. strigosus	North American Red Raspberry	S5	L5	N
Rubus occidentalis	Black Raspberry	S5	L5	N
Rumex crispus	Curled Dock	SE5	L+	I
Salix amygdaloides	Peach-leaved Willow	S5	L4	N
Salix bebbiana	Bebb's Willow	S5	L4	N
Salix discolor	Pussy Willow	S5	L4	N
Salix x fragilis	Crack Willow	SNA	L+	I

Common Name	Scientific Name	S-Rank [a]	TRCA Rank [b]	Native Status
Salix x sepulcralis	Weeping Willow	SNA	L+	I
Scirpus atrovirens	Dark-green Bulrush	S5	L5	N
Scirpus microcarpus	Red-tinged Bulrush	S5	L5	N
Scutellaria galericulata	Marsh Skullcap	S5	L5	N
Setaria faberi	Giant Foxtail	SE4	L+	I
Setaria pumila	Yellow Foxtail	SE5	L+	I
Setaria verticillata	Bristly Foxtail	SE4	L+	I
Setaria viridis	Green Foxtail	SE5	L+	I
Solanum dulcamara	Bittersweet Nightshade	SE5	L+	I
Solidago altissima	Tall Goldenrod	S5	L5	N
Solidago canadensis var. canadensis	Canada Goldenrod	S5	L5	N
Solidago flexicaulis	Zigzag Goldenrod	S5	L5	N
Sonchus arvensis ssp. arvensis	Glandular Sow-thistle	SE5	L+	I
Sonchus asper	Prickly Sow-thistle	SE5	L+	I
Spiraea alba	White Meadowsweet	S5	L4	N
Spirodela polyrhiza	Great Duckweed	S5	L4	N
Symphyotrichum lanceolatum ssp. lanceolatum	Eastern Panicled Aster	S5	L5	N
Symphyotrichum puniceum var. puniceum	Purple-stemmed Aster	S5	L5	N
Syringa vulgaris	Common Lilac	SE5	L+	I
Taraxacum officinale	Common Dandelion	SE5	L+	I
Thuja occidentalis	Eastern White Cedar	S5	L5	N
Tilia americana	Basswood	S5	L5	N
Trifolium hybridum	Alsike Clover	SE5	L+	I
Trifolium pratense	Red Clover	SE5	L+	I
Trifolium repens	White Clover	SE5	L+	I
Triosteum aurantiacum	Orange-fruit Horse-gentian	S4S5	L3	N
Tripleurospermum inodorum	Scentless Chamomile	SE	L+	I
Tussilago farfara	Coltsfoot	SE5	L+	I
Typha angustifolia	Narrow-leaved Cattail	SE5	L+	I
Typha latifolia	Broad-leaved Cattail	S5	L4	N
Typha x glauca	Hybrid Cattail	SNA	L+	N
Ulmus americana	White Elm	S5	L5	N
Urtica dioica ssp. gracilis	Slender Stinging Nettle	S5	L5	N
Verbena hastata	Blue Vervain	S5	L5	N
Veronica americana	American Speedwell	S5	L4	N

Common Name	Scientific Name	S-Rank [a]	TRCA Rank [b]	Native Status
Viburnum lentago	Nannyberry	S5	L5	N
Vicia cracca	Tufted Vetch	SE5	L+	I
Vitis riparia	Riverbank Grape	S5	L5	N

a – S-Rank (from Natural Heritage Information Centre) for breeding status: S1 (Extremely Rare), S2 (Very Rare), S3 (Rare to Uncommon) (S4 (Common), S5 (Very Common) SNA (Not applicable…'because the species is not a suitable target for conservation activities'; includes non-native species)

b – TRCA Rank (Toronto and Region Conservation Authority) for breeding status: L5 (Able to withstand high levels of disturbance; generally secure throughout the jurisdiction, including the urban matrix; may be of very localized concern in highly degraded areas), L4 (Able to withstand some disturbance; generally secure in rural matrix; of concern in urban matrix), and L+ (non-native species)

Appendix E

Tree Inventory for Caledon Station Secondary Plan

Appendix E

Tree Inventory for Caledon Station Secondary Plan

Table E-1. Tree Inventory of Individual Trees for Caledon Station Secondary Plan

Tag Number	Species	DBH (cm)	Condition	Structure			Comments	Preservation Priority
				Root Flare	Trunk	Crown/Branches		
71	*Acer negundo*	14	Good	Good	Good	Fair	None	Low
45	*Acer negundo*	20	Good	Good	Good	Fair	None	Low
43	*Acer negundo*	21	Good	Good	Good	Fair-Good	None	Low
42	*Acer negundo*	22	Good	Good	Good	Fair-Good	None	Low
55	*Acer negundo*	25	Good	Good	Fair	Poor	None	Low
44	*Acer negundo*	31	Good	Good	Good	Fair-Good	None	Low
37	*Acer negundo*	32	Good	Good	Good	Fair	None	Low
60	*Acer negundo*	78	Fair	Good	Good	Poor	Branch dieback, unbalanced crown	Low
74	*Acer negundo*	14,15,15,14,12	Good	Good	Fair	Fair	None	Low
41	*Acer negundo*	17,14,14	Fair	Fair	Good	Fair-Poor	None	Low
72	*Acer negundo*	20,10,10,10	Good	Good	Good	Fair	None	Low
62	*Acer negundo*	22,22	Good	Good	Good	Fair	None	Low
73	*Acer negundo*	32,31,20	Good	Good	Good	Fair	None	Low
68	*Acer negundo*	40,20	Good	Good	Good	Fair	None	Low
59	*Acer platanoides*	27	Good	Fair	Good	Fair-Good	Girdling root, included bark in some unions	Moderate
54	*Acer platanoides*	17,14	Poor	Good	Good	Poor	Branch dieback, trunk half dead	Low
21	*Aesculus hippocastanea*	50	Fair	Fair	Poor	Poor	Top cut off, hollow trunk with extensive decay	Low
22	*Aesculus hippocastanea*	50	Fair	Fair	Poor	Poor	Top cut off, hollow trunk with extensive decay	Low
20	*Aesculus hippocastanea*	52	Good	Good	Good	Poor	Top cut off due to overhead wires	Low
15	*Aesculus hippocastanea*	53	Good	Good	Fair	Fair	Several cavities with decay in trunk, uneven crown due to pruning for adjacent power lines	Low
16	*Aesculus hippocastanea*	62	Good	Good	Good	Good	Several cavities at branch stubs	Moderate
17	*Aesculus hippocastanea*	65	Fair	Good	Fair	Fair	Minor dieback, cavities at branch stubs	Moderate
18	*Aesculus hippocastanea*	48,48	Fair	Fair	Poor	Poor	Branch dieback, hollow trunk with multiple cavities, poor form	Low
53	*Betula papyrifera*	19,20	Good	Good	Fair	Good	Fused trunks	Moderate
58	*Betula* sp.	22,27	Good	Good	Good	Good	None	Moderate
38	*Catalpa* sp.	63	Good	Good	Good	Fair-Good	Slight lean	Low
23	*Crataegus* sp.	40,20	Fair	Good	Good	Fair	Branch dieback	Low
36	*Fraxinus americana*	43	Dead	N/A	N/A	N/A	None	Low
40	*Juglans nigra*	52	Good	Good	Good	Fair-Good	3 leaders	Moderate
19	*Picea abies*	78	Good	Good	Good	Fair	Codominant leaders with included bark	Moderate
50	*Picea glauca*	20	Good	Good	Good	Good	None	Moderate
51	*Picea glauca*	20	Good	Good	Good	Good	None	Moderate
33	*Picea glauca*	28	Fair	Good	Good	Good	Twig dieback, lean	Moderate
56	*Picea glauca*	28	Good	Good	Good	Good	None	Moderate
49	*Picea pungens*	16	Good	Good	Good	Good	None	Moderate
57	*Picea pungens*	16	Good	Good	Good	Good	None	Moderate
48	*Picea pungens*	21	Good	Good	Good	Good	None	Moderate
46	*Picea pungens*	22	Good	Good	Good	Good	None	Moderate

Tag Number	Species	DBH (cm)	Condition	Structure			Comments	Preservation Priority
				Root Flare	Trunk	Crown/Branches		
47	*Picea pungens*	22	Good	Good	Good	Good	None	Moderate
52	*Picea pungens*	40	Fair	Fair	Good	Good	Large exposed surface roots	Moderate
35	*Picea pungens*	29,34	Good	Good	Good	Fair-Good	Codominant trunks	Moderate
61	*Prunus avium*	38	Good	Good	Good	Fair-Good	3 codominant leaders	Low
39	*Quercus rubra*	47	Good	Good	Good	Good	Small dead branches	High
63	*Salix alba*	100	Good	Poor	Poor	Fair	Massive wound in lower trunk with extensive decay as a result of fallen trunk	Low
65	*Salix alba*	19,15,10,10,8	Good	Good	Good	Fair	None	Low
69	*Tilia americana*	74	Poor	Poor	Poor	Poor	Branch dieback, brown leaves, poor form, hollow trunk	Low
70	*Ulmus americana*	28	Fair-Poor	Good	Fair	Fair	In decline, sparse foliage	Low
64	*Ulmus americana*	50	Good	Good	Fair-Good	Fair-Good	Embedded fence, codominant leaders with included bark	Moderate
66	*Ulmus americana*	35,32,38,36	Good	Good	Good	Fair	Stems fused at base, branch unions with included bark	Moderate
67	*Ulmus americana*	35,40	Fair-Good	Good	Good	Fair-Good	None	Moderate

Table E-2. Tree Inventory of Tree Grouping for Caledon Station Secondary Plan

Species	DBH (cm)	Condition	Form/Structure	Comments
Tree Group A				
Juninperus sp.	20	Good	Good	None
Juninperus sp.	15	Good	Fair	Significant lean
Juninperus sp.	20	Good	Poor	No leader, bushy
Tree Group B1				
Thuja occidentalis	59	Good	Poor	Codominant leaders with included bark, split in crotch between leaders
Thuja occidentalis	20	Good	Fair	Crowded
Thuja occidentalis	21	Fair	Fair	Crowded
Thuja occidentalis	64	Good	Poor	Codominant leaders with included bark, crack below crotch
Thuja occidentalis	30,35	Good	Poor	Cavity in crotch with decay into trunk
Tree Group B2				
Thuja occidentalis	26,26	Good	Fair	None
Thuja occidentalis	32	Fair	Fair	None
Thuja occidentalis	23,17,14	Fair	Fair	None
Thuja occidentalis	27,26	Fair	Fair	Rocks piled against base
Thuja occidentalis	30,19	Fair	Fair-Good	Split in crotch, rocks piled against base
Thuja occidentalis	16	Fair	Fair	Rocks piled against base
Thuja occidentalis	16,18	Fair	Fair	Rocks piled against base
Thuja occidentalis	15,10	Fair	Fair	Rocks piled against base
Thuja occidentalis	17,29	Good	Poor	Large open wound in root flare/lower trunk
Thuja occidentalis	50	Good	Fair	Codominant leaders with included bark
Thuja occidentalis	22	Good	Fair	Crowded
Thuja occidentalis	43	Good	Fair	Codominant leaders with included bark
Thuja occidentalis	35	Good	Fair	None
Thuja occidentalis	27,27	Fair	Fair-Good	None
Thuja occidentalis	22,22	Good	Fair	None
Thuja occidentalis	21	Fair	Poor	None
Thuja occidentalis	32,32	Fair	Poor	Codominant leaders, split in crotch
Thuja occidentalis	59	Good	Fair	Multiple codominant leaders
Thuja occidentalis	22	Fair	Poor	None

Species	DBH (cm)	Condition	Form/Structure	Comments
Thuja occidentalis	26,26	Poor	Poor	Codominant leaders , split in crotch through trunk
Thuja occidentalis	30,35	Fair	Poor	Large old wound in trunk, poor form
Thuja occidentalis	25,14	Fair	Fair	None
Thuja occidentalis	16	Fair	Poor	None
Thuja occidentalis	20,24,24,20	Fair	Poor	None
Prunus avium	16	Good	Fair	Lean
Thuja occidentalis	30	Fair	Poor	Large decaying stump at base
Thuja occidentalis	30,35	Fair	Fair	Multiple codominant leaders
Thuja occidentalis	26,26	Good	Fair	None
Thuja occidentalis	27	Fair	Good	None
Thuja occidentalis	24,21	Fair	Fair	None
Prunus avium	13,11	Good	Fair-Good	Twisted trunk, lean
Thuja occidentalis	17	Good	Fair	Lean, uneven crown
Thuja occidentalis	16,18,18	Good	Fair	Codominant stems with included bark
Thuja occidentalis	25,25	Good	Fair-Poor	None
Thuja occidentalis	18	Fair	Poor	None
Thuja occidentalis	20	Fair	Poor	Large wound in trunk
Thuja occidentalis	11,13,13,14	Good	Fair	None
Acer negundo	18	Good	Poor	None
Thuja occidentalis	32,19	Good	Fair	Codominant
Thuja occidentalis	30	Good	Fair	Large wound in trunk
Thuja occidentalis	32	Good	Fair	Lean
Tree Group B3				
Thuja occidentalis	22,14	Good	Fair	None
Robinia psuedo-acacia	10	Good	Fair	None
Thuja occidentalis	11	Good	Good	None
Thuja occidentalis	17,14,12	Good	Fair	None
Thuja occidentalis	10	Fair	Fair	None
Thuja occidentalis	11	Fair	Fair	None
Thuja occidentalis	15	Good	Fair	None
Thuja occidentalis	17	Fair	Fair	None
Thuja occidentalis	14	Good	Fair	None
Thuja occidentalis	13	Good	Fair	None
Thuja occidentalis	15	Good	Fair	None
Thuja occidentalis	13	Good	Fair	None
Thuja occidentalis	13	Good	Fair	None
Thuja occidentalis	13	Good	Fair	None
Thuja occidentalis	15	Good	Fair	None
Thuja occidentalis	11,13	Good	Fair	None
Thuja occidentalis	13	Good	Fair	None
Robinia psuedo-acacia	39	Good	Fair	None
Thuja occidentalis	11	Good	Fair	None
Thuja occidentalis	10	Good	Fair	None
Thuja occidentalis	13	Good	Fair	None
Acer platanoides	16	Good	Fair	None
Thuja occidentalis	13	Good	Fair	None
Thuja occidentalis	10	Good	Fair	None
Thuja occidentalis	12	Good	Fair	None
Populus deltoides	55	Dead	N/A	None
Thuja occidentalis	10	Good	Fair	None
Thuja occidentalis	11	Good	Fair	None

Species	DBH (cm)	Condition	Form/Structure	Comments
Thuja occidentalis	12	Good	Fair	None
Thuja occidentalis	14	Good	Fair	None
Thuja occidentalis	15	Good	Fair	None
Thuja occidentalis	12	Good	Fair	None
Thuja occidentalis	15	Good	Fair	None
Thuja occidentalis	12	Good	Fair	None
Thuja occidentalis	10	Good	Fair	None
Populus deltoides	65	Fair	Fair	None
Thuja occidentalis	21	Good	Fair	None
Thuja occidentalis	20	Good	Fair	None
Thuja occidentalis	17	Good	Fair	None
Thuja occidentalis	17	Good	Fair	None
Robinia psuedo-acacia	41	Fair	Fair	None
Thuja occidentalis	19	Fair	Fair	None
Thuja occidentalis	15	Fair	Fair	None
Thuja occidentalis	29	Good	Fair	None
Thuja occidentalis	17	Good	Fair	None
Thuja occidentalis	27	Good	Fair	None
Thuja occidentalis	21	Good	Fair	None
Thuja occidentalis	22	Good	Fair	None
Thuja occidentalis	15	Good	Fair	None
Thuja occidentalis	29	Good	Fair	None
Thuja occidentalis	16	Good	Fair	None
Thuja occidentalis	16	Good	Fair	None
Thuja occidentalis	23	Good	Fair	None
Thuja occidentalis	41	Good	Fair	None
Thuja occidentalis	42	Fair	Fair	None
Thuja occidentalis	41	Good	Fair	None
Thuja occidentalis	42	Fair	Fair	None
Thuja occidentalis	40	Good	Fair	None
Thuja occidentalis	30,12,18,15	Good	Fair	None
Thuja occidentalis	40	Good	Fair	None
Thuja occidentalis	32,13,13	Good	Fair	None
Tree Group B4				
Thuja occidentalis	18,12	Good	Fair	None
Thuja occidentalis	14	Good	Fair	None
Thuja occidentalis	16	Good	Good	None
Thuja occidentalis	12	Good	Good	None
Thuja occidentalis	11	Good	Good	None
Thuja occidentalis	12	Good	Good	None
Thuja occidentalis	14	Good	Good	None
Thuja occidentalis	16	Good	Good	None
Thuja occidentalis	10	Good	Good	None
Thuja occidentalis	12	Good	Good	None
Thuja occidentalis	11	Good	Good	None
Thuja occidentalis	17	Good	Good	None
Thuja occidentalis	19,15	Good	Good	None
Tree Group B5				
Thuja occidentalis	19,20,13	Good	Fair	None
Thuja occidentalis	21,11	Good	Good	None
Thuja occidentalis	15	Good	Good	None
Thuja occidentalis	20,12	Good	Good	None
Thuja occidentalis	20	Good	Good	None

Species	DBH (cm)	Condition	Form/Structure	Comments
Thuja occidentalis	15	Good	Good	None
Thuja occidentalis	13	Good	Good	None
Thuja occidentalis	18	Good	Good	None
Thuja occidentalis	15	Good	Poor	None
Thuja occidentalis	15	Good	Good	None
Thuja occidentalis	16	Good	Good	None
Thuja occidentalis	29	Good	Good	None
Thuja occidentalis	17	Good	Good	None
Thuja occidentalis	18	Good	Good	None
Thuja occidentalis	23	Good	Good	None
Thuja occidentalis	15	Good	Good	None
Acer platanoides	15,21	Good	Fair-Poor	None
Acer negundo	22	Good	Poor	None
Acer negundo	27,24	Good	Poor	None
Tree Group C1				
Malus pumila	20,20,15,15	Fair	Fair	None
Malus pumila	50	Good	Poor	Crack in branch unions, cavity at base
Malus pumila	12	Good	Fair	None
Tree Group C2				
Pyrus communis	14,14	Good	Fair	None
Fraxinus pennsylvanica	30	Dead	N/A	None
Malus pumila	25,24,25,20	Good	Poor	None
Crataegus sp.	15	Good	Fair	None
Crataegus sp.	25	Poor	N/A	Nearly dead
Fraxinus pennsylvanica	50	Dead	N/A	None
Crataegus sp.	40,22,20	Good	Poor	Split at base
Crataegus sp.	28	Good	Fair	Bulges in root flare
Crataegus sp.	15,20	Fair	Poor	Cavities in lower trunk
Malus pumila	50	Fair	Poor	Twisted trunk, dead branches, poor form
Malus pumila	25,20	Poor	Poor	None
Crataegus sp.	40,20	Fair	Poor	Poor form, cavities in trunk
Fraxinus pennsylvanica	38	Dead	N/A	None
Crataegus sp.	15,15,16,18	Good	Fair	None
Crataegus sp.	12	Poor	Poor	None
Malus pumila	20	Fair	Poor	None
Malus pumila	40	Poor	Poor	None
Crataegus sp.	14,12	Good	Fair	None
Malus pumila	50,35,25,30,25	Fair	Poor	None
Crataegus sp.	40	Fair	Poor	Cavities in trunk large broken branches
Malus pumila	35,45	Fair-Good	Poor	Branch dieback, poor form, extensive epicormics
Malus pumila	25,25,20,28	Fair	Poor	None
Crataegus sp.	11,14,15,12	Good	Poor	None
Malus pumila	45	Poor	Poor	Extensive dieback, poor form
Crataegus sp.	15	Fair	Poor	None
Crataegus sp.	20,22,14	Good	Fair	None
Malus pumila	30,30	Poor	Poor	One stem broken
Malus pumila	13	Poor	Poor	None
Crataegus sp.	20,12,20,18	Good	Fair	None
Crataegus sp.	18,15,22	Good	Fair	None
Malus pumila	17,20,15	Fair	Fair-Good	None
Ulmus americana	16	Good	Fair	None

Species	DBH (cm)	Condition	Form/Structure	Comments
Crataegus sp.	22	Good	Fair	None
Quercus macrocarpa	10	Good	Good	None
Crataegus sp.	27	Poor	Poor	None
Crataegus sp.	20,25,35	Poor	Poor	Poor form, large cavities, extensive decay
Malus pumila	38	Fair	Fair	Damage to base
Malus pumila	25	Fair	Fair	None
Crataegus sp.	25	Poor	Poor	None
Malus pumila	20,18,20,20	Good	Poor	None
Crataegus sp.	20,18,30,20,20	Fair	Poor	Fused trunks
Crataegus sp.	20,35,22,20	Good	Fair	None
Crataegus sp.	45,26,30	Good	Fair	None
Crataegus sp.	25,20,17	Good	Fair-Good	None
Crataegus sp.	26,25	Good	Fair	None
Malus pumila	40,40	Fair	Fair-Good	None
Malus pumila	25	Good	Poor	None
Prunus serotina	30	Good	Fair	Damage to trunk, codominant stems
Prunus serotina	20,20	Good	Fair	Codominant stems with included bark
Crataegus sp.	20,25,22,20	Good	Fair	None
Tree Group C3				
Crataegus sp.	18,18,14	Good	Fair	None
Malus pumila	15,12	Good	Poor	None
Malus pumila	20	Good	Fair	None
Malus pumila	17	Good	Fair	None
Malus pumila	45,30	Fair	Fair-Good	None
Tree Group C4				
Crataegus sp.	12,8,8,8	Good	Fair-Poor	None
Crataegus sp.	25,15,10,25,10,10	Good	Fair-Good	None
Crataegus sp.	8,8,12	Good	Good	None
Crataegus sp.	11,11	Good	Good	None
Crataegus sp.	11,9	Good	Good	None
Crataegus sp.	13	Good	fair	None
Crataegus sp.	10,10,10,10	Good	fair	None
Crataegus sp.	13,15	Good	Fair	None
Crataegus sp.	15,10	Good	Fair	None
Malus pumila	22,16	Fair	Poor	None
Crataegus sp.	14,10	Fair	Poor	None
Crataegus sp.	20	Good	Good	None
Tree Group C5				
Malus pumila	20,20,25	Good	Fair	None
Malus pumila	47,20,40	Fair	Poor	Large dead branch
Crataegus sp.	30	Fair	Fair-Good	Wound in lower trunk, dead branches
Malus pumila	35,25,25	Good	Poor	None
Malus pumila	25,20,20	Fair	Poor	None
Ulmus americana	10	Fair	Fair-Good	None
Ulmus americana	15	Good	Fair-Poor	None
Tree Group C6				
Crataegus sp.	16,13,20	Good	Fair	None
Crataegus sp.	11,12,12,10	Good	Fair	None
Ulmus americana	18	Good	Good	None
Crataegus sp.	14,10,10	Good	Fair	None
Crataegus sp.	12,10,10	Good	Fair	None

Species	DBH (cm)	Condition	Form/Structure	Comments
Acer negundo	12,15	Fair	Poor	None
Crataegus sp.	14,14,10	Good	Fair	None
Ulmus americana	55	Fair	Fair-Good	None
Crataegus sp.	15,16	Good	Poor	None
Crataegus sp.	18, 21,14,14,	Poor	Poor	None
Crataegus sp.	10,10,10,10	Good	Fair	None
Tilia americana	16	Good	Good	None
Ulmus americana	50	Good	Fair-Poor	None
Tilia americana	11	Good	Fair-Poor	None
Tilia americana	28,15,16	Good	Poor	None
Crataegus sp.	20,20,11	Good	Fair	None
Tree Group C7				
Malus pumila	14,10,10	Fair	Fair-Good	None
Crataegus sp.	26,13,14,12,18	Poor	Poor	None
Malus pumila	20,25,20	Fair	Fair	None
Malus pumila	15,16,18,13	Good	Fair	None
Malus pumila	15,16	Good	Fair	None
Malus pumila	13,15,20	Good	Fair-Good	None
Malus pumila	16,16,22	Fair	Fair	None
Tree Group C8				
Fraxinus americana	30,25	Dead	N/A	None
Fraxinus americana	13	Poor	Poor	None
Fraxinus americana	10	Poor	Poor	None
Fraxinus americana	15	Dead	N/A	None
Crataegus sp.	20	Fair	Fair	None
Crataegus sp.	20	Fair	Fair	None
Crataegus sp.	12,10,10,12	Fair	Poor	None
Crataegus sp.	20	Fair	Fair	None
Crataegus sp.	12,10,10,12	Fair	Poor	None
Fraxinus americana	20,26	Dead	N/A	None
Fraxinus americana	24	Dead	N/A	None
Malus pumila	22	Poor	Poor	None
Fraxinus americana	35	Dead	N/A	None
Crataegus sp.	10	Fair	Fair	None
Crataegus sp.	14	Fair	Fair	None
Fraxinus americana	12	Dead	N/A	None
Crataegus sp.	20	Fair	Poor	None
Crataegus sp.	18	Fair	Poor	None
Fraxinus americana	30	Dead	N/A	None
Quercus macrocarpa	20	Fair	Fair	None
Fraxinus americana	27	Dead	N/A	None
Fraxinus americana	12	Dead	N/A	None
Fraxinus americana	35	Dead	N/A	None
Ulmus americana	25	Dead	N/A	None
Fraxinus americana	30	Dead	N/A	None
Crataegus sp.	14	Good	Fair	None
Fraxinus americana	32.24	Dead	N/A	None
Crataegus sp.	10	Fair	Fair	None
Crataegus sp.	20	Fair	Fair	None
Fraxinus americana	32	Dead	N/A	None
Fraxinus americana	32	Dead	N/A	None
Fraxinus americana	14	Dead	N/A	None
Crataegus sp.	20,20,20	Fair	Poor	None

Species	DBH (cm)	Condition	Form/Structure	Comments
Fraxinus americana	28	Dead	N/A	None
Crataegus sp.	17,20,17	Fair	Fair	None
Malus pumila	25,22,30	Fair	Poor	None
Crataegus sp.	14,18	Fair	Poor	None
Crataegus sp.	10,10,10,10	Fair	Fair	None
Fraxinus americana	14	Dead	N/A	None
Fraxinus americana	10	Dead	N/A	None
Fraxinus americana	17,17	Dead	N/A	None
Fraxinus americana	14	Dead	N/A	None
Fraxinus americana	15	Dead	N/A	None
Fraxinus americana	38	Dead	N/A	None
Malus pumila	15	Dead	N/A	None
Malus pumila	16,17,34,20	Dead	N/A	None
Fraxinus americana	10	Dead	N/A	None
Malus pumila	40	Fair	Poor	None
Fraxinus americana	10	Dead	N/A	None
Fraxinus americana	15	Dead	N/A	None
Crataegus sp.	10,16	Fair	Poor	None
Crataegus sp.	15,15,15,15	Fair	Fair	None
Crataegus sp.	23,23,20	Fair	Poor	None
Fraxinus americana	10	Fair	Fair	None
Crataegus sp.	14,15,11,11,15	Good	Fair	None
Tree Group C9				
Malus pumila	50	Dead	N/A	None
Prunus serotina	15	Fair	Poor	None
Fraxinus americana	22,14	Dead	N/A	None
Malus pumila	50	Poor	Poor	None
Fraxinus americana	31	Dead	N/A	None
Malus pumila	46,38	Fair	Poor	None
Malus pumila	28, 28,34	Poor	Poor	None
Crataegus sp.	22,16,15	Fair	Poor	None
Malus pumila	23,27,32	Poor	Poor	None
Malus pumila	20	Dead	N/A	None
Crataegus sp.	17,20,14,14,15	Poor	Poor	None
Malus pumila	25	Fair	Poor	None
Crataegus sp.	30	Poor	Poor	None
Malus pumila	43	Poor	Poor	None
Crataegus sp.	16	Fair	Poor	None
Crataegus sp.	20	Fair	Poor	None
Malus pumila	26,26,14	Poor	Poor	None
Malus pumila	29,18	Poor	Poor	None
Malus pumila	26,25,32,30	Poor	Poor	None
Crataegus sp.	15,28	Poor	Poor	None
Crataegus sp.	22,15	Fair	Fair	None
Prunus serotina	25	Poor	Poor	None
Crataegus sp.	30,30	Poor	Poor	None
Malus pumila	28,50	Fair	Poor	None
Crataegus sp.	17,10	Fair	Fair	None
Malus pumila	28	Poor	Poor	None
Crataegus sp.	11	Fair	Fair	None
Crataegus sp.	16,16,20	Fair	Poor	None

Species	DBH (cm)	Condition	Form/Structure	Comments
Malus pumila	60	Poor	Poor	None
Crataegus sp.	12	Fair	Poor	None
Prunus serotina	17	Good	Fair	None
Crataegus sp.	33,22,30	Fair	Poor	None
Prunus serotina	25	Good	Fair	None
Crataegus sp.	26,30	Fair	Fair	None
Malus pumila	30	Fair	Fair	None
Crataegus sp.	20,20	Fair	Poor	None
Fraxinus americana	15	Dead	N/A	None
Prunus serotina	65,50	Fair	Poor	None
Crataegus sp.	24,22,22,20	Fair	Fair	None
Crataegus sp.	11	Fair	Fair	None
Crataegus sp.	12,15	Fair	Fair	None
Prunus serotina	15	Good	Fair	None
Prunus serotina	25,40,34,28	Fair	Poor	None
Prunus serotina	12	Poor	Poor	None
Prunus serotina	22	Fair	Fair	None
Prunus serotina	20	Dead	Poor	None
Malus pumila	20	Poor	Poor	None
Malus pumila	37,28,37	Poor	Poor	None
Malus pumila	24,24,40	Fair	Poor	None
Crataegus sp.	22,22	Fair	Poor	None
Crataegus sp.	28,23,24,20	Fair	Poor	None
Malus pumila	38,32,36,26,26	Poor	Poor	None
Crataegus sp.	18,14,17	Fair	Fair	None
Malus pumila	22,25,20	Poor	Poor	None
Crataegus sp.	12	Dead	N/A	None
Malus pumila	22,25,20	Poor	Poor	None
Crataegus sp.	12	Dead	N/A	None
Crataegus sp.	24	Poor	Poor	None
Crataegus sp.	15,16,18,19,21	Fair	Poor	None
Crataegus sp.	22,15,14	Fair	Poor	None
Crataegus sp.	17,18	Fair	Poor	None
Crataegus sp.	22,14,14,14	Fair	Fair	None
Crataegus sp.	19	Fair	Fair	None
Crataegus sp.	24	Fair	Poor	None
Malus pumila	30,16,22,15	Fair	Poor	None
Acer negundo	40	Good	Fair	None
Tree Group D				
Juglans nigra	17	Good	Fair	None
Juglans nigra	13	Good	Fair-Good	Crowded
Juglans nigra	15	Good	Fair	Crowded
Juglans nigra	11	Good	Fair	Crowded
Juglans nigra	29	Good	Fair	None
Acer saccharinum	16,18	Fair	Poor	Large cavity at base, codominant stems with included bark
Acer saccharinum	32,22,40	Fair	Poor	Wound at base, leaning
Pinus sylvestris	20	Dead	N/A	None
Acer saccharinum	14,18	Fair	Fair	Smaller trunk dead
Acer saccharinum	20	Good	Fair	None
Acer saccharinum	36	Dead	N/A	None
Pinus sylvestris	22	Poor	Poor	Poor form, extensive dieback
Pinus sylvestris	36	Fair-Poor	Fair	Embedded fence
Pinus sylvestris	13	Fair-Poor	Fair	Embedded fence

Species	DBH (cm)	Condition	Form/Structure	Comments
Pinus sylvestris	15	Fair	Fair	None
Pinus sylvestris	22	Good	Fair-Good	None
Pinus sylvestris	30	Good	Good	None
Pinus sylvestris	34	Good	Fair-Poor	Uneven crown
Pinus sylvestris	25	Good	Fair-Poor	Uneven crown
Malus pumila	50	Good	Poor	Hollow trunk
Tree Group E1				
Acer negundo	10,10,10	Fair	Fair	None
Acer negundo	13	Fair	Fair	None
Acer negundo	17	Fair	Poor	None
Acer negundo	17,19	Fair	Fair	None
Acer negundo	10,13,8	Fair	Fair	None
Acer negundo	17,11	Fair	Fair	None
Acer negundo	23	Fair	Fair	None
Acer negundo	15,12,16	Fair	Fair	None
Acer negundo	19	Fair	Fair	None
Acer negundo	15,24	Fair	Fair	None
Fraxinus pennslyvanica	13,13,10	Dead	Fair	None
Acer negundo	15,13,19, 10,10	Fair	Fair	None
Tree Group E2				
Acer negundo	12	Fair	Fair	None
Acer negundo	10,11	Fair	Fair	None
Acer negundo	11	Fair	Fair	None
Acer negundo	16,14	Fair	Fair	None
Acer negundo	16	Fair	Fair	None
Tree Group E3				
Acer negundo	14,14	Good	Fair-Good	Severe bend at base of trunk
Acer negundo	11,8	Good	Fair	None
Acer negundo	9,9	Good	Fair	None
Acer negundo	15,15	Good	Fair	None
Acer negundo	12	Good	Fair	None
Acer negundo	14	Good	Fair-Poor	None
Acer negundo	18,18	Good	Fair-Poor	None
Acer negundo	20	Good	Fair	None
Acer negundo	8,8	Fair	Fair	None
Acer negundo	15	Good	Fair	None
Acer negundo	17	Good	Fair	None
Tree Group E4				
Acer negundo	13,12,26	Good	Poor	Damage at base, sprawling form
Acer negundo	30	Good	Fair	None
Acer negundo	24,19,12,13	Fair-Good	Fair-Good	None
Acer negundo	20	Fair	Fair	None
Tree Group E5				
Acer negundo	10	Good	Fair	Embedded fence
Acer negundo	16,18	Fair	Fair	None
Acer negundo	14	Fair	Fair	None
Acer negundo	12,15	Fair	Fair	Wound at base
Acer negundo	12,10	Fair	Fair	None
Acer negundo	12,10	Fair	Poor	Split in crotch
Acer negundo	23,20	Good	Fair	None
Acer negundo	12,12,11,10	Good	Fair	Embedded fence

Species	DBH (cm)	Condition	Form/Structure	Comments
Acer negundo	10,12	Fair	Fair	None
Acer negundo	11,10,14	Fair	Fair	None
Tree Group E6				
Acer negundo	16	Good	Fair	None
Acer negundo	12	Fair-Poor	Fair-Poor	None
Acer negundo	12	Good	Good	None
Acer negundo	10	Poor	Fair-Good	None
Acer negundo	11,11	Fair	Fair	None
Acer negundo	10	Fair	Fair	None
Acer negundo	14	Fair	Fair	None
Acer negundo	15,10,10	Good	Fair-Poor	None
Tree Group E7				
Acer negundo	12	Good	Poor	None
Acer negundo	15,16,16	Good	Fair	None
Acer negundo	24,15	Good	Fair	None
Acer saccharinum	11	Good	Fair	None
Acer negundo	12	Good	Fair	None
Acer negundo	22,16	Good	Fair	None
Acer negundo	20,15	Good	Fair	None
Acer negundo	20,20,23,14	Fair	Fair	None
Acer negundo	30	Good	Poor	None
Acer negundo	20	Good	Poor	None
Acer negundo	19,20	Good	Poor	None
Acer negundo	16,16	Fair	Poor	None
Acer negundo	18,16	Fair	Poor	None
Acer negundo	16	Good	Poor	None
Tree Group F				
Populus tremulodies	8	Good	Good	None
Populus tremulodies	8	Good	Fair	None
Populus tremulodies	8	Good	Good	None
Populus tremulodies	8	Poor	Fair	None
Populus tremulodies	8	Good	Poor	None
Populus tremulodies	8	Good	Fair	None
Populus tremulodies	8	Good	Fair	None
Populus tremulodies	8	Good	Good	None
Populus tremulodies	8	Good	Fair	None
Populus tremulodies	8	Good	Fair	None
Populus tremulodies	8	Poor	Poor	None
Populus tremulodies	9	Good	Good	None
Populus tremulodies	9	Good	Good	None
Populus tremulodies	9	Good	Fair	None
Populus tremulodies	9	Good	Poor	None
Populus tremulodies	9	Good	Fair	None
Populus tremulodies	9	Good	Fair	None
Populus tremulodies	9	Good	Fair	None
Populus tremulodies	9	Good	Good	None
Populus tremulodies	10	Good	Good	None
Populus tremulodies	10	Good	Fair	None
Populus tremulodies	10	Good	Fair	None
Populus tremulodies	10	Good	Fair	None
Populus tremulodies	10	Good	Fair-Good	None

Species	DBH (cm)	Condition	Form/Structure	Comments
Populus tremulodies	10	Good	Good	None
Populus tremulodies	10	Good	Fair	None
Populus tremulodies	10	Good	Fair	None
Populus tremulodies	11	Good	Fair	None
Populus tremulodies	11	Good	Fair	None
Populus tremulodies	11	Fair	Poor	None
Populus tremulodies	11	Fair	Fair	None
Populus tremulodies	11	Good	Fair	None
Populus tremulodies	11	Good	Fair	None
Populus tremulodies	11	Good	Fair	None
Populus tremulodies	11	Good	Fair-Poor	None
Populus tremulodies	12	Good	Fair	None
Populus tremulodies	12	Good	Fair	None
Populus tremulodies	12	Good	Fair	None
Populus tremulodies	13	Good	Good	None
Populus tremulodies	13	Good	Good	None
Populus tremulodies	14	Dead	N/A	None
Populus tremulodies	14	Fair	Fair	None
Populus tremulodies	14	Good	Fair	None
Populus tremulodies	15	Good	Fair	None
Populus tremulodies	15	Fair	Fair	None
Populus tremulodies	15	Good	Good	None
Populus tremulodies	16	Good	Good	None
Populus tremulodies	16	Poor	Poor	None
Populus tremulodies	17	Good	Good	None
Populus tremulodies	17	Poor	Poor	None
Populus tremulodies	18	Dead	N/A	None
Populus tremulodies	17	Poor	Poor	None
Populus tremulodies	18	Dead	N/A	None
Populus tremulodies	18	Fair	Poor	None
Populus tremulodies	19	Fair-Good	Fair-Good	None
Populus tremulodies	20	Good	Fair	None
Populus tremulodies	20	Poor	Poor	None
Populus tremulodies	30	Fair	Fair	None
Tree Group G				
Acer x *fremanii*	11	Good	Fair	None
Acer x *fremanii*	8	Good	Fair	None
Acer x *fremanii*	14,10	Good	Fair	None
Acer x *fremanii*	12,10	Good	Fair	None
Acer x *fremanii*	11	Good	Fair	None
Acer x *fremanii*	8	Good	Fair	None
Tree Group H				
Tilia americana	15,15	Good	Fair-Poor	Codominant with included bark
Tilia americana	15	Good	Good	None
Tilia americana	20,29,29,35,35	Good	Fair-Poor	Codominant with included bark
Tilia americana	43	Good	Fair	None
Tilia americana	22,23,20,15,15	Good	Fair-Poor	Codominant with included bark
Tilia americana	21	Good	Good	None
Tilia americana	24	Good	Good	None
Crataegus sp.	14,10,10,10	Good	Good	None
Tilia americana	47,44,37,52	Good	Fair	Multiple stems with included bark, crossing trunks
Tilia americana	15	Good	Fair	None
Tilia americana	15	Good	Good	None

Species	DBH (cm)	Condition	Form/Structure	Comments
Tilia americana	15	Good	Good	None
Tilia americana	15	Good	Good	None
Tilia americana	18	Good	Good	None
Acer negundo	20,12,12	Good	Poor	None
Crataegus sp.	15,12	Good	Fair	None
Ulmus americana	70	Fair-Poor	Fair	Codominant leaders, unbalanced crown
Tilia americana	12	Good	Good	None
Ulmus americana	10	Good	Good	None
Ulmus americana	15	Good	Fair	None
Ulmus americana	20	Good	Fair-Poor	None
Crataegus sp.	10,10	Good	Fair	None
Crataegus sp.	15,12,10	Good	Good	None
Crataegus sp.	12,10,10	Good	Good	None
Tree Group I				
Salix x sepulcralis	100,60	Good	Poor	Main stem fallen, hollow trunk
Salix x sepulcralis	>100	Good	Poor	One stem fallen
Acer negundo	30	Good	Fair	None

Appendix F

Breeding Bird 2020 Field Notes for Caledon Station Secondary Plan

Breeding Bird Survey Summary Form

Surveyor Name: Geoff Carpenter Date (use letters for mos.): May 28/20

Project Name: BOLTON - BRES Project #: 21476

Time of Survey (start and finish): 0445 - 0815

Weather (approx. temp., cloud cover, wind, precipitation): overcast, no wind

16 - 18°C

Additional notes on birds (nests, uncertainties, unusual observations, habitat comments etc.) :

Incidental Observations

Anything welcome (mammals, herps, fish presence, insects, plants esp. unusual spp. etc.). For herps, rare plants, occurrence of fish, please also mark location on map. For herps, number observed. Thanks!

EUST	2-4	RWBL	28-30	EAPH	2
MALL - foraging		BRTH	2	AMCR	1-2
Canada Goose - foraging		NOCA	2	AMRO	6-8
KILL	2	[illegible]		AMGO	3-4
Spot. Sandp	1	[illegible]		GRCA	1
SASP	7-9	CWYE	1	BADR	2
SOSP	10-12	YEWA	3	WAVI	1
BOBO	4 males	SWSP	1	REVI	1
EAME	1	EAKI	2	GBHE - foraging	
CHSP	2	WIFL	3	HOLA	2
BLJA	1	COGR	2-3	MODO	2
HOWR	1	INBU	1		
BARS - foraging					

RFC Apr 2012

2 of 3 (As will be 1st)

Project #: 214476
Project Name: Bolton-BRES Option 3 Lands NH Review
Project Manager: KU

597000 597500 598000 598500

4859500 4859000 4858500 4858000 4857500 4857000 4856500

Lumber Station Rd

The Gore Road

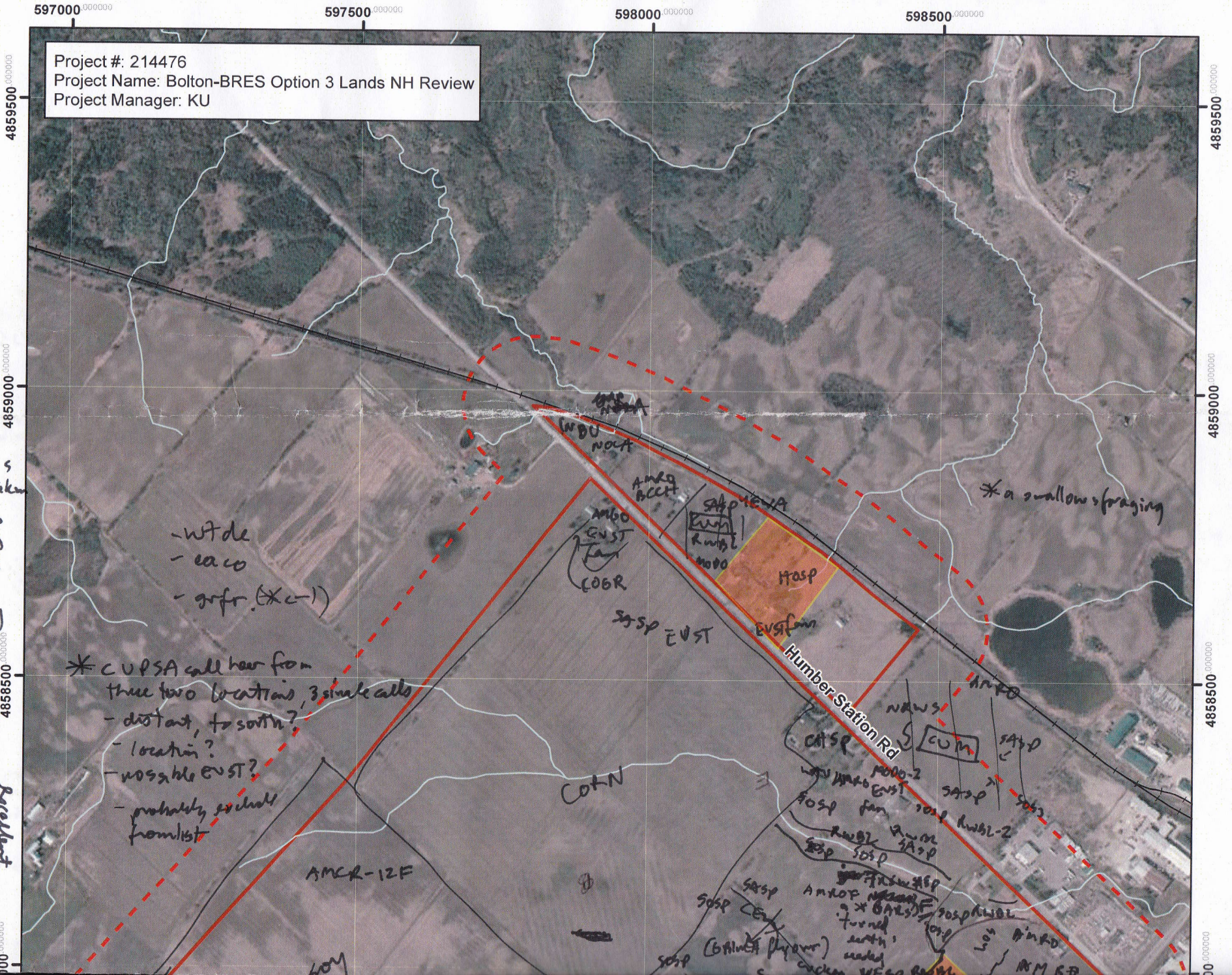
King St

No Access

0 75 150 300 Metres

N W E S

Stochastic urban expansion for Option 3 06




4857000
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The Gore Road
King St
Humber Station Rd
No Access
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Breeding Bird Survey Summary Form

Surveyor Name: Geoff Carpentier Date (use letters for mos.): July 4/20

Project Name: Bolton Project #: 214476

Time of Survey (start and finish): 0445 – 0830

Weather (approx. temp., cloud cover, wind, precipitation): Sunny no wind

18 - 21 °C

Additional notes on birds (nests, uncertainties, unusual observations, habitat comments etc.) :

Green Frog

E. Cottontail.

Incidental Observations

Anything welcome (mammals, herps, fish presence, insects, plants esp. unusual spp. etc.). For herps, rare plants, occurrence of fish, please also mark location on map. For herps, number observed. Thanks!

SOSP	13 - 14	AMCR	1	HOWR	2
SASP	11 - 12	AMGO	2 - 3	BBCU	1
CHSP	4	EAKI	2	Spot. Sandp	1
HOSP	1 - 2	EAPH	2	VESP	1
WIFL	2	EUST	1 - 3	HOLA	- 1
YEWA	2	MODO	3 - 4	INBU	1
AMRO	6 - 7	KILL	2	RTHA	1
COGR	2 - 3	EAME	1	SWSP	1
RWBL	8	BRTH	1	BAOR	1
COYE	1	BCCH	1	~~[illegible]~~	
NOCA	3	GRCA	2	WAVI - 1	

RFC Apr 2012

Project #: 214476
Project Name: Bolton-BRES Option 3 Lands NH Review
Project Manager: KU

597000 597500 598000 598500

4859500 4859000 4858500 4858000 4857500 4857000 4856500

Humber Station Rd

The Gore Road

King St

No Access

0 75 150 300 Metres

N W E S

Appendix G

Breeding Bird Checklist for Caledon Station Secondary Plan

Appendix G

Breeding Bird Checklist for Caledon Station Secondary Plan

Common Name	Scientific Name	National Species at Risk COSEWIC[a]	Species at Risk in Ontario Listing [b]	Provincial breeding season SRANK [c]	TRCA Status [d]	Area-sensitive [d]	May 28, 2020		June 19, 2020		July 4, 2020	
							Subject Property	120 m Buffer Study Area	Subject Property	120 m Buffer Study Area	Subject Property	120 m Buffer Study Area
Great Blue Heron	*Ardea herodias*	-	-	S4	L3	-	1F	-	1F	-	-	-
Canada Goose	*Branta canadensis*	-	-	S5	L5	-	2	-	-	-	-	-
Mallard	*Anas platyrhynchos*	-	-	S5	L5	-	2	-	1	-	-	-
Red-tailed Hawk	*Buteo jamaicensis*	-	-	S5	L5	-	-	-	-	-	1	-
Peregrine Falcon	*Falco peregrinus*	-	SC	S3	L4	-	-	-	1F	-	-	-
Wild Turkey	*Meleagris gallopavo*	-	-	S5	L3	-	-	-	1	-	-	-
Killdeer	*Charadrius vociferus*	-	-	S5	L4	-	1	-	1	-	2	-
Spotted Sandpiper	*Actitis macularia*	-	-	S5	L4	-	1	-	1	-	1	-
Ring-billed Gull	*Larus delawarensis*	-	-	S5	L4	-	-	-	2F	-	-	-
Rock Pigeon	*Columba livia*	-	-	SNA	L+	-	-	-	3	-	-	-
Mourning Dove	*Zenaida macroura*	-	-	S5	L5	-	2	-	7 + 12F	-	4	-
Black-billed Cuckoo	*Coccyzus erythropthalmus*	-	-	S5	L3	-	-	-	-	-	1	-
Cuckoo sp.	*Coccyzus sp.*	-	-	n/a	n/a	-	-	-	1	-	-	-
Willow Flycatcher	*Empidonax traillii*	-	-	S5	L4	-	3	-	3	-	1	1
Eastern Phoebe	*Sayornis phoebe*	-	-	S5	L5	-	3	-	-	-	2	-
Eastern Kingbird	*Tyrannus tyrannus*	-	-	S4	L4	-	2	-	1	1	2	-
Horned Lark	*Eremophila alpestris*	-	-	S5	L3	-	2	-	3	-	1	-
Tree Swallow	*Tachycineta bicolor*	-	-	S4	L4	-	-	-	1F	-	-	-
N. Rough-winged Swallow	*Stelgidopteryx serripennis*	-	-	S4	L4	-	-	-	-	1F	-	-
Barn Swallow	*Hirundo rustica*	THR	THR	S4	L4	-	1F (ELC Unit 2e)	1	1F (ELC Unit 2j)	1	-	-
Blue Jay	*Cyanocitta cristata*	-	-	S5	L5	-	1	-	1	-	-	-
American Crow	*Corvus brachyrhynchos*	-	-	S5	L5	-	4	-	2 + 12F	-	1	-
Black-capped Chickadee	*Poecile atricapillus*	-	-	S5	L5	-	-	-	2	-	1	-
House Wren	*Troglodytes aedon*	-	-	S5	L5	-	1	-	1	-	2	-
American Robin	*Turdus migratorius*	-	-	S5	L5	-	1	-	5+1F	2	6	1
Gray Catbird	*Dumetella carolinensis*	-	-	S4	L4	-	2	-	2	-	2	-
Brown Thrasher	*Toxostoma rufum*	-	-	S4	L3	-	2	-	-	-	1	-
Cedar Waxwing	*Bombycilla cedrorum*	-	-	S5	L5	-	-	-	5	-	-	-
European Starling	*Sturnus vulgaris*	-	-	SE	L+	-	3	-	9	2	2	1
Warbling Vireo	*Vireo gilvus*	-	-	S5	L5	-	1	-	1	-	1	-
Red-eyed Vireo	*Vireo olivaceus*	-	-	S5	L4	-	1	-	-	-	-	-
Yellow Warbler	*Setophaga petechia*	-	-	S5	L5	-	3	-	2	1	2	-
Common Yellowthroat	*Geothlyphis trichas*	-	-	S5	L4	-	2	-	1	-	1	-
Northern Cardinal	*Cardinalis cardinalis*	-	-	S5	L5	-	1	-	2	-	3	-
Indigo Bunting	*Passerina cyanea*	-	-	S4	L4	-	1	-	2	-	1	-
Chipping Sparrow	*Spizella passerina*	-	-	S5	L5	-	2	-	1	1	4	-
Vesper Sparrow	*Pooecetes gramineus*	-	-	S4	L3	-	-	-	1	-	1	-
Savannah Sparrow	*Passerculus sandwichensis*			S4	L4	A	8	-	14	3	12	-
Song Sparrow	*Melospiza melodia*			S5	L5		6	-	16	15	14	-
Swamp Sparrow	*Melospiza georgiana*			S5	L4		1	-	3	-	1	-
Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4	L2	A	4 (ELC Unit 2b, 2i, 2j)	-	3 (ELC Unit 2j)	1	-	-

Common Name	Scientific Name	National Species at Risk COSEWIC[a]	Species at Risk in Ontario Listing [b]	Provincial breeding season SRANK [c]	TRCA Status [d]	Area-sensitive [d]	May 28, 2020		June 19, 2020		July 4, 2020	
							Subject Property	120 m Buffer Study Area	Subject Property	120 m Buffer Study Area	Subject Property	120 m Buffer Study Area
Red-winged Blackbird	*Agelaius phoeniceus*			S4	L5		31	-	21	7	8	-
Eastern Meadowlark	*Sturnella magna*	THR	THR	S4	L3	A	1 (ELC Unit 2c, 2d)	-	-	1	1 (ELC Unit 2o)	-
Common Grackle	*Quiscalus quiscula*			S5	L5		3	-	2	2	3	-
Baltimore Oriole	*Icterus galbula*			S4	L5		1	1		1	1	-
American Goldfinch	*Spinus tristis*			S5	L5		4	1	6	-	3	-
House Sparrow	*Passer domesticus*			SNA	L+		2	-	3	-	2	-

= Maximum number of breeding pairs recorded on subject property, F = species foraging on / flying over the subject property
a - COSEWIC = Committee on the Status of Endangered Wildlife in Canada: END = Endangered, THR = Threatened, SC = Special Concern
b - Species at Risk in Ontario List (as applies to ESA) as designated by COSSARO (Committee on the Status of Species at Risk in Ontario): END = Endangered, THR = Threatened, SC = Special Concern
c - SRANK (from Natural Heritage Information Centre) for breeding status if: S1 (Critically Imperiled), S2 (Imperiled),S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure) SNA (Not applicable…'because the species is not a suitable target for conservation activities'; includes non-native species)
d - Toronto and Region Conservation Authority L rank (2016): L1 to L3 Regional species of concern from highest to lowest; L4 Urban concern; L5 Secure through region; L+ Non-native
e - Ontario Ministry of Natural Resources (OMNR). 2000. Significant Wildlife Habitat Technical Guide (Appendix G). 151 p plus appendices.

Appendix H

Significant Wildlife Habitat (SWH) Screening for Caledon Station Secondary Plan

Appendix H

Significant Wildlife Habitat (SWH) Screening for Caledon Station Secondary Plan

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
Seasonal Concentration Areas					
1. Waterfowl Stopover and Staging Areas (Terrestrial)					
American Black Duck Wood Duck Mallard Northern Pintail Gadwall Blue-winged Teal Green-winged Teal American Wigeon Northern Shoveler	CUM1 CUT1 Plus evidence of annual spring flooding from malt water or run-off within these Ecosites.	*Suitable Habitat* • Fields with sheet water during Spring (mid-March to May) *Suggested Criteria* Studies carried out and verified presence of an annual concentration of any listed species	No suitable habitat identified on the Subject Lands or within the Study Area.	✘	✘
2. Waterfowl Stopover and Staging Areas (Aquatic)					
Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed duck Surf Scoter White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	*Suitable Habitat* • Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration • Sewage treatment ponds and storm water ponds do not qualify as SWH, however a reservoir managed as a large wetland or pond/lake does qualify • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water) *Suggested Criteria* Studies carried out and verified presence of: • Aggregations of 100 or more of listed species for 7 days, results in > 700 waterfowl use days • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH • Wetland area and shorelines associated with sites identified within the Significant Wildlife Habitat Technical Guide (SWHTG) (MNRF 2000) Appendix K are SWH	All marshes with open water and shallow aquatic ecosites on the Subject Lands are too small to potentially support the required aggregations to be considered Confirmed SWH. Additionally, the Bolton PSW Complex within the Study Area is not productive or large enough to support considered suitable habitat.	✘	✘
3. Shorebird Migratory Stopover Area					
Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2	*Suitable Habitat* • Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats • Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH *Suggested Criteria*	No suitable habitat identified on the Subject Lands or within the Study Area, and none would be expected to occur.	✘	✘

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin	MAM3 MAM4 MAM5	• Presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100 m radius area			
4. Raptor Wintering Area					
Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl Short-eared Owl Bald Eagle	<u>Hawks/Owls:</u> Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM, CUT, CUS, CUW. <u>Bald Eagle:</u> Forest Community Series: FOD, FOM, FOC, SWD, SWM, or SWC on shoreline areas adjacent to large rivers to adjacent to lakes with open water (hunting area).	*Suitable Habitat* • The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors • Raptor wintering (hawk/owl) sites need to be > 20 ha with a combination of forest and upland *Suggested Criteria* Studies confirm the use of these habitats by: • One or more Short-eared Owls or; One of more Bald Eagles or at least 10 individuals and two listed hawk/owl species • To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area	No suitable habitat identified on the Subject Lands or within the Study Area.	✘	✘
5. Bat Hibernacula					
Big Brown Bat Tri-colored Bat	Bat Hibernacula may be in the Ecosites: CCR1 CCR2 CCA1 CCA2	*Suitable Habitat* • Hibernacula may be found in caves, mine shafts, underground foundations and Karsts *Suggested Criteria* • All sites with confirmed hibernating bats are SWH • The area includes 200m radius around the entrance of the hibernaculum for most development types and for wind farms (Note: buildings are not to be considered SWH)	No suitable habitat identified on the Subject Lands or within the Study Area.	✘	✘
6. Bat Maternity Colonies					
Big Brown Bat Silver-haired Bat	Maternity Colonies considered for SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	*Suitable Habitat* • Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH) • Maternity colonies located in mature deciduous or mixed forest stands with >10/ha large diameter (>25cm dbh) wildlife trees • Female bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2 • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred *Suggested Criteria* • Maternity colonies with confirmed use by; – >10 Big Brown Bats – >5 Adult Female Silver-haired Bats	No suitable habitat identified on the Subject Lands or within the Study Area.	✘	✘

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
		The area of the habitat includes the entire woodland or the forest stand ELC ecosite or an ecoelement containing the maternity colonies			
7. Turtle Wintering Areas					
Midland Painted Turtle Northern Map Turtle Snapping Turtle	Snapping and Midland Painted Turtles: ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO. Northern Map Turtles: Open Water areas such as deeper rivers, or streams and lakes with current can also be used as over-wintering habitat.	*Suitable Habitat* • For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH *Suggested Criteria* • Presence of 5 over-wintering Midland Painted Turtles is significant • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant • The mapped ELC ecosite area with the over wintering turtles is the SWH If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH	Midland Painted Turtle and Snapping Turtle have been documented in ponds near the Bolton PSW Complex (Dougan et al. 2014b) and west of the Bolton PSW Complex, east of the railroad tracks within the Study Area, although none have been observed on the Subject Lands. Candidate SWH includes the Bolton PSW Complex and other wetlands or ponds with permanent open water on the Subject Lands. Surveys for this category of SWH were not conducted as part of the CEISMP, and some wetlands were not accessible at the time of this CEISMP. Surveys will be conducted at the draft plan stage to confirm the status of this SWH category.	✓ **Wetlands with Permanent Open Water. While no turtles have been observed on the Subject Lands, we recommend conducting basking surveys in the future.**	✓ **Bolton PSW Complex**
8. Reptile Hibernaculum					
Eastern Gartersnake Northern Water Snake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake Milksnake Eastern Ribbonsnake Five-lined Skink	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Tock Barren, Crevice, Cave and Alvar may be directly related to these habitats. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and ecosite: FOC1 and FOC3.	*Suitable Habitat* • For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations • The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying Candidate SWH • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost • Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover • For five-lined Skink, Community Series FOD and FOM, and FOC1 and FOC3 should be considered. They prefer mixed forests with rock outcrop openings with cover rock overlaying granite bedrock with fissures *Suggested Criteria* Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (e.g., foundation or rocky slope) on sunny warm days in spring	Suitable habitat may be present on the Subject Lands or within the Study Area in sites such as animal burrows within margins of agricultural fields and wetlands, and wetlands that go below the frost line. Additionally, suitable habitat may be present in areas with old, anthropogenic foundations (such as old barns or former railbeds. To date, no snakes have been incidentally recorded on the Subject Lands or within the Study Area. Surveys for this category of SWH were not conducted as part of the CEISMP. Surveys will be conducted at the draft plan stage to confirm the status of this SWH category.	✓ **Natural, Semi-Natural Communities and Areas with Old Anthropogenic Foundations. While no snakes have been observed on the Subject Lands, we recommend conducting basking surveys in the future.**	✓ **Natural and Semi-Natural Communities**
9. Colonially-Nesting Bird Breeding Habitat (Bank and Cliff)					
Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, steep slopes and sand piles. Cliff faces, bridge abutments, silos and barns. Habitat found in the following ecosites: CUM1 CLO1 CUT1 CLS1 CUS1 CLT1 BLO1 BLS1 BLT1	*Suitable Habitat* • Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles • Does not include a licensed/permitted Mineral Aggregate Operation *Suggested Criteria* Studies confirming: • Presence of 1 or more nesting sites with 8 or more cliff swallow pairs or 50 Bank Swallow and/or Rough-winged Swallow pairs during the breeding season	No suitable habitat identified on the Subject Lands or within the Study Area. Bank Swallow was noted by Dougan et al. (2014b) in 2013/2014 within the Study Area, and they assumed that it was simply foraging due to lack of suitable nesting habitat.	✗	✗

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
		A colony identified as SWH will include a 50m radius habitat area from the peripheral nests			
10. Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs)					
Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	*Suitable Habitat* • Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used • Most nests in trees are 11 to 15 m from ground, near the top of the tree *Suggested Criteria* Studies confirming: • Presence of 2 or more active nests of Great Blue Heron or other listed species The habitat extends from the edge of the colony and a minimum 300m radius or extent of the forest ecosite containing the colony or any island <15.0 ha with a colony is the SWH	No suitable habitat identified on the Subject Lands or within the Study Area.	✘	✘
11. Colonially-Nesting Bird Breeding Habitat (Ground)					
Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island to peninsula (natural or artificial) with a lake or larger river. Close proximity or watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird). MAM1-6 MAS1-3 CUM CUT CUS	*Suitable Habitat* • Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas • Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands *Suggested Criteria* Studies confirming: • Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant • Presence of 5 or more pairs for Brewer's Blackbird • The edge of the colony and a minimum 150m area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH	No suitable habitat identified on the Subject Lands or within the Study Area.	✘	✘
12. Migratory Butterfly Stopover Areas					
Painted Lady Red Admiral Monarch	Combination of ELC Community Series; need to have present one Community Series from each land class: <u>Field:</u> CUM CUT CUS <u>Forest:</u> FOC FOD COM CUP A candidate site will have a history of butterflies being observed.	*Suitable Habitat* • A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario or Lake Erie • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest *Suggested Criteria* Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct). MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. • Numbers of butterflies can range from 100-500/day - significant variation can occur between years and multiple years of sampling should occur MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admirals is to be considered significant	Suitable habitat not identified on the Subject Lands or the Study Area due to its distance from Lake Ontario and Lake Erie.	✘	✘

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
13. Landbird Migratory Stopover Areas					
All migratory songbirds	All Ecosites associated with the ELC Community Series; FOC FOM FOD SWC SWM SWD	*Suitable Habitat* • Woodlots >10 ha in size and within 5 km of Lake Ontario and Lake Erie • If multiple woodlands are located along the shoreline those Woodlands <2 km from Lake Erie or Ontario are more significant • Sites have a variety of habitats; forest, grassland and wetland complexes • The largest sites are more significant • Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and located within 5km of Lake Ontario are Candidate SWH *Suggested Criteria* Studies confirm: • Use of the woodlot by >200 birds/day and with >35 species with at least 10 bird spp. recorded on at least 5 different survey dates This abundance and diversity of migrant bird species is considered above average and significant	Suitable habitat not identified on the Subject Lands or the Study Area due to its distance from Lake Ontario and Lake Erie.	✘	✘
14. Deer Yarding Areas					
White-tailed Deer	*Note: MNRF to determine this habitat.* ELC Community Series providing a thermal cover component for a deer yard would include: FOD, FOC, SWM and SWC. Or ELC Ecosites: CUP2, CUP3, FOD3 and CUT	*Suitable Habitat* • Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. Deer establish traditional use areas with two areas called Stratum I and Stratum II • Stratum II covers entire winter yard and is usually in FOD or FOM (or agricultural lands) where browsing can occur. Deer move here in early winter, and will continue to stay here until snow depths reach about 30 cm. • Stratum I is the core of a deer yard, and is found within the Stratum II, and is critical for deer survival in areas where winter is severe. It is primarily coniferous trees with a canopy cover of at least 60% *Suggested Criteria* Studies confirm: • Snow depth and temperature or the greatest influence on deer use of winter yards. Snow depths of >40 cm for more than 60 days are minimum criteria for a deer yard to be considered as SWH • Deer management is an MNRF responsibility, and they field investigations (by aircraft over a series of winters to establish boundaries of Stratum I and II. Deer yarding areas considered significant will be mapped by MNRF If SWH is determined for deer wintering area or if a proposed development is within Stratum II yard areas, then movement corridors are to be considered	No suitable habitat identified on the Subject Lands or the Study Area by MNRF.	✘	✘
15. Deer Winter Congregation Areas					
White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer Plantations much smaller than 50 ha may also be used.	*Suitable Habitat* • Woodlots >100 ha in size. Woodlots <100 ha may be considered significant based on MNRF studies or assessment • Deer movement during winter in Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands • Large woodlots > 100 ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha • Woodlots with high densities of deer due to artificial feeding are not significant *Suggested Criteria* Studies confirm:	No suitable habitat identified on the Subject Lands or the Study Area by MNRF.	✘	✘

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
		• Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF If SWH is determined for deer wintering area or if a proposed development is within Stratum II yard areas, then movement corridors are to be considered			
Rare Vegetation Communities					
16. Cliffs and Talus Slopes					
ELC Communities: TAO, TAS, TAT, CLO, CLS, CLT		• A Cliff is vertical to near vertical bedrock >3m in height • A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris • Most cliff and talus slopes occur along the Niagara Escarpment	Does not occur on the Subject Lands or within the Study Area.	✘	✘
17. Sand Barren					
ELC Communities: SBO1, SBS1, BT1		• Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion • Usually located within other types of natural habitat such as forest or savannah • Vegetation can vary from patchy and barren to tree covered but less than 60% *Suggested Criteria* • A sand barren area >0.5ha in size • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics).	Does not occur on the Subject Lands or within the Study Area.	✘	✘
18. Alvar					
Field studies identify four of the five Alvar indicator species within ELC communities: ALO1, ALS, ALT1, FOC1, FOC2, CUM2, CUS2, CUT2-1, CUW2		• An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil • The hydrology of alvars is complex, with alternating periods of inundation and drought • Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant • Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species • Vegetation cover varies from patchy to barren with a less than 60% tree cover *Suggested Criteria* • An Alvar site > 0.5 ha in size • Five indicator species specific to alvars within Ecoregion 6E: *1) Carex crawei 2) Panicum philadelphicum 3) Eleocharis compressa 4) Scutellaria parvula 5) Trichostema brachiatum* • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics) • The Alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses	Does not occur on the Subject Lands or within the Study Area.	✘	✘
19. Old Growth Forest					
ELC Communities: FOD FOC FOM SWD SWC SWM		• Old-growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris *Suggested Criteria* • Woodland area is >30 ha with at least 10 ha of interior habitat • If dominant trees species of the ecosite are >140 years old, then stand is SWH • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present)	Does not occur on the Subject Lands or within the Study Area.	✘	✘

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
		• The area of forest ecosites combined or an eco-element within an ecosite that contain the old growth characteristics is the SWH			
20. Savannah					
ELC Communities: TPS1 TPS2 TPW1 TPW2 CUS2		• A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60% *Suggested Criteria* • No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH • Field studies confirm one or more of the Prairie indicator species listed in Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 6E should be used • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)	Does not occur on the Subject Lands or within the Study Area.	✘	✘
21. Tallgrass Prairie					
ELC Communities: TPO1 TPO2		• A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover • In ecoregion 6E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario) *Suggested Criteria* • No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH • ELC communities TPO1, TPO2 • Field studies confirm one or more of the Prairie indicator species listed in Appendix N in SWHTG (MNRF 2000) should be present. Prairie plant spp. list from Ecoregion 6E should be used • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)	Does not occur on the Subject Lands or within the Study Area.	✘	✘
22. Other Rare Vegetation Communities					
		• Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG (MNRF 2000) • Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps • ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in SWHTG (MNRF 2000) Appendix M • The MNRF/NHIC will have up to date listing for rare vegetation communities	Does not occur on the Subject Lands or within the Study Area.	✘	✘
Specialized Habitat for Species					
23. Waterfowl Nesting Area					
American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1, MAS2, MAS3 SAS1, SAM1, SAF1 MAM1, MAM2, MAM3, MAM4, MAM5, MAM6 SWT1, SWT2, SWD1, SWD2, SWD3, SWD4 Note: Includes adjacency to Provincially Significant Wetlands	*Suitable Habitat* • A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a wetland (>0.5 ha) with small wetlands (<0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur • Upland areas should be at least 120m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests *Suggested Criteria* Studies confirm: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or presence of 10 or more nesting pairs for listed species including Mallards • Any active nesting site of an American Black Duck is considered significant	Suitable habitat is present on the Subject Lands and within the Study Area in the vicinity of ponds, however surveys conducted as part of the CEISMP did not document adequate numbers of listed species.	✘	✘

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
		Wood Ducks and Hooded Mergansers utilize large diameter trees (>40 cm dbh) in woodlands for cavity nest sites			
24. Bald Eagle and Osprey Nesting, Foraging and Perching Habitat					
Osprey Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM, SWC directly adjacent to riparian areas - rivers, lakes, ponds and wetlands.	*Suitable Habitat* • Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms) *Suggested Criteria Studies confirm the use of these nests by:* • One or more active Osprey or Bald Eagle nests in an area • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH [ccvii], maintaining undisturbed shorelines with large trees within this area is important • For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant	No suitable habitat identified on the Subject Lands or within the Study Area.	✘	✘
25. Woodland Raptor Nesting Habitat					
Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in: SWC SWM SWD CUP3	*Suitable Habitat* • All natural or conifer plantation woodland/forest stands combined >30ha or with >4 ha of interior habitat; interior habitat determined with a 200 m buffer • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore island • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest *Suggested Criteria* Studies confirm: • Presence of 1 or more active nests from species list is considered significant • Red-shouldered Hawk and Northern Goshawk – a 400m radius around the nest or 28 ha of suitable habitat is the SWH. (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest)	No suitable habitat identified on the Subject Lands or within the Study Area.	✘	✘

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
		• Barred Owl – a 200m radius around the nest is the SWH • Broad-winged Hawk and Coopers Hawk,– a 100m radius around the nest is the SWH Sharp-Shinned Hawk – a 50m radius around the nest is the SWH			
26. Turtle Nesting Areas					
Midland Painted Turtle Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100 m) to within the following Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	*Suitable Habitat* • Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas • Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used *Suggested Criteria* Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles • One or more Northern Map Turtle or Snapping Turtle nesting • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependant on slope, riparian vegetation and adjacent land use is the SWH Travel routes from wetland to nesting area are to be considered within the SWH	Midland Painted Turtle and Snapping Turtle have been documented in ponds near the Bolton PSW Complex (Dougan et al. 2014b) and west of the Bolton PSW Complex, east of the railroad tracks within the Study Area, although none have been observed on the Subject Lands. Candidate SWH includes the exposed mineral soil adjacent to the Bolton PSW Complex and other wetlands or ponds with permanent open water on the Subject Lands. Surveys for this category of SWH were not conducted as part of the CEISMP, and some wetlands with open water were not accessible at the time of this CEISMP. Surveys will be conducted at the draft plan stage to confirm the status of this SWH category.	✓ **Wetlands with Permanent Open Water. While no turtles have been observed on the Subject Lands, we recommend conducting basking surveys and searches for turtle nests in the future.**	✓ **Bolton PSW Complex**
27. Seeps and Springs					
Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Seeps and springs are areas where ground water comes to the surface. Often, they are found within headwater areas within forested habitats. Any forested Ecosite within headwater areas of a stream could have seeps/springs.	*Suitable Habitat* • Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system (could contain a seep or spring - areas where ground water comes to the surface) • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species • The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat *Suggested Criteria* Studies confirm: • Presence of a site with 2 or more seeps/springs should be considered SWH The area of an ELC forest ecosite containing the seeps/springs is the SWH	According to the work completed by DS Consultant Ltd. (2020), seepage has been observed in three areas within the subject lands. However, none of these seepage areas are associated with a forest. Please refer to DS Consultant Ltd. (2020) for more detail.	✘	✘

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
28. Amphibian Breeding Habitat (Woodland)					
Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated within these ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD Breeding pools within the woodland or the shortest distance from the forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	*Suitable Habitat* • Presence of a wetland, pond, or woodland pool within or adjacent (within 120m) to a woodland (no minimum size) • Some small wetlands may not be mapped and may be important breeding pools for amphibians • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat *Suggested Criteria* Studies confirm: Presence of breeding population of 1 or more of the listed salamander species or 2 or more of the listed frog species with at least 20 individuals (adults, juveniles, eggs/larval masses) or 2 or more of the listed frog species with Call Level Codes of 3	No suitable habitat identified on the Subject Lands or within the Study Area.	✘	✘
29. Amphibian Breeding Habitat (Wetland)					
Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	Classes SW, MA, FE, BO, OA and SA. Typically, these wetland Ecosites will be isolated >120 m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bullfrog) may be adjacent to woodland.	*Suitable Habitat* • Wetlands >500 m^2 (about 25 m diameter) supporting high species diversity are significant • Some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators • Bullfrogs require permanent water bodies with abundant emergent vegetation *Suggested Criteria* Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog or toad species and with at least 20 individuals (adults, juveniles, eggs/larval masses) or 2 or more of the listed frog species with Call Level Codes of 3 The ELC ecosite wetland area and the shoreline are the SWH	Minimal suitable habitat is present in the southern and eastern portions of the Subject Lands and within the Study Area. Amphibian surveys completed to date have not observed the required threshold of breeding amphibians to classify the habitats as significant.	✘	✘
30. Woodland Area-Sensitive Bird Breeding Habitat					
Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	*Suitable Habitat* • Habitats where interior forest breeding birds are breeding • Typically large mature (>60 yrs old) forest stands or woodlots >30 ha • Interior forest habitat is at least 200 m from forest edge habitat *Suggested Criteria* Studies confirm: • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. Any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH	No suitable habitat or associated species identified on the Subject Lands or within the Study Area.	✘	✘
Habitat for Species of Conservation Concern					
31. Marsh Bird Breeding Habitat					

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan Black Tern Yellow Rail	MAM 1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	*Suitable Habitat* • Nesting occurs in wetlands • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water *Suggested Criteria* Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species • Note: any wetland with breeding of 1 or more Trumpeter Swans, Black Terns or Yellow Rail is SWH • Area of the ELC ecosite is the SWH	Minimal suitable habitat is present in the southern and eastern portions of the Subject Lands; however, no listed species were recorded on the Subject Lands or within the Study Area.	✘	✘
32. Open Country Bird Breeding Habitat					
Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow Short-eared Owl	CUM1 CUM2	*Suitable Habitat* • Large grassland areas (includes natural and cultural fields and meadows) >30 ha • Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years) • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older • The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species *Suggested Criteria* Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species • A field with 1 or more breeding Short-eared Owls is to be considered SWH. The area of SWH is the contiguous ELC ecosite field areas	No suitable habitat is present on the Subject Lands or within the Study Area. The majority of the Study Area is row cropped and rotated on an annual basis.	✘	✘
33. Shrub/Early Successional Bird Breeding Habitat					
<u>Indicator Species</u>: Brown Thrasher Clay-coloured Sparrow <u>Common Species:</u> Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher <u>Special Concern:</u> Yellow-breasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	*Suitable Habitat* • Large natural field areas succeeding to shrub and thicket habitats >10ha in size. Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years) • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands *Suggested Criteria* Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat The area of the SWH is the contiguous ELC ecosite field/thicket area	No suitable habitat is present on the Subject Lands or within the Study Area. The majority of the Study Area is row cropped and rotated on an annual basis.	✘	✘

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
34. Terrestrial Crayfish					
Chimney or Digger Crayfish (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish (*Cambarus Diogenes*)	MAM1, MAM2, MAM3, MAM4, MAM5, MAM6 MAS1, MAS2, MAS3 SWD, SWT, SWM CUM1 within inclusions of above meadow marsh or swamp ecosites can be used by terrestrial crayfish.	*Suitable Habitat* • Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish • Constructs burrows in marshes, mudflats, meadows; the ground can't be too moist • Can often be found far from water • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels; usually the soil is not too moist so that the tunnel is well formed *Suggested Criteria* Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites Area of ELC Ecosite polygon is the SWH	No evidence of Terrestrial Crayfish was documented during field studies.	✘	✘
35. Special Concern and Rare Wildlife Species					
		• All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species • When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially rare species • Linking candidate habitat on the site needs to be completed to ELC Ecosites *Suggested Criteria* Studies confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable • Habitat form and function needs to be assessed from the assessment of ELC vegetation types and an area of significant habitat that protects the rare or special concern species identified • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH; this must be delineated through detailed field studies • The habitat needs be easily mapped and cover an important life stage component for a species (e.g. specific nesting habitat or foraging habitat)	Suitable habitat occurs on the Subject Lands and within the Study Area for several Special Concern and Provincially Rare (S1-S3, SH): • Snapping Turtle (Special Concern): Potentially suitable habitat is present within the wetland habitat on the Subject Lands and within the Bolton PSW Complex within the Study Area. • Monarch (Special Concern): Potentially suitable habitat may be present within the meadow habitat on the Subject Lands and within the Study Area. Surveys for this category of SWH were not conducted as part of the CEISMP. Surveys will be conducted at the draft plan stage to confirm the status of this SWH category.	✓ **Wetlands and meadows**	✓ **Bolton PSW Complex**
Animal Movement Corridors					
36. Amphibian Movement Corridors					
Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog		• Amphibian movement corridors should only be identified as SWH where a confirmed or Candidate SWH has been identified by MNRF or the planning authority • Movement corridors between breeding habitat and summer habitat • Movement corridors must be considered when amphibian breeding habitat is confirmed as SWH • Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites • Corridors should consist of native vegetation, with several layers of vegetation • Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant • Corridors should be at least 15 m of vegetation on both sides of waterway or be up to 200 m wide of woodland habitat and with gaps <20 m • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat	Amphibian breeding habitat (woodland and wetland) was not a Candidate SWH type found on the Subject Lands or within the Study Area.	✘	✘

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities	Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands and Study Area	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
37. Deer Movement Corridors				
White-tailed Deer	• Deer movement corridors should only be identified as SWH where a confirmed or Candidate SWH has been identified by MNRF or the planning authority • Corridors follow riparian areas, woodlots, areas of physical geography (ravines or ridges) • Field Studies must be conducted at the time of year when species are expected to be migrating or moving to and from winter concentration areas • Corridors that lead deer to wintering habitat should be unbroken by roads or residential areas • Corridors should be at least 200 m wide with gaps less than 20 m, and if following a riparian area, there must be at least 15 m of vegetation on both sides of the waterway	No deer movement corridors meeting the SWH criteria have been identified by MNRF to date on the Subject Lands or within the Study Area.	✘	✘

* Adapted from the listed species and habitat criteria provided in the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF 2015) but updated to reflect any relevant changes in species status. For example, Tri-coloured Bat (*Perimyotis subflavus*) is now listed as Threatened so needs to be addressed as a Species at Risk under the Endangered Species Act (2007) and not under SWH.

Appendix I

Species at Risk (SAR) Screening for Caledon Station Secondary Plan

Appendix I

Species at Risk (SAR) Screening for Caledon Station Secondary Plan

Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Potentially Suitable Habitat Present within the Subject Lands or Study Area	Likelihood of Presence
Western Chorus Frog *Pseudacris triseriata*	No Status	THR Schedule 1	THR	Western Chorus Frogs inhabit lowland areas such as marshes and wooded wetland areas. Like most frogs, it needs terrestrial and aquatic habitats near each other to carry out its life cycle. For breeding purposes, Western Chorus Frog utilizes seasonally dry, temporary ponds devoid of predators, such as fish. They are rarely found in permanent ponds. This species hibernates in terrestrial habitats under rocks, dead trees or leaves, loose soil or animal burrows.	In southern Ontario, Western Chorus Frog's range is bounded by the United States border in the south, Georgian Bay in the northwest, and south of Algonquin Park and up the Ottawa River valley to the vicinity of Eganville in the east. This species is divided into two distinct populations: the Carolinian population (southwestern Ontario) and the Great Lakes/St. Lawrence–Canadian Shield population (other regions of Ontario). Only the Canadian Shield population as been listed as Threatened federally.	**Yes** Potentially suitable habitat is present within the wetland habitat on the Subject Lands and within the Bolton PSW complex/other wetlands within the Study Area.	**Not present** (species not located on Subject Lands or within the Study Area during targeted field surveys in 2013, 2014 and 2020)
Acadian Flycatcher *Empidonax virescens*	END	END Schedule 1	END	In Ontario, the Acadian Flycatcher primarily lives in the warmer climate of southern Ontario's Carolinian forests. It needs large, undisturbed forests, often more than 40 hectares in size. It is typically found in mature, shady forests with ravines, or in forested swamps with lots of maple and beech trees. The nest is placed near the tip of a lower limb on a tree, and is loosely woven, with strands of plant material hanging down.	In Canada, the Acadian Flycatcher nests only in southwestern Ontario, mostly in large forests and forested ravines near the shore of Lake Erie. It has also been known to nest at a few sites in the Greater Toronto Area, but this is unusual. The Acadian Flycatcher population in Ontario is very small, with 25 to 75 breeding pairs recorded in 2010.	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Bank Swallow *Riparia riparia*	THR	THR Schedule 1	THR	Bank Swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable. The birds breed in colonies ranging from several to a few thousand pairs.	The Bank Swallow is found across southern Ontario, with sparser populations scattered across northern Ontario. The largest populations are found along the Lake Erie and Lake Ontario shorelines, and the Saugeen River (which flows into Lake Huron).	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Barn Swallow *Hirundo rustica*	SC	THR Schedule 1	SC	Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. The species is attracted to open structures that include ledges where they can build their nests, which are often re-used from year to year. They prefer unpainted, rough-cut wood, since the mud does not adhere as well to smooth surfaces.	The Barn Swallow may be found throughout southern Ontario and can range as far north as Hudson Bay, wherever suitable locations for nests exist.	**Yes** Potentially suitable habitat is present within the buildings on the Subject Lands and within the Study Area.	**Not Present** (species located on the Subject Lands and within the Study Area during targeted field surveys in 2013, 2014 and 2020, and was nesting within the Study Area in 2020; however, no breeding was confirmed on the Subject Lands in 2020)
Bobolink *Dolichonyx oryzivorus*	THR	THR Schedule 1	THR	Historically, Bobolinks lived in North American tallgrass prairie and other open meadows. With the clearing of native prairies, Bobolinks moved to living in hayfields. Bobolinks often build their small nests on the ground in dense grasses. Both parents usually tend to their young, sometimes with a third Bobolink helping.	The Bobolink breeds across North America. In Ontario, it is widely distributed throughout most of the province south of the boreal forest, although it may be found in the north where suitable habitat exists.	**Yes** Potentially suitable habitat may be present within the field habitat on the Subject Lands or within the Study Area.	**Present** (species located on the Subject Lands and within the Study Area during targeted

Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Potentially Suitable Habitat Present within the Subject Lands or Study Area	Likelihood of Presence
							field surveys in 2013, 2014 and 2020; however, no breeding was confirmed on the Subject Lands during the final survey in 2020)
Canada Warbler *Wilsonia canadensis*	SC	THR Schedule 1	THR	The Canada Warbler breeds in a range of deciduous and coniferous, usually wet forest types, all with a well- developed, dense shrub layer. Dense shrub and understory vegetation help conceal Canada Warbler nests that are usually located on or near the ground on mossy logs or roots, along stream banks or on hummocks.	The Canada Warbler only breeds in North America and 80 per cent of its known breeding range is in Canada. Its primary breeding range is in the Boreal Shield, extending north into the Hudson Plains and south into the Mixedwood Plains. Although the Canada Warbler breeds at low densities across its range, in Ontario, it is most abundant along the Southern Shield.	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Cerulean Warbler *Dendroica cerulea*	THR	END Schedule 1	END	Cerulean Warblers spend their summers (breeding seasons) in mature, deciduous forests with large, tall trees and an open under storey. In late summer, they begin their long migration to wintering grounds in the Andes Mountains in South America.	In Canada, the Cerulean Warbler's breeding range extends from extreme southwestern Quebec to southern Ontario. In southern Ontario, populations appear to be separated into two distinct bands: one from southern Lake Huron to western Lake Ontario, and further north, the other from the Bruce Peninsula and Georgian Bay area to the Ottawa River.	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Chimney Swift *Chaetura pelagica*	THR	THR Schedule 1	THR	Before European settlement Chimney Swifts mainly nested on cave walls and in hollow trees or tree cavities in old growth forests. Today, they are more likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other manmade structures. They also tend to stay close to water as this is where the flying insects they eat congregate.	The Chimney Swift breeds in eastern North America, possibly as far north as southern Newfoundland. In Ontario, it is most widely distributed in the Carolinian zone in the south and southwest of the province but has been detected throughout most of the province south of the 49th parallel. It winters in northwestern South America.	**Yes** Potentially suitable habitat is present within the buildings on the Subject Lands and within the Study Area.	**Not present** (species not located on Subject Lands or within the Study Area during targeted field surveys in 2013, 2014 and 2020)
Common Nighthawk *Chordeiles minor*	SC	THR Schedule 1	SC	Traditional Common Nighthawk habitat consists of open areas with little to no ground vegetation, such as logged or burned-over areas, forest clearings, rock barrens, peat bogs, lakeshores, and mine tailings. Although the species also nests in cultivated fields, orchards, urban parks, mine tailings and along gravel roads and railways, they tend to occupy natural sites.	The range of the Common Nighthawk spans most of North and Central America. In Canada, the species is found in all provinces and territories except Nunavut. In Ontario, the Common Nighthawk occurs throughout the province except for the coastal regions of James Bay and Hudson Bay.	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Eastern Meadowlark *Sturnella magna*	THR	THR Schedule 1	THR	Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs or fence posts are used as elevated song perches.	In Ontario, the Eastern Meadowlark is primarily found south of the Canadian Shield, but it also inhabits the Lake Nipissing, Timiskaming and Lake of the Woods areas.	**Yes** Potentially suitable habitat may be present within the field habitat on the Subject Lands and within the Study Area.	**Present** (species located on the Subject Lands and within the Study Area during targeted field surveys in 2013, 2014 and 2020; breeding confirmed on the Subject Lands during the final survey in 2020)

Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Potentially Suitable Habitat Present within the Subject Lands or Study Area	Likelihood of Presence
Eastern Whip-poor-will *Caprimulgus vociferus*	THR	THR Schedule 1	THR	The Eastern Whip-poor-will is usually found in areas with a mix of open and forested areas, such as savannahs, open woodlands, or openings in more mature, deciduous, coniferous and mixed forests. It forages in these open areas and uses forested areas for roosting (resting and sleeping) and nesting. It lays its eggs directly on the forest floor, where its colouring means it will easily remain undetected by visual predators.	The Eastern Whip-poor-will's breeding range includes two widely separate areas. It breeds throughout much of eastern North America, reaching as far north as southern Canada and also from the southwest United States to Honduras. In Canada, the Whip-poor-will can be found from east-central Saskatchewan to central Nova Scotia and in Ontario they breed as far north as the shore of Lake Superior.	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Eastern Wood-Pewee *Contopus virens*	SC	SC Schedule 1	SC	The Eastern Wood-pewee lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in intermediate-age mature forest stands with little understory vegetation.	The eastern wood-pewee is found across most of southern and central Ontario, and in northern Ontario as far north as Red Lake, Lake Nipigon and Timmins.	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Golden-winged Warbler *Vermivora chrysoptera*	SC	THR Schedule 1	THR	Golden-winged Warblers prefer to nest in areas with young shrubs surrounded by mature forest – locations that have recently been disturbed, such as field edges, hydro or utility right-of-ways, or logged areas.	In Ontario the Golden-winged Warbler breed in central-eastern Ontario, as far south as Lake Ontario and the St. Lawrence River, and as far north as the northern edge of Georgian Bay. Golden-winged Warblers have also been found in the Lake of the Woods area near the Manitoba border, and around Long Point on Lake Erie.	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Grasshopper Sparrow *Ammodramus savannarum*	SC	SC Schedule 1	SC	It lives in open grassland areas with well-drained, sandy soil. It will also nest in hayfields and pasture, as well as alvars, prairies and occasionally grain crops such as barley. It prefers areas that are sparsely vegetated. Its nests are well-hidden in the field and woven from grasses in a small cup-like shape.	The Grasshopper Sparrow can be found throughout southern Ontario, but only occasionally on the Canadian Shield. It is most common where grasslands, hay or pasture dominate the landscape.	**Yes** Potentially suitable habitat may be present within the field habitat on the Subject Lands and within the Study Area.	**Not present** (species not located on Subject Lands or within the Study Area during targeted field surveys in 2013, 2014 and 2020)
Least Bittern *Ixobrychus exilis*	THR	THR Schedule 1	THR	In Ontario, the Least Bittern is found in a variety of wetland habitats, but strongly prefers cattail marshes with a mix of open pools and channels. This bird builds its nest above the marsh water in stands of dense vegetation, hidden among the cattails. The nests are almost always built near open water, which is needed for foraging. This species eats mostly frogs, small fish, and aquatic insects.	In Ontario, the Least Bittern is mostly found south of the Canadian Shield, especially in the central and eastern part of the province. Small numbers also breed occasionally in northwest Ontario. This species has disappeared from much of its former range, especially in southwestern Ontario, where wetland loss has been most severe. In winter, Least Bitterns migrate to the southern United States, Mexico and Central America.	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Prothonotary Warbler *Protonotaria citrea*	END	END Schedule 1	END	In Ontario, the Prothonotary Warbler is found in the warmer climate of the Carolinian deciduous forests. It nests in small, shallow holes, found low in the trunks of dead or dying trees standing in or near flooded woodlands or swamps. They will also readily use properly placed artificial nest boxes. Silver maple, ash, and yellow birch are common trees in these habitats. The Prothonotary is the only warbler in eastern North America that nests in tree cavities, where it typically lays four to six eggs on a cushion of moss, leaves and plant fibres.	In Canada, the Prothonotary Warbler is only known to nest in southwestern Ontario, primarily along the north shore of Lake Erie. Over half of the small and declining population is found in Rondeau Provincial Park. In 2005, it was estimated that there were only between 28-34 individuals in Ontario.	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Red-headed Woodpecker *Melanerpes erythrocephalus*	SC	THR Schedule 1	END	The Red-headed Woodpecker lives in open woodland and woodland edges, and is often found in parks, golf courses and cemeteries. These areas typically have many dead trees, which the bird uses for nesting and perching. This woodpecker regularly winters in the United States, moving to locations where it can find sufficient acorns and beechnuts to eat. A few of these	The Red-headed Woodpecker is found across southern Ontario, where it is widespread but rare. Outside Ontario, it lives in Alberta, Saskatchewan, Manitoba and Quebec, and is relatively common in the United States.	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-

Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Potentially Suitable Habitat Present within the Subject Lands or Study Area	Likelihood of Presence
				birds will stay the winter in woodlands in southern Ontario if there are adequate supplies of nuts.			
Short-eared Owl *Asio flammeus*	SC	SC Scheudle 1	SC	The Short-eared Owl lives in open areas such as grasslands, marshes and tundra where it nests on the ground and hunts for small mammals, especially voles.	The Short-eared Owl has a world-wide distribution, and in North America its range extends from the tundra south to the central United States. In Ontario, the species has a scattered distribution, found along the James Bay and Hudson Bay coastlines, along the Ottawa River in eastern Ontario, in the far west of the Rainy River District, and elsewhere in southern Ontario, at places such as Wolfe and Amherst Islands near Kingston. Most northern populations are migratory, moving southward in the winter.	**Yes** Potentially suitable habitat may be present within the field and wetland habitat on the Subject Lands and within the Study Area.	**Not present** (species not located on Subject Lands or within the Study Area during day/night field surveys in 2013, 2014 and 2020)
Wood Thrush *Hylocichla mustelina*	SC	THR Schedule 1	THR	The Wood Thrush lives in mature deciduous and mixed (conifer-deciduous) forests. They seek moist stands of trees with well-developed undergrowth and tall trees for singing perches. These birds prefer large forests, but will also use smaller stands of trees. They build their nests in living saplings, trees or shrubs, usually in sugar maple or American beech.	The wood thrush is found all across southern Ontario. It is also found, but less common, along the north shore of Lake Huron, as far west as the southeastern tip of Lake Superior. There is a very small population near Lake of the Woods in northwestern Ontario, and there have been scattered sightings in the mixed forest of northern Ontario.	**No** Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Redside Dace *Clinostomus elongatus*	END	END Schedule 1	END	The Redside Dace is found in pools and slow-moving areas of small streams and headwaters with a gravel bottom. They are generally found in areas with overhanging grasses and shrubs, and can leap up to 10 cm out of the water to catch insects. During spawning, they can be found in shallow parts of streams, which are also popular spawning areas for other minnow species.	In Canada, Redside Dace are found in a few tributaries of Lake Huron, in streams flowing into western Lake Ontario, the Holland River (which flows into Lake Simcoe), and Irvine Creek of the Grand River system (which flows into Lake Erie).	**Yes** Potential suitable habitat is present within the watercourses on the Subject Lands and within the Study Area.	**Present** (Contributing Redside Dace habitat is mapped on the Subject Lands and within the Study Area by the MNRF)
Monarch *Danaus plexippus*	SC	SC Schedule 1	END	Throughout their life cycle, Monarchs use three different types of habitat. Only the caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of wildflowers.	The Monarch's range extends from Central America to southern Canada. In Canada, Monarchs are most abundant in southern Ontario and Quebec where milkweed plants and breeding habitat are widespread. During late summer and fall, Monarchs from Ontario migrate to central Mexico where they spend the winter months. During migration, groups of Monarchs numbering in the thousands can be seen along the north shores of Lake Ontario and Lake Erie.	**Yes** Potentially suitable habitat may be present within the meadow habitat on the Subject Lands and within the Study Area.	**Moderate** (Milkweed is present on the Subject Lands and within the Study Area)
Eastern Small-footed Myotis (Bat) *Myotis leibii*	END	No Status	No Status	In the spring and summer, eastern small-footed bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. These bats often change their roosting locations every day. At night, they hunt for insects to eat, including beetles, mosquitos, moths, and flies. In the winter, these bats hibernate, most often in caves and abandoned mines. They seem to choose colder and drier sites than similar bats and will return to the same spot each year.	The Eastern Small-footed bat has been found from south of Georgian Bay to Lake Erie and east to the Pembroke area. There are also records from the Bruce Peninsula, the Espanola area, and Lake Superior Provincial Park. Most documented sightings are of bats in their winter hibernation sites.	**Yes** Potentially suitable habitat is present within the swamp and buildings on the Subject Lands and within the buildings in the Study Area.	**Very Low**
Little Brown Myotis (Bat) *Myotis lucifugus*	END	END Schedule 1	END	Bats are nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. Bats can squeeze through very tiny spaces (as small as six millimetres across) and this is how they access many roosting areas. Little brown bats hibernate from October or November to	The Little Brown Myotis is widespread in southern Ontario and found as far north as Moose Factory and Favourable Lake. Outside Ontario, this bat is found across Canada (except in Nunavut) and most of the United States.	**Yes** Potentially suitable habitat is present within the swamp and buildings on the Subject Lands and within the buildings in the Study Area.	**Moderate**

Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Potentially Suitable Habitat Present within the Subject Lands or Study Area	Likelihood of Presence
				March or April, most often in caves or abandoned mines that are humid and remain above freezing. This species can typically be associated with any community where suitable roosting (i.e. cavity trees, houses, abandoned buildings, barns, etc.) habitat is available.			
Northern Myotis *(Bat)* *Myotis septentrionalis*	END	END Schedule 1	END	Northern Myotis bats are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines.	The Northern Myotis is found throughout forested areas in southern Ontario, to the north shore of Lake Superior and occasionally as far north as Moosonee, and west to Lake Nipigon.	**Yes** Potentially suitable habitat is present within the swamp and buildings on the Subject Lands and within the buildings in the Study Area.	**Low**
Tricoloured Bat *Perimyotis subflavus*	END	END Schedule 1	END	Tricoloured Bat inhabits a variety of forested communities, and will roost older forests and barns (or other structures). Foraging habitats include areas over water and streams. They hibernate in cave where they typically roost independently rather than in groups.	Tricoloured Bat is found in southern Ontario, where its northern limit is in proximity to Sudbury. Due to its rarity, their distribution is scattered.	**Yes** Potentially suitable habitat is present within the swamp and buildings on the Subject Lands and within the buildings in the Study Area.	**Very Low**
Butternut *Juglans cinerea*	END	END Schedule 1	END	In Ontario, Butternut usually grows alone or in small groups in deciduous forests. It prefers moist, well-drained soil and is often found along streams. It is also found on well-drained gravel sites and rarely on dry rocky soil. This species does not do well in the shade, and often grows in sunny openings and near forest edges.	Butternut can be found throughout central and eastern North America. In Canada, Butternut occurs in Ontario, Quebec and New Brunswick. In Ontario, this species is found throughout the southwest, north to the Bruce Peninsula, and south of the Canadian Shield.	**Yes** Potentially suitable habitat is present within the woodland and hedgerow habitat on the Subject Lands and within the Study Area.	**Not present** (species not located on Subject Lands or within the Study Area during targeted field surveys in 2013, 2014 and 2020)
Blanding's Turtle *Emydoidea blandingii*	THR	THR Schedule 1	END	Blanding's Turtles live in shallow water, usually in large wetlands and shallow lakes with lots of water plants. It is not unusual, though, to find them hundreds of metres from the nearest water body, especially while they are searching for a mate or traveling to a nesting site. Blanding's Turtles hibernate in the mud at the bottom of permanent water bodies from late October until the end of April.	The Blanding's Turtle is found in and around the Great Lakes Basin, with isolated populations elsewhere in the United States and Canada. In Canada, the Blanding's Turtle is separated into the Great Lakes-St. Lawrence population and the Nova Scotia population. Blanding's Turtles can be found throughout southern, central and eastern Ontario.	**Yes** Potentially suitable habitat is present within the Bolton PSW complex in the Study Area and could potentially transverse the Subject Lands.	**Not Present** (Species record located far from Study Area; Blanding's Turtle would not be able to travel to Study Area)
Eastern Ribbonsnake *Thamnophis sauritus*	SC	SC Schedule 1	SC	The Eastern Ribbonsnake is usually found close to water, especially in marshes, where it hunts for frogs and small fish. A good swimmer, it will dive in shallow water, especially if it is fleeing from a potential predator. At the onset of cold weather, these snakes congregate in underground burrows or rock crevices to hibernate together.	In Ontario the eastern Ribbonsnake occurs throughout southern and eastern Ontario and is locally common in parts of the Bruce Peninsula, Georgian Bay and eastern Ontario.	**Yes** Potentially suitable habitat is present within the wetland habitat on the Subject Lands and within the Bolton PSW complex within the Study Area.	**Not Present** Species record from 1984.
Snapping Turtle *Chelydra serpentina*	SC	SC Schedule 1	SC	Snapping Turtles spend most of their lives in water. They prefer shallow waters so they can hide under the soft mud and leaf litter, with only their noses exposed to the surface to breathe. During the nesting season, from early to mid summer, females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	The Snapping Turtle's range extends from Ecuador to Canada. In Canada this turtle can be found from Saskatchewan to Nova Scotia. It is primarily limited to the southern part of Ontario. The Snapping Turtle's range is contracting.	**Yes** Potentially suitable habitat is present within the wetland habitat on the Subject Lands and within the Bolton PSW complex in the Study Area.	**Moderate** (species located within the Study Area close to the Bolton PSW complex by Dougan *et al*. (2014b); species not located in 2020)

Glossary

EXP	ESA - Extirpated - a species that no longer exists in the wild in Ontario but still occurs elsewhere.
	SARA - Extirpated - a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
END	ESA - Endangered - a species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act.
	SARA - Endangered - a wildlife species that is facing imminent extirpation or extinction.
THR	ESA - Threatened - a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
	SARA - Threatened - a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
SC	ESA - Special Concern (formerly Vulnerable) - a species with characteristics that make it sensitive to human activities or natural events.
	SARA - Special Concern - a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
MNRF	Ontario Ministry of Natural Resources and Forestry
ESA	Endangered Species Act (Provincial)
SARA	Species at Risk Act (Federal)
Schedule 1	The official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2	Species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3	Species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
COSEWIC	Committee on the Status of Endangered Wildlife in Canada - a committee of experts that assesses and designates which wild species are in some danger of disappearing from Canada.

References

1 - Species at Risk. Ontario Ministry of Natural Resources and Forestry. http://www.mnr.gov.on.ca/en/Business/Species/index.html. © Queens Printer for Ontario, 2013.

2 - Species at Risk Status Reports. Committed on the Status of Endangered Wildlife in Canada. Ottawa. http://www.sararegistry.gc.ca/search/advSearchResults_e.cfm?stype=doc&docID=18.