

TOWN OF CALEDON
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Comprehensive Environmental Impact Study and Management Plan Mayfield West Phase 1 – Stage 2 Expansion Area

Prepared For:
Argo Kennedy Limited

Prepared By:
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Date: **August 30, 2021** *Project:* **219527.1**



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1. Introduction

Beacon Environmental Limited (Beacon), in collaboration with David Schaeffer Engineering Ltd. (DSEL), Glen Schnarr and Associates Inc. (GSAI) and DS Consultants Inc. (DS) have been retained by Argo Kennedy Limited (the proponent) to prepare a Comprehensive Environmental Impact Study and Management Plan (CEISMP) in support of a Local Official Plan Amendment (LOPA) application for lands identified as Parts of Lot 22, Concession 1 and 2 East of Hurontario Street (Chinguacousy) in the Town of Caledon, Regional Municipality of Peel (hereafter referred to as the “subject lands”). These lands were previously identified as Future Potential Growth Area in the CEISMP for the Mayfield West Community Development Plan Area (Dillon *et al.* 2007). The purpose of the LOPA is to bring the subject lands into the Mayfield West Rural Service Centre and assign land use designations and policies for urban uses.

The subject lands are bordered by Highway 10 to the west, Old School Road to the north and the Greenbelt to the east. The limits of the subject lands and delineation of the three main land parcels, identified from west to east as the Newhouse, Hicks and Russell parcels, are outlined on **Figure 1**. Enclosed within the Mayfield West Community Development Plan Area, the subject lands are located immediately to the north of the existing Mayfield West Phase 1 Community.

Most of the subject lands are currently under agricultural use. Natural heritage features associated with the subject lands include woodlands and wetlands that are associated with tributaries of Etobicoke Creek and the West Humber River. Schedule B of The Town of Caledon Official Plan designates most of the subject lands as ‘Prime Agricultural’. It also identifies the forest, wetlands, watercourses as ‘Environmental Policy Area’ (EPA). Additionally, the West Humber tributary (identified officially as Kamanga Creek by MECP; or locally by TRCA as Campbell’s Cross Creek) is designated as Greenbelt Protected Countryside. Both tributaries are recognized as an ‘Environmentally Sensitive Area’ and represent ‘Core Areas’ that form part of the Region of Peel ‘Greenlands System’. The portion of Kilmanagh Creek that traverses the Russell parcel is identified as part of the Greenbelt Plan Area as per the Town’s OP. Portions of the Etobicoke Creek Headwater Provincially Significant Wetland (PSW) Complex are located to the north and south of the subject lands.

The Newhouse and Hicks parcels are associated with tributaries to Etobicoke Creek and the Russell property is associated with Kilmanagh Creek (**Figure 1**). Russell is a non-participating landowner, so investigations, for the time being, are limited primarily to background review.

Town of Caledon policies require that a CEISMP be prepared in support of applications for settlement area expansion or development that are adjacent to EPA. The purpose of a CEISMP is to characterize existing biophysical conditions and ecological functions, identify constraints and opportunities to future development, describe the proposed land use plan and associated environmental management plans, assess potential impacts, identify mitigation and monitoring requirements, and evaluate conformity with applicable environmental protection policies and regulations.

The lands immediately to the south of the subject lands were recently developed. This CEISMP, as well as the companion Functional Servicing Report (FSR) being prepared by DSEL, will have regard for the environmental protection, management and monitoring strategies and plans outlined in the Mayfield West Community Development Plan Area CEISMP and FSR.

A Terms of Reference (TOR) for the CEISMP were submitted to the Toronto and Region Conservation Authority (TRCA) and the Town of Caledon on March 11, 2021.

As was outlined in the TOR, a CEISMP report generally consists of three parts as follows:

- Part A - Existing Conditions and Biophysical Characterization;
- Part B - Impact Assessment and Detailed Studies; and
- Part C – Implementation.

Given that the subject lands consist of a relatively small area compared to the overall Mayfield West Study Area which has already been subjected to extensive study, the following CEISMP is to be prepared and submitted as a single comprehensive document inclusive of all three parts. It is believed this approach is similarly comprehensive but more efficient. Additionally, it is proposed that the CEISMP be submitted in two phases by preparing an initial report followed by a final report.

This CEISMP will comprise the Initial report and will be based on available background information from previous studies including the Mayfield West Community Development Plan Area CEISMP, available field data and analyses collected to date, as well as feature staking and confirmation.

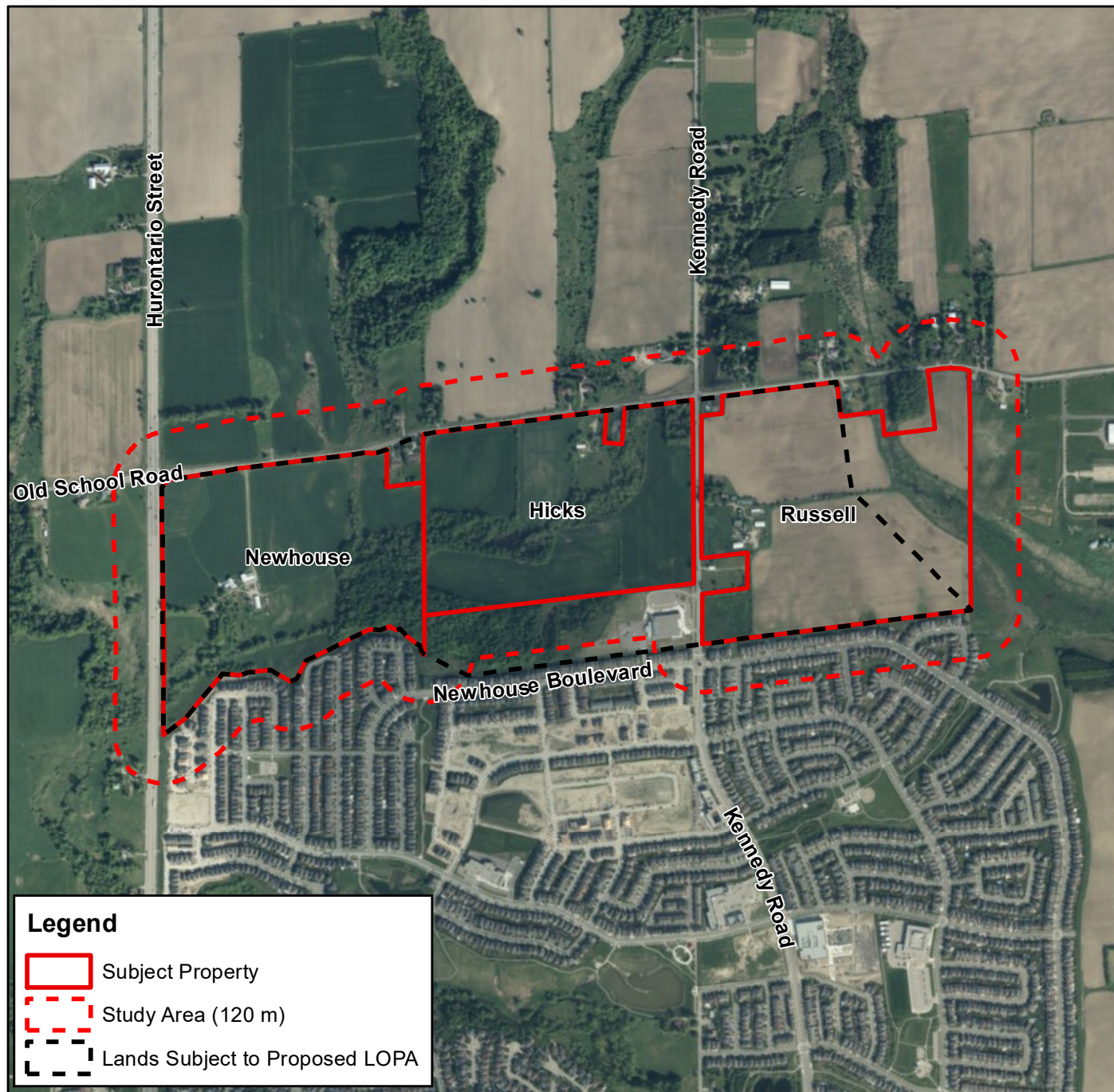
This proposed approach allows for a land use plan to be developed early in the process once development limits have been established and confirmed. The land use plan will be supported by preliminary stormwater management, servicing, and grading plans. This land use plan will be used for the LOPA application submission.

A copy of the Argo Kennedy CEISMP TOR has been included in **Appendix A**. TRCA provided comments on the CEISMP TOR which are addressed in this report. **Appendix B** includes the TRCA comments along with Beacon's responses.

1.1 Planning Context

The Growth Plan for the Greater Golden Horseshoe (Growth Plan 2019) set population and employment targets for Peel to achieve by 2051. In response, the Region of Peel is in the process of developing a new Regional Official Plan Amendment (ROPA) through the Peel 2041+ Regional Official Plan Review (Peel 2041). This amendment will bring the Regional Official Plan (ROP) into conformity with provisions of the Growth Plan 2019.

As part of this overall process, the Region is currently undertaking a Scoped Subwatershed Study (SWS) to provide water resources and natural heritage information in support of a Settlement Area Boundary Expansion (SABE) study to determine where new settlement area growth can be proposed in the Region. The SABE study, along with the ROPA will define the area of planned growth in Peel Region and the related environmental management policies, at a level sufficient to confirm the principle of development at a regional scale.



Site Location

Figure 1

Mayfield West Phase 1 –
Stage 2 Expansion Area



Project: 219527
Last Revised: August 2021

Client: Argo Kennedy
Limited

Prepared by: DU
Checked by: KU



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Inset Map: 1:80,000

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While the subject lands are currently outside of the Town and Region's settlement areas and designated Prime Agricultural, based on the Region's Draft SABE mapping available at the date of this Report, the subject lands are planned as "Community Area" which is intended to accommodate residential and population-related employment growth and intended to be included in the Region's 2051 Settlement Boundary expansion.

At the time of report preparation, only the "Hicks" lands are under the ownership of Argo Kennedy Limited, however, in the interest of ensuring contiguous and comprehensive planning, Argo Kennedy Limited is pursuing the advancement of a Local Official Plan Amendment for lands which extend to logical community boundaries, such as the surrounding arterial roads and the Greenbelt.

Given that the lands are contiguous to the existing Mayfield West Secondary Plan and serve as an extension to the existing community, the proposed LOPA is crafted as an amendment to the existing Secondary Plan (i.e., "Stage 2") which will generally maintain the existing community structure and vision but with the subject lands added to the northerly extent of the planning area. The location of the subject lands are also well-suited as a priority area for expansion given its adjacency to the built-out area, proximity to existing services, and the availability of public infrastructure.

The proposed amendment assumes that both the Region and the Town include the subject lands into the settlement area through the Peel 2041+ MCR and the Town's Official Plan Update, "Future Caledon".

1.2 CEISMP Study Process

1.2.1 Study Purpose

The overall purpose of the CEISMP report is to characterize the biophysical environment and identify constraints and opportunities to future development to help guide the design of the development and associated environmental management systems required to support it. The management plan component informs 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.

Additionally, the CEISMP report will provide a sufficient level of detail and direction for implementation of development in accordance with the PPS, the Region of Peel Official Plan and the Town of Caledon Official Plan. Throughout the CEISMP reports all necessary components of an implementation strategy will be identified which will ensure that all goals, objectives, targets and other related recommendations and management measures will be implemented. This includes identifying additional studies that may be required at the site-specific scale to fill in information gaps where necessary.

1.2.2 Study Area

This CEISMP report adopts an integrated subwatershed based study approach. As such, the study area limits are variable and are defined by disciplines and scale of investigation. For example, when characterizing groundwater and surface water resources, the study area boundaries extend to the limits of the catchments, 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 CEISMP does consider the subject lands within the context of the broader landscape and ecological setting.

1.2.3 Study Goals

The goal of the CEISMP is to demonstrate how the subject lands can be developed to create a complete community that is compact, pedestrian and cyclist-friendly, while also protecting and enhancing significant and sensitive natural heritage features by directing development to appropriate areas and through the design and implementation of environmental management systems.

The objective of the study is to characterize the existing natural heritage resources, identify significant and sensitive natural heritage features and functions, recommend appropriate development limits to avoid or minimize impacts to features and functions, assess development impacts, identify environmental management systems and associated monitoring programs that are to be implemented to mitigate potential adverse effects on the natural environment. The CEISMP includes both a review of applicable environmental protection legislation, regulations and policies as well as a conformity evaluated that demonstrates how the proposed Land Use Plan complies with these. To address Regional planning objectives, the SABE study and supporting studies were also reviewed to ensure these objectives were also considered from a natural heritage planning perspective.

These study goals are consistent with Section 3.2.4.15 of the Town of Caledon's Official Plan, which describes how the proposal is consistent with the Town's ecosystem principles, management goals and objectives.

1.2.4 Study Team

This CEISMP report 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 <i>CEISMP Report – Primary Author</i>
	Shelley Gorenc	M.Sc. P.Geo. / Senior Geomorphologist	Geomorphic Assessment <i>CEISMP Report - Author</i>
	Grace Bolton	B.Sc. (Hons.) / Ecologist	Turtle Surveys, Incidental Wildlife <i>CEISMP Report – Author</i>
	Chana Steinberg	B.Sc. (Hons) / Ecologist	Amphibian Surveys, Incidental Wildlife <i>CEISMP - Author</i>
	Sevan Torus	B.Sc. (Hons) / Terrestrial Ecologist, Certified Arborist	Tree Inventory <i>CEISMP Report - Author</i>

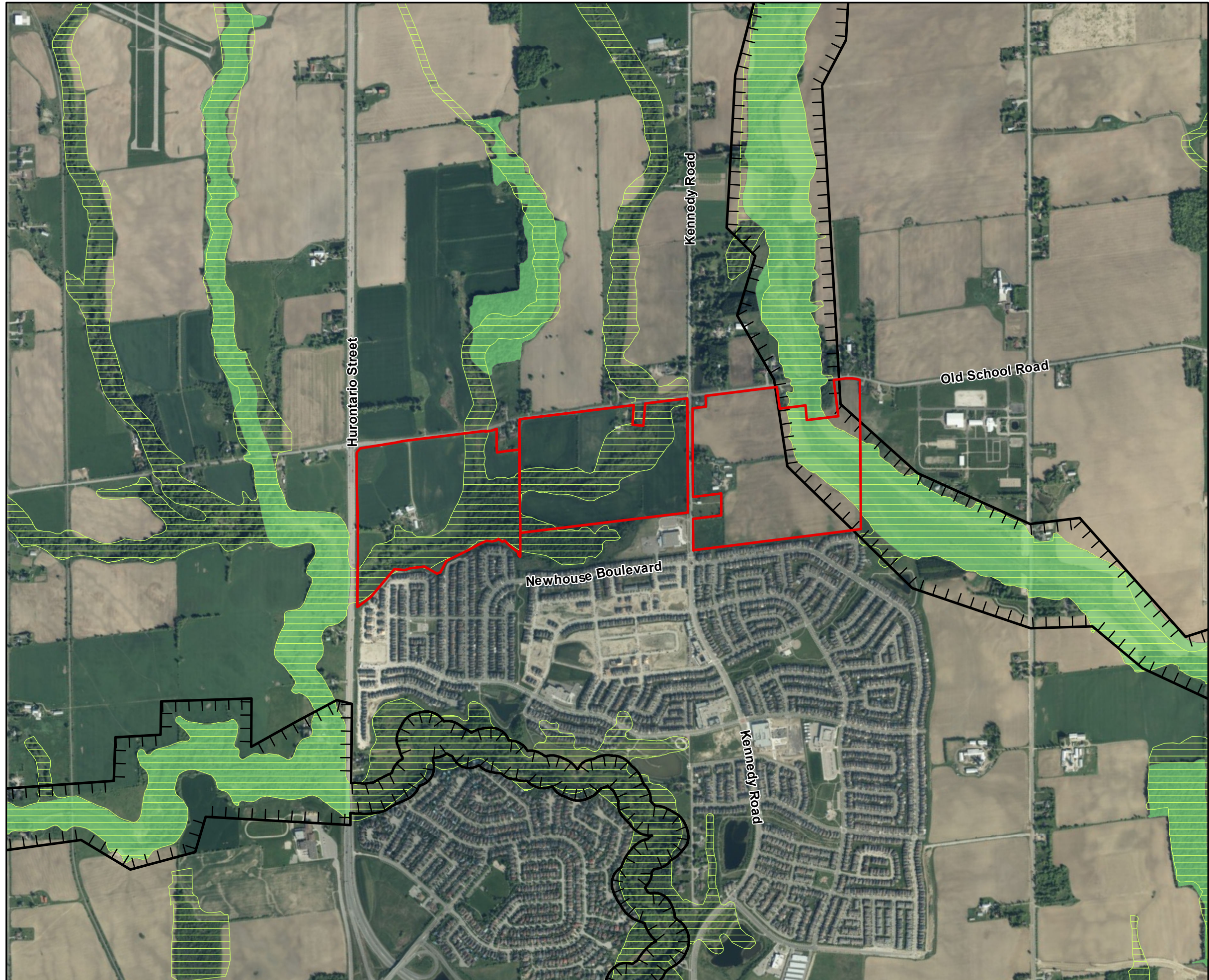
Firm	Individuals	Title - Qualifications	Key Role and Reporting
	Jason Krompart	M.Sc., G.I.T. / River Scientist	Geomorphic Assessment, Figure Production
	Devin Upper	GIS Analyst / Environmental Scientist	Figure Production
David Schaeffer Engineering Ltd.	John Tjeedrsma	P.Eng.	Functional Servicing Report <i>CEISMP Report - Author</i>
DS Consultants Ltd.	Martin Gedeon	M.Sc, P.Geo., Vice President	Hydrogeological Report
	Scott Watson	B.A.T / Manager	Hydrogeological Report <i>CEISMP Report - Author</i>
	Fanyu Zhu	P.Eng, Principal Engineer	Geotechnical and Slope Stability Report
Gerrard Designs	Ryan Kearns	Designer	Input to Figure Production
Glen Schnarr & Associates Inc. (GSAI)	Glen Schnarr	MCIP, RPP, Partner	Project management of planning process to establish Secondary Plan
	Jason Afonso	MCIP, RPP, Senior Associate	

2. Regulatory Framework for Environmental Protection

To ensure that the proposed Land Use Plan for the subject lands 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 report is to inform the constraint analysis presented in **Section 4** which was used to guide the design of the Argo Kennedy Land Use Plan and Preliminary 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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Designated Environmental Areas		Figure 2												
Mayfield West Phase 1 – Stage 2 Expansion Area														
Legend														
	Subject Property													
	Environmental Policy Area (Town of Caledon, 2021)													
	Greenlands System (Region of Peel, 2021)													
	Green Belt													
<p>Note: Contains Information owned by The Regional Municipality of Peel; use does not imply endorsement</p> <div><div> Geotechnical ♦ Environmental ♦ Materials ♦ Hydrogeology</div><div> david schaeffer engineering ltd</div><div></div><div> Glen Schnarr & Associates Inc.</div></div> <table border="1"><tr><td colspan="2">Project: 219527.1</td><td colspan="2">Last Revised: August 2021</td></tr><tr><td colspan="2">Client: Argo Kennedy Limited</td><td colspan="2">Prepared by: DU Checked by: KU</td></tr><tr><td></td><td>1:15,000</td><td colspan="2"></td></tr></table> <p>Contains information licensed under the Open Government License– Ontario Orthoimagery Baselayer: FBS Peel 2020</p>			Project: 219527.1		Last Revised: August 2021		Client: Argo Kennedy Limited		Prepared by: DU Checked by: KU			1:15,000		
Project: 219527.1		Last Revised: August 2021												
Client: Argo Kennedy Limited		Prepared by: DU Checked by: KU												
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Table 2. Regulatory Framework for Environmental Protection

Level of Government	Act/Regulation/Policy/Guideline	Type	Purpose	Relevance to the Mayfield West Phase 1 – Stage 2 Expansion Area LOPA Application
Federal	<i>Fisheries Act</i> (1985; 2019 Update)	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: <ul style="list-style-type: none"> • 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 the death of fish, or Harmful Alteration, Disruption or Destruction (HADD) to fish habitat. While not relevant at this stage of the land use planning process, compliance with the Act will need to be demonstrated as a Condition of Draft Plan approval and prior to commencing site preparation, earthworks and construction.
	<i>Migratory Birds Convention Act</i> (1994)	Act	To protect listed migratory bird species and their nests.	Breeding habitat for listed migratory birds is present 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 with the Act will need to be demonstrated as a Condition of Draft Plan approval and prior to commencing site preparation, earthworks and construction.
	<i>Species at Risk Act</i> (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 <i>Species at Risk Act</i> applies primarily to lands under federal jurisdiction. Outside of federal lands, the <i>Species at Risk Act</i> prohibitions apply only to aquatic species and migratory birds that are also listed in the <i>Fisheries Act</i> and <i>Migratory Birds Convention Act</i> . This is applicable to the subject lands as fish habitat and nesting birds are present.
Provincial	<i>Conservation Authorities Act</i> (1990)	Act	The Conservation Authorities Act 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.
	<i>Fish and Wildlife Conservation Act</i> (1997)	Act	The <i>Fish and Wildlife Conservation Act</i> enables the Ministry of Natural Resources and Forestry (MNRF) to provide sound management of the province's fish and wildlife.	The <i>Fish and Wildlife Conservation Act</i> protects the nest or eggs of birds not already protected under the <i>Migratory Birds Convention Act</i> , with some exceptions.
	<i>Endangered Species Act</i> (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.
	<i>Greenbelt Plan</i> (2017)	Act	The Greenbelt Plan (2017) was prepared and approved under the <i>Greenbelt Act</i> (2005) to guide future development in the Greater Golden Horseshoe, providing direction for urbanization and protection of the agricultural land base and ecological and hydrological features, areas and functions.	A portion of the Greenbelt's designated Protected Countryside intersects within the subject lands, associated with the valley corridor of Kilmanagh Creek (part of the West Humber River watershed). Development or site alteration is not permitted within lands associated with the designated Protected Countryside area, and development or site alteration in proximity to a Key Natural or Hydrologic Feature must establish a vegetation protection zone.
	<i>A Place to Grow: Growth Plan for the Greater Golden Horseshoe 2017 and 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.)</i>	Provincial Plan	The <i>Places to Grow Act</i> 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. <i>A Place To Grow: Growth Plan for the Greater Golden Horseshoe</i> 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	All land use planning in Ontario is required to be consistent with the policies of the PPS. These are outlined in

Level of Government	Act/Regulation/Policy/Guideline	Type	Purpose	Relevance to the Mayfield West Phase 1 – Stage 2 Expansion Area LOPA Application
			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.	<ul style="list-style-type: none"> 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, valleylands 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.
	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, valleylands 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 Guideline schedules provide guidance for SWH designation for the four categories of SWH outlined in the Significant Wildlife Habitat Technical Guide (ref. below) and its Appendices, while Table 1.5 contains and provides descriptions for exceptions criteria for ecoregional SWH which will be identified at an eco-district scale. The CEISMP will assess the subject lands for potential 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 SWH.	Planning authorities require proponents to use the guide when completing an ecological site assessment for SWH. 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 (<i>Clinostomus elongatus</i>) habitat.	The watercourse located at the eastern limit of the subject lands is identified through correspondence with MECP (ref. to Appendix C for correspondence record) as occupied 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 (2018)	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)”.	Currently, Schedule A of the Regional Official Plan identifies the reach and valley corridor of the West Humber River tributary (Kilmanagh Creek; Russell parcel) within the subject lands as a Core Area. One of the objectives of the CEISMP is to evaluate any additional features that may qualify as 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.
	Region of Peel's Settlement Area Boundary Expansion and Preliminary Draft Scoped Subwatershed Study (2020)	N/A	The Region of Peel has initiated an Environmental Screening and Scoped Subwatershed Study (SWS) to provide water resources and natural heritage input to support a Settlement Area Boundary Expansion (SABE) to help determine an area for recommended growth, as required by the <i>Growth Plan for the Greater Golden Horseshoe</i> .	The CEISMP will have consideration for the natural heritage information contained within the preliminary draft SWS. The preliminary draft SWS findings are presented at a high-level in order to address the larger scale Focus Study Area, whereas the CEISMP will provide refined findings at a site-specific level.
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 B of The Town of Caledon Official Plan designates most of the subject lands as 'Prime Agricultural'. It also identifies the forest, wetlands, watercourses as EPA. One of the objectives of the CEISMP is to evaluate how the land use plan and preliminary framework plans accommodate the NHS within the Town's Ecosystem Framework.
Conservation Authority	Ontario Regulation 166/06 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 O Reg. 166/06, in support of the <i>Conservation Authorities Act</i> (1990).	Regulated areas occur within the subject lands. These relate to floodplain, valleylands, 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.

Level of Government	Act/Regulation/Policy/Guideline	Type	Purpose	Relevance to the Mayfield West Phase 1 – Stage 2 Expansion Area LOPA Application
	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.	<p>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.</p> <p>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.</p>
	TRCA's Humber River Watershed Plan (2008b)	Guideline	Describes current conditions of the Humber River Watershed and provides strategies to protect and enhance it.	The subject lands are found partially 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)
	TRCA's Etobicoke and Mimico Creeks Technical Update Report (2010)	Guideline	Describes updated conditions of the Etobicoke Creek Watershed and provides strategies to protect and enhance it.	The subject lands are found partially within the Etobicoke Creek watershed. Within the Technical Update Report policy recommendations are provided in Table 11-1 to promote sustainable infrastructure, maintenance of pre-development infiltration conditions, and adaptive management.

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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 provides a detailed characterization of biophysical resources in the study area, the reader should also consult the Preliminary Hydrogeological Investigation (DS Consultants Ltd. 2021) and Functional Servicing Report (FSR; DSEL 2021).

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 December 2020);
- Etobicoke Creek Headwater Wetland Complex Evaluation (MNRF 1990; updated 2014);
- 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); and
- Historical and current aerial photography (1964 – 2019).

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

- Comprehensive Environmental Impact Study and Management Plan for the Mayfield West Community Development Plan Area: Secondary Plan Study in Support of a Regional Official Plan Amendment, Dillon Consulting Limited, DSEL, Shaheen and Peaker Limited, and Valcoustics Inc. (November 2007); and
- Mayfield West Community Development Plan Study, Water Supply and Sanitary Sewage Systems Functioning Servicing, February 1997, CG&S.

3.2 Physical Resources

This section characterizes the physical resources of the subject lands and study area. To understand the physical setting, various topographic maps, environmental, geotechnical, and hydrogeological background reports were used.

To accurately characterize the site-specific soil, hydrologic and hydrogeologic conditions within the study area various preliminary studies have been completed by DS consultants and summarized in the report titled *Preliminary Hydrogeological Investigation Proposed Residential Subdivision Hicks, Newhouse and Russell Properties Caledon, ON (dated August, 2021)*. Findings summaries from this report are provided in the following section of the CEISMP and are integrated into the proposed environmental management plan and associated monitoring plans detailed in **Sections 7 and 8**.

3.2.1 Bedrock Geology

Available published mapping indicates that bedrock in the area predominantly comprises of shale and minor limestone part of the Queenston Formation (MNDM Map 2544 Bedrock Geology of Ontario).

As part of the hydrogeological investigation, (DS 2021), DS completed a search of the MECP water well records (WWRs) database for records within 500m of the site. Based on the search, there are nine (9) nearby water well records indicating that a grey to red shale was encountered between depths of 24.1 and 51.8 m below ground surface (m bgs). The shallow

The Site investigation completed by DS did not encounter bedrock during the drilling programs completed.

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 predominantly covered by a clay to silt-textured till (derived from glaciolacustrine deposits or shale), modern alluvial deposits associated with the Etobicoke Creek and Kilmanagh Creek valleys, and coarse-textured glaciolacustrine deposits located within portions of the Hicks and Russell parcels

(identified more specifically as Foreshore and basinal deposits). Adjacent to the study area, the geology is generally consistent with some glacial deposits of interbedded pebbly flow till and rainout deposits located to the south of the study area. An illustration of surficial geology for the Study Area is provided in Figure 2 within the Preliminary Hydrogeological Investigation (DS 2021).

From preliminary borehole results advanced by DS, onsite soil findings align generally with the Ontario Geological Survey (2010) information. Sand layers were noted within the 1.5 to 7.5 mbgs (metres below ground surface) zone from onsite investigations. This is discussed further in **Section 3.2.3** 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. Site investigations detailing site topography, slope stability and soil analysis are currently underway, and will be provided under separate cover when completed.

The study area is generally characterized by gently rolling to hilly topography and the ground slopes generally to the south across the subject lands. Relief across the Site ranges from approximately 275 masl at the highest point in the northeast corner between the Etobicoke Creek and the Humber River, to about 254 masl in the southwest corner within the valley lands of Etobicoke Creek.

Based on field review as part of the geotechnical investigation completed by DS Consultants Ltd. (2021), there were three areas on the subject lands that would require further investigation regarding potential slope instability. The investigation completed includes the following findings:

- There is a wide flood plain in the creek area, where the ground is covered with trees, bushes, high grass etc. The creek is typically 3 to 5 m wide, and is about 1 to 2 m below the flood plain level;
- The slopes at both sides of the creek area are generally gentle in steepness, flatter than 3 horizontal to 1 vertical (3H:1V). A few local slopes of about 2H:1V and steeper are observed at the site; and
- It is difficult to accurately estimate the height of the slopes, as the top of slope locations are not obvious, and the slopes are gentle in steepness. Typically, the elevation difference between the creek level and the tree line areas at both sides of the creek area is about 3 to 6 m.

Based on site observations by DS, the study area slopes are generally considered stable in terms of long-term stability. The line staked out (agreed) by TRCA during the site walk on March 30, 2021 is considered to be the long-term stable top of slope (LTSTOS) line or constraint to development limits, except for a few local areas where the slopes are 2H:1V or steeper.

During the site visits, the geotechnical engineer from DS identified 3 local areas where the slopes are 2H:1V or steeper. New boreholes will be drilled in these areas for detailed slope stability analyses to determine the locations of the long-term stable top of slope (LTSTOS) line. A detailed slope stability assessment report will be prepared. Based on our site observations, the impact of the detailed slope stability analyses on the development limit is anticipated to be minor, compared to the line staked out (agreed) by TRCA.

Soil conditions were first investigated in 2019 on the Hicks property by DS at which time eight (8) boreholes drilled to depths ranging from 6.5 to 13.2m. In January 2021, five (5) boreholes (BH21-1 through BH21-5) were drilled on the Newhouse property to depths ranging from 6.4 to 8.2 m. No boreholes were drilled to the east of Kennedy Road as there was no site access permission. A desktop review of the subsurface conditions east of Kennedy Road was completed. Figure 3 within the Preliminary Hydrogeological Investigation illustrates borehole locations from DS (2021). A summary of the findings is provided below.

- Based on all Thirteen (13) boreholes, DS (2021) encountered a topsoil/organic layer with a thickness ranging from 200 to 350mm throughout the site. The topsoil is underlain with a shallow layer of disturbed/reworked till extending 0.8 to 1.5 mbgs;
- Cohesionless deposits of sandy silt/silty sand, sand, silt and sand and gravel were encountered in most of the boreholes and extended to various depths. These deposits were found in loose to very dense state. Most of the cohesionless deposits were found to be wet to saturated and below groundwater table;
- Cohesive deposits of clayey silt to silty clay till and clayey silt to silty clay were encountered in boreholes BH19-3 to BH19-6, BH21-1 and BH21-2 at various depths. The cohesive deposits were found to have a firm to hard consistency; and
- Silty sand till to sandy silt till deposits were encountered in all boreholes except BH19-4, BH21-1 and BH21-3. These deposits were found generally in a loose to very dense state.

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.

To accurately characterize the site-specific groundwater resources within the study area site investigations are currently being completed and information is being gathered. Upon completion of these investigations, the findings will be integrated into the Final version of the CEISMP report.

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 WWR search, there are eighty-eight (88) water wells within 500 meters of the site (Appendix E). Fifty-two (52) wells were noted as domestic (DO) wells, eight (8) wells were noted for livestock (ST) use, and one (1) well was noted as a public supply well (PS). The depths of these wells range from 21 to 50 mbgs. All other wells were noted as test holes, monitoring well, not in use or unknown. Of the eighty-eight wells, nine (9) were completed in shale bedrock. Remaining wells were completed in overburden. Domestic water supply records exist for wells drilled between the dates of January 1950 to December 2016. The water well record summary is included in the Preliminary Hydrogeological Investigation (DS 2021). Figure 1 within the Preliminary Hydrogeological Investigation shows the MECP water well location plan (DS 2021).

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 within the Etobicoke Creek and Humber River watersheds are comprised of the following, from shallowest to deepest (TRCA 2008a, 2010):

- 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 (composes the Late Wisconsin Glacial complex which includes Halton and Newmarket). These glaciolacustrine 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 and Etobicoke Creek watersheds 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, including York Till, 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 waning influence towards the deeper flow systems. There are deviations in the regional groundwater flow patterns towards local streams and/or watercourses in the watershed. This predicts there are inter-watershed flows into Etobicoke Creek and 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 Macville Community 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 Etobicoke Creek and Humber River were noted throughout 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. has initiated a manual groundwater monitoring program in the spring of 2021 and continuing on a regular basis to assess groundwater fluctuations.

To assess groundwater levels across the study area, DS Consultants Ltd. (2021) implemented a groundwater monitoring program with manual measurements starting in February 2021 and continuing on a monthly basis to assess long-term groundwater fluctuations. Within the Preliminary Hydrogeological Investigation, Figure 3 shows the monitoring well locations and Table 3-2 presents a summary of the measured groundwater level elevations in all monitoring wells (DS 2021). Groundwater levels were measured in all available wells on the Hicks property on January 2nd, 2020 and on February 3rd and May 3rd, 2021 in all wells on the Hicks and Newhouse properties. Groundwater levels ranged from 262.7 to 272.0 masl on the Hicks property and from 258.0 to 261.1 on the Newhouse property. Figure 4 in the Preliminary Hydrogeological Investigation shows a groundwater contour map completed for measurements collected May 2021 (DS 2021). Based on groundwater elevations, the flow direction is inferred to be generally west to southwest from high to low areas of the subject lands. There are localized contours toward Etobicoke Creek including those in the southeast corner of the Hicks Property which show northwest groundwater flow direction. Average horizontal groundwater gradients across the subject lands are approximately 0.02 m/m. The levels are expected to fluctuate with seasonal variations and responses to storm events.

In total, fourteen (14) Single Well Response Tests (slug tests) were completed by DS in wells BH19-2 to BH19-9 on January 2nd, 2020, and on February 3rd, 2021 in wells BH21-1, BH21-3 and BH21-4 to estimate hydraulic conductivity (k) for the representative geological units in which the wells were screened. Methodology for conducting the k-tests is provided in Section 3.3.3 of the Preliminary Hydrogeological Investigation report (DS 2021). Table 3-3 in the Preliminary Hydrogeological Investigation presents the Hydraulic Conductivity (k) values for the representative geological units (DS 2021). The semi-log plots for normalized drawdown versus time are provided in the Preliminary Hydrogeological Investigation (DS 2021). The k-values ranged between 2.8×10^{-8} to 6.8×10^{-6} m/s on the Hicks Property and between 1.4×10^{-6} to 4.5×10^{-6} m/s on the Newhouse property which is considered consistent with the sandy silty to silty sand till overburden.

Continuous water level monitoring is currently under way. The results of the monitoring will be provided in groundwater hydrographs showing seasonal variations of groundwater levels including groundwater levels collected from shallow piezometers installed as part of the surface water monitoring program.

3.2.5 Surface Water Resources

3.2.5.1 Subwatershed Catchment Areas

The subject lands are situated at the drainage divide between Etobicoke Creek and the West Humber River watersheds.

The majority of the subject lands, consisting of all lands located to the west of Kennedy Road, as well as a part of Lot 22 Concession 2 East of Centre Road (east of Kennedy Road) are located within the Etobicoke Creek watershed. Two tributaries of the East Etobicoke Creek cross the property, with minor headwater features located at various points on the tablelands. The headwater features convey runoff from various subcatchments towards the tributaries and all flows exit the subject lands through a culvert located beneath Highway 10 (Hurontario Street). More details on the drainage catchments are provided in the FSR (DSEL 2021).

East of Kennedy Road, a portion of the subject lands are located within the Humber River watershed, where site drainage is directed towards Kilmanagh Creek, a tributary of the West Humber River.

CEISMP **Figure 3** illustrate the drainage features within the study area.

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.

3.2.5.2 Headwater Drainage Features

The study area is situated in the headwaters of Etobicoke Creek and the West Humber River and supports a number of surface drainage features (**Figure 3**).

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 and inform environmental management strategies for the development.







In 2019, preliminary mapping of HDFs west of Kennedy Road was completed by Beacon through aerial photo interpretation as part of due diligence study for the subject lands. In 2021, Beacon completed a field review all HDFs on the subject lands west of Kennedy Road for the purposes of validating the mapping of HDFs from the due diligence study. To help identify HDFs east of Kennedy Road, Beacon, as part of this CEISMP study, has completed review of background aerial photography. As part of the validation exercise, the following task were completed:

- The preliminary HDF mapping was reviewed;
- Tile drainage mapping was reviewed to identify HDFs affected (OMAFRA 2020);
- HDFs on the subject lands and west of Kennedy Road were walked on March 18 and May 12, 2021;
- Mapping of HDFs was updated to reflect the 2021 field conditions;
- Photographs of select HDF were taken to supplement the original HDFA (**Appendix E**);
- HDF Classifications were reviewed to confirm consistency with 2021 field observations and adjusted where necessary;
- HDF Management Recommendations were reviewed and adjusted where necessary; and
- Findings were summarized.



Mayfield West Phase 1 –
Stage 2 Expansion Area

Legend

-  Subject Property
-  Reach Break
-  Amphibian Monitoring Stations
-  Turtle Monitoring Stations
-  Watercourse (MNR 2019)
-  Headwater Drainage Feature



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BEACON
ENVIRONMENTAL



GSAI
Glen Schnarr & Associates Inc.

Project: 219527.1

Last Revised: August 2021

Client: Argo Kennedy
Limited

Prepared by: DU
Checked by: KU



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The validation exercise resulted in several refinements to the HDF preliminary mapping. The changes are based on the field review and confirmation of existing tile drain networks (OMAFRA 2020) and culvert locations. All HDFs and reaches were also assigned names/number for consistency with the tributary nomenclature utilized in the CEISMP. The Russell parcel is non-participating. HDFs located on non-participating landowner properties were not validated through field investigation and were limited to delineation through aerial photography and background review. Refinements to the Russell parcel HDFs may be updated at the Draft Plan stage.

In reviewing the HDF classifications, Beacon relied upon field observations as well as preliminary biophysical information collected during field investigations in 2020 as part of the previous due diligence study, including updated ecological community classifications.

A summary of functional classifications and management recommendations for all HDF reaches is provided in **Table 3** below.

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Table 3. Headwater Drainage Feature Assessment Summary

HDF Reach	Step 1		Step 2	Step 3	Step 4	Management Recommendation ⁱ	Governing Factor
	Hydrology ⁱⁱ	Modifiers	Riparian ⁱⁱⁱ	Fish Habitat ^{iv}	Terrestrial Habitat ^v		
EC1-A	Important Functions	Historically channelized	Important Functions	Valued Functions	Contributing Functions	Protection	Management recommendation governed by hydrology and riparian vegetation
EC1-B	Limited Functions	Historically channelized	Valued Functions	Contributing Functions	Limited Functions	No Management Required	n/a
EC1-C	Important Functions	Historically channelized	Important Functions	Valued Functions	Contributing Functions	Protection	Management recommendation governed by hydrology and riparian vegetation
EC1-D	Contributing Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	Mitigation	Management recommendation governed by hydrology.
EC1-E	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
EC1-F	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
EC2-A	Valued Functions	Historically channelized	Valued Functions	Contributing Functions	Limited Functions	Mitigation	Management recommendation governed by hydrology.
EC2-B	Contributing Functions	Historically channelized	Valued Functions	Contributing Functions	Limited Functions	Mitigation	Management recommendation governed by hydrology.
EC2-C	Valued Functions	Historically channelized	Valued Functions	Contributing Functions	Limited Functions	Mitigation	Management recommendation governed by hydrology.
EC3-A	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
EC4-A	Valued Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	Mitigation	Management recommendation governed by hydrology.
EC5-A	Limited Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	No Management Required	n/a
EC6-A	Recharge Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	Maintain Recharge	Management recommendation governed by hydrology. Potential subsurface contributions to be confirmed through additional hydrologic study.
EC7-A	Contributing Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	Mitigation	Management recommendation governed by hydrology.
EC8-A	Contributing Functions	Agriculture	Limited Functions	Contributing Functions	Limited Functions	Mitigation	Management recommendation governed by hydrology.
EC-9A	Not Assessed						Feature identified through background aerial photo interpretation. Hydrology not assessed due to land access restrictions. OMAFRA 2020 indicates the Russell property is tile drained.
EC-9B	Not Assessed						Feature identified through background aerial photo interpretation. Hydrology not assessed due to land access restrictions. OMAFRA 2020 indicates the Russell property is tile drained.
EC-9C	Not Assessed						Feature identified through background aerial photo interpretation. Hydrology not assessed due to land access restrictions. OMAFRA 2020 indicates the Russell property is tile drained.
EC10-A	Limited Functions	Manicured Lawn	Contributing Functions	Contributing Functions	Limited Functions	No Management Required	Management recommendation governed by hydrology, riparian vegetation and terrestrial habitat. Potential subsurface contributions to be confirmed through additional hydrologic study.
WH-1A	Not Assessed						Feature identified through background aerial photo interpretation. Hydrology not assessed due to land access restrictions. OMAFRA 2020 indicates the Russell property is tile drained.
WH-2A	Not Assessed						Feature identified through background aerial photo interpretation. Hydrology not assessed due to land access restrictions. OMAFRA 2020 indicates the Russell property is tile drained.

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

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The following sections summarize the CEISMP HDF reaches by management classification. **Figure 3** illustrates HDFA reaches and associated management recommendations.

No Management Required

Reaches EC1-B, EC1-E, EC1-F, EC3-A, EC5-A and EC10-A were 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

Reaches EC1-D, EC2-A, EC4-A, EC7-A and EC8-A were identified as 'Mitigation' in accordance with the TRCA (2014b) Guidelines. These reaches provide contributing hydrologic functions and do not provide aquatic or terrestrial habitat.

Protection

Reaches EC1-A and EC1-C were identified as 'Protection' in accordance with the Guidelines (2014b). These reaches provide important hydrological function as well as valued riparian habitat and fish habitat.

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 recommended 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.

In order to characterize existing geomorphic conditions, a field assessment was conducted on April 13, 2021. Figure 2 within the Geomorphic Assessment Report (**Appendix F**) identifies the extent assessed

in support of this study. Field investigations focussed on unconfined reaches (i.e., Reach TEC1) to inform the determination of meander belt limits, but extended upstream to include Reaches EC2 and EC3. As the Russel parcel is nonparticipant, assessment of Reach KC1 was limited to within the Old School Road right-of-way. The following standardized rapid visual assessment methods were applied:

i. Rapid Geomorphic Assessment (RGA – MOE 2003)

The RGA documents observed indicators of channel instability by quantifying observations using an index that identifies channel sensitivity. Sensitivity is based on evidence of aggradation, degradation, channel widening and planimetric form adjustment. The index produces values that indicate whether the channel is stable/in regime (score <0.20), stressed/transitional (score 0.21-0.40) or in adjustment (score >0.41).

ii. Rapid Stream Assessment Technique (RSAT – Galli 1996)

The RSAT uses an index to quantify overall stream health and includes the consideration of biological indicators (Galli 1996). Observations concerning channel stability, channel scouring/sediment deposition, physical in-stream habitat, water quality, and riparian habitat conditions are used to calculate a rating that indicates whether the channel is in poor (<13), fair (13-24), good (25-34), or excellent (35-42) condition.

iii. Downs Classification Method (Downs 1995)

The Downs (1995, outlined in Thorne et al. 1997) classification method infers present and future potential adjustments based on physical observations, which indicate the stage of evolution, and type of adjustments that can be anticipated based on the channel evolution model. The resultant index classifies streams as stable, laterally migrating, enlarging, undercutting, aggrading, or recovering.

Rapid assessment results are summarized in **Table 4** and **Table 5** below. A photographic record of site conditions at the time of assessment is provided in Appendix B within the Geomorphic Assessment Report (**Appendix F**), with the photo locations identified in Figure 2 in that appendix.

Etobicoke Creek

Reach EC2

Reach EC2 was characterized as a highly sinuous, well-defined channel situated within a confined valley setting. Riparian vegetation was characterized as continuous, measuring one to five channel widths laterally and consisted predominantly of trees. Bank angles ranged between 30 to 90 degrees with 30 to 60% of banks identified as exhibiting evidence of erosion. Bank materials were comprised of clay, silt, and sand.

Bankfull widths and depths ranged from 3.4 to 5.2 m and 0.3 to 0.9 m, respectively. Riffle and pool substrate consisted of clay, silt, sand, gravel and cobble-sized materials with localized areas of exposed

consolidated till. A large beaver dam and associated backwater condition influenced channel morphology within the upstream extent.

RGA results indicated that Reach EC2 was 'in transition', with a score of 0.38. Planimetric form adjustment and widening were identified as the dominant modes of adjustment, as evident through formation of chutes, single thread channel to multiple thread channel development and cut off channels. Evidence of widening included fallen leaning trees occurrence of large woody debris, exposed trees roots and fracture line along the tops of banks.

An RSAT score of 28 indicated a 'good' degree of overall ecological health, with channel stability and sediment deposition as the primary limiting factors. The Downs (1995) model reflected the RGA evaluation of this reach through a classification of U – 'undercutting' based on evidence of erosion on outer banks.

Reach EC3

Reach EC3 was characterized as a moderately sinuous, well-defined channel situated within a confined valley setting. Riparian vegetation was characterized as continuous, measuring one to five channel widths laterally. Vegetation consisted predominantly trees and shrubs, transitioning to shrubs and herbaceous and shrubs in vicinity of Old School Road. Bank angles ranged between 30 to 90 degrees with 5 to 30% of banks identified as exhibiting evidence of erosion. Bank materials were comprised of clay, silt, and sand.

Bankfull widths and depths ranged from 2.4 to 4.0 m and 0.4 to 1.1 m, respectively. Riffle and pool substrate consisted of clay, silt, sand, gravel and cobble-sized materials with localized areas of exposed consolidated till. A second beaver dam and associated backwater condition influenced channel morphology within the downstream extent of this reach.

RGA results indicated that Reach EC2 was 'in transition', with a score of 0.28. Widening was identified as the dominant mode of adjustment, as evident through fallen leaning trees, occurrence of large woody debris, exposed tree roots basal scour through riffles and fractures with evidence of slumping banks.

An RSAT score of 26 indicated a 'good' degree of overall ecological health, with riparian habitat conditions and water quality as the primary limiting factors. The Downs (1995) model reflected the RGA evaluation of this reach through a classification of U – 'undercutting' based on evidence of erosion on outer banks.

Reach TEC1

Reach TEC1 was characterized as a relatively straight, intermittently defined channel situated within an unconfined valley setting. Downstream of Old School Road, Reach TEC1 was poorly defined but transitioned to a more defined channel with distance downstream. Riparian vegetation was characterized as continuous, measuring one to five channel widths laterally. Vegetation consisted predominantly grasses and herbaceous plants but transitioned to woody within the downstream valley corridor. Bank angles ranged between 30 to 90 degrees with 5 to 30% of banks identified as exhibiting evidence of erosion. Bank materials were comprised of clay, silt, and sand. Banks also exhibited local evidence of mass failure.

Where defined, bankfull widths and depths ranged from 1.7 to 2.4 m and 0.3 to 0.4 m, respectively. Riffle substrate consisted of gravel and cobble-sized materials with localized areas of exposed underlying consolidated till. Pool substrate consisted of sand, gravel and cobble. Modifications included the Old School Road crossing, which consisted of twin 750 mm plastic corrugated culverts.

RGA results indicated that Reach TEC1 was 'in transition', with a score of 0.21. Widening and degradation were identified as the dominant modes of adjustment and reflect the downstream transition into the main tributary valley corridor. Evidence of widening included the presence of fallen leaning trees, occurrence of large woody debris, exposed tree root and fracture line along the top of the banks. Evidence of degradation included cut face on bar forms head cutting due to knickpoint migration and observations of the channel cutting into the undisturbed overburden.

An RSAT score of 26 indicated a 'good' degree of overall ecological health, with channel stability and riparian habitat conditions identified as the limiting characteristics. The Downs (1995) model reflected the RGA evaluation of this reach through a classification of S – 'stable' with evidence of U – 'undercutting' (erosion on outer banks).

Kilmanagh Creek

Reach KC1

Within the extend assessed, Reach KC1 was characterized as a well-defined channel with a high degree of sinuosity situated within an unconfined valley setting. The reach displayed a low gradient and moderate degree of entrenchment. Riparian vegetation was generally characterized as fragmented, extending 1 to 5 channel widths laterally. Riparian vegetation was comprised of grasses and herbaceous plants with trees and shrubs. Bankfull widths were estimated to range from 2.5 to 3.0 m. Channel substrate consisted of clay, silt, sand and gravel-sized materials.

RGA results indicated that Reach KC1 was 'in transition', with a score of 0.24. Planimetric form adjustment and aggradation were identified as the dominant modes of adjustment. Evidence of planimetric form adjustment included the formation of chutes and single thread to multiple thread channel development. Evidence of aggradation included siltation in pools and deposition in overbank zones.

An RSAT score of 22.5 indicated a 'fair' degree of overall ecological health, with physical instream habitat and riparian habitat conditions as the primary limiting factors. The Downs (1995) model reflected the RGA evaluation of this reach through a classification of M – 'lateral migration'.

Table 4. General Reach Characteristics

Watercourse	Reach	Bankfull Width (m)	Bankfull Depth (m)	Substrate	Riparian Vegetation	Notes
Etobicoke Creek Tributary	EC2	3.4 – 5.2	0.3 – 0.9	clay, silt, sand, gravel, cobble, consolidated till	trees, shrubs	<ul style="list-style-type: none"> • Woody debris in channel and along banks • Beaver dam • Valley wall contacts
	EC3	2.4 – 4.0	0.4 – 1.1	clay, silt, sand, gravel, cobble, consolidated till	trees, shrubs, herbaceous	<ul style="list-style-type: none"> • Undercut and slumping banks • Beaver dam with backwater influence (downstream extent)
	TEC1	1.7 – 2.4	0.3 – 0.4	Sand, gravel, cobble, consolidated till	shrubs, grasses, herbaceous plants	<ul style="list-style-type: none"> • Knickpoint formation • Intermittently defined with vegetation encroachment (upstream extent)
Kilmanagh Creek	KC1	2.5 – 3.0	--	Clay, silt, sand, gravel	grasses, herbaceous plants	<ul style="list-style-type: none"> • Assessed from road right-of-way (nonparticipant lands) • Sinuous planform • Low gradient

Table 5. Rapid Assessment Results

Watercourse	Reach	Rapid Geomorphic Assessment			Rapid Stream Assessment Technique			Downs Classification Method
		Score	Condition	Dominant Mode of Adjustment	Score	Condition	Limiting Feature	
Etobicoke Creek Tributary	EC2	0.38	In Transition	Planimetric form adjustment	28	Good	channel stability and sediment deposition	U – 'undercutting'
	EC3	0.28	In Transition	Widening	26	Good	riparian habitat, water quality	U – 'undercutting'
	TEC1	0.21	In Transition	Widening	26	Good	channel stability and riparian habitat conditions	S – 'stable' with evidence of U – 'undercutting'
Kilmanagh Creek	KC1	0.32	In Transition	Planimetric form adjustment	22.5	Fair	physical instream habitat and riparian habitat conditions	M – 'lateral migration'

Meander Belt Analysis

The meander belt width is generally defined as the lateral extent that a meandering channel has historically occupied and will likely occupy in the future.

Following the TRCA (2004) *Belt Width Delineation Procedures* document, meander belts were delineated for Reaches TEC1 and KC1 were delineated based on the lateral extent of the outermost meander bends along the reach over the available historical record. As Reach TEC1 had been subject to historic channelization, meander belt limits also referenced evidence of frequent floodplain inundation. The resultant 25 m and 54 m dimensions for Reaches TEC1 and KC1, respectively, were then reviewed relative to available topographic mapping and field observations to ensure that it was sufficient to capture the active (bankfull) channel and evidence of lateral occupation of the floodplain at the reach scale. A 20% factor of safety (10% either side) was then applied to this preliminary meander belt in order to account for long-term adjustments in channel form (channel erosion and migration), as well as potential post-development changes in hydrologic regime. The resultant recommended meander belt dimensions for Reaches TEC1 and KC1 of 30 m and 65 m, respectively, are illustrated in Figure 3 within the Geomorphic Assessment Report (**Appendix F**).

Stormwater Erosion Control Analysis

Stormwater erosion criteria for proposed SWM facilities were established based on the TRCA SWM Criteria (2012) and MOE (2003) requirement for extended detention volume based on detention of the 25mm storm event over a period of 48 hours. This level of design was sufficient to develop preliminary sizing of stormwater facilities in support of the land use plan. Through subsequent stages of this study, consultation will be undertaken with TRCA to confirm additional erosion analysis scope requirements for stormwater management, such as determination of an appropriate erosion threshold and exceedance analysis, in coordination with the geomorphic assessment.

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 (2016, 2018), Etobicoke Creek and the West Humber both received surface water quality grades of "poor". This grade is based off of phosphorous and *Escherichia coli* (*E.coli*) concentrations.

3.2.5.5 Hydraulics

The floodplain model and mapping for Etobicoke Creek completed to date by the TRCA was intended for use only as a screening tool to determine whether properties or structures are potentially susceptible to flooding. The TRCA confirmed this information is not appropriate for use in determining the development limit for the subject lands since the model didn't include crossing structures, doesn't have refined Manning's n values, and crossing geometry is not detailed. As such, the TRCA recommended the model be refined with more detailed information in support of this LOPA application.

The TRCA provided the HEC-RAS 6.0.0 model and a refined hydraulic assessment has been undertaken. Reaches of the model through the subject lands were updated based on site-specific survey information and LiDAR data. Reaches were modified from their confluence on the subject lands

to the upstream crossings of Old School Road. An additional reach was added to the model to define flood levels between the confluence of the two reaches and the downstream crossing of Highway 10 / Hurontario Street. Culvert details of the crossings of Old School Road were added based on survey information or culvert replacement details shown on the design drawings of the imminent reconstruction of Old School Road, as appropriate. Manning's roughness coefficients were reviewed and refined. The existing beaver dam was included in the model as an inline structure based on survey data.

Based on the above, design water levels and velocities under existing conditions for Etobicoke Creek were determined and incorporated into the development limit constraint mapping and overall design of the site. Details of the floodplain assessment is provided in the FSR (DSEL 2021).

3.2.6 Existing Water Balance

3.2.6.1 Existing Site Water Balance

To properly understand and compare existing hydrologic conditions over the study area, a pre-development and post-development water balance was completed by DS Consultants using the Thornthwaite water balance method (Thornthwaite 1948; Mather 1978; 1979). The full assessment is provided in Section 4.0 of the Preliminary Hydrogeological Investigation (DS 2021).

Based on results of the pre-development and post-development water balance completed for the subject lands, the proposed development will produce a decrease in annual evapotranspiration, a reduction in annual infiltration and an increase in annual runoff. The effects are mainly the result of increased impervious area and decreased pervious areas. The analysis is summarised Section 4.1.3.1 of this report.

3.2.6.2 Existing Feature Based Water Balance

Following the completion of the year 1 hydrologic monitoring period, a feature-based wetland water balance will be completed. The monitoring data will be used to define wetland hydroperiods and assess groundwater and surface water interactions. The model will be used to assess the effect of the hydrologic changes on each of the wetland hydroperiods to help determine the magnitude of hydrologic changes as a result of proposed conditions. The results of the model will be used to define a LID plan which ensures that the retained features maintain 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 available supplementary data gathered through recent field investigations completed by Beacon in fall 2020, and the spring of 2021. Additional field investigations will be conducted by Beacon during the remainder of 2021 to further define the natural heritage resources located in the study area.

Natural heritage resources in the study area were previously characterized by the Region of Peel for Natural Areas Inventory (NAI) for areas #8130, 9773 and 9779. They were also characterized within

the Scoped Subwatershed Study, Part B: Detailed Studies and Impact Assessment (Preliminary Draft) – Settlement Area Boundary Expansion, which was prepared for the Region of Peel by Wood Environment and Infrastructure Solutions (2020). Additionally, the Region's SABE study also characterizes some of the natural heritage resources associated with the subject lands using background sources.

The subject lands are included in the subwatershed study include the study area of this CEISMP, and lands that extend beyond the study area boundary. Information from these background studies was reviewed and the findings have been integrated within the supplemental work completed by Beacon in 2020 and 2021. The subsections below provide a preliminary 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 south of where the Oak Ridges Moraine converges with the Niagara Escarpment. The Niagara Escarpment which is located 5 km to the northwest and the Oak Ridges Moraine, which is located 6 km to the north, form part of the provincial Greenbelt which supports protected natural areas and linkages. Along with the Etobicoke Creek and West Humber River tributary (identified as Kilmanagh Creek) valleylands, which intersect the western and eastern portions of the study area respectively, these natural features and areas form part of a broader provincial and regional Natural Heritage System (NHS) identified in the Growth Plan NHS, Region of Peel Greenlands System and the Town of Caledon's Environmental Policy Areas (refer to **Figure 2**).

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 Etobicoke Creek and larger Humber River valleylands both connect headwaters in Caledon to Lake Ontario, some 30-35 km downstream and each represent a significant landscape north-south linkage corridor, although Etobicoke Creek is recorded to be considerably more degraded than the Humber River system.

The lands in the study area are used primarily for agriculture. Natural features consist of the riverine valley corridors which incorporate wetland areas and fish habitat, while various drainage features gather water from the upland fields and represent some of the headwaters of the east and west branches of Etobicoke Creek and the Humber River, respectively. These valley networks connect to similar environments immediately downstream of the study area and function to provide significant local scale connectivity. Land use immediately downstream of the study area remains predominantly agriculture whereas further downstream conditions are more urbanized as the valley corridors intersect with the residential boundary of the City of Brampton.

Treed features on the subject lands are generally confined to the wooded valley corridors and Greenbelt area, or limited to hedgerows, most of which are short and fragmented and offer little connectivity due to poor cover. Contiguous wooded areas are identified outside of the Etobicoke Creek valley at the southern limit of the subject lands, however due to the size are located outside of any proposed development area.

Within the study area, the two valley corridors are designated as natural heritage areas. The Region Official Plan (ROP) identifies, as part of its Regional Greenlands System, the West Humber River tributary valley as a Core Area. The Town of Caledon Official Plan identifies the valley corridors of Etobicoke Creek and the West Humber River tributary as Environmental Policy Areas (EPA). Outside of the subject lands two wetland areas are identified, one north of Old School Road and the other adjacent to the existing elementary school. Both wetland areas are identified as part of the Provincially Significant Etobicoke Creek Headwater Wetland Complex.

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 eco-element level depending on scale and specific application.

The boundaries of wetland communities have been adjusted to align the wetland limits that were staked by MNRF staff on March 30, 2021.

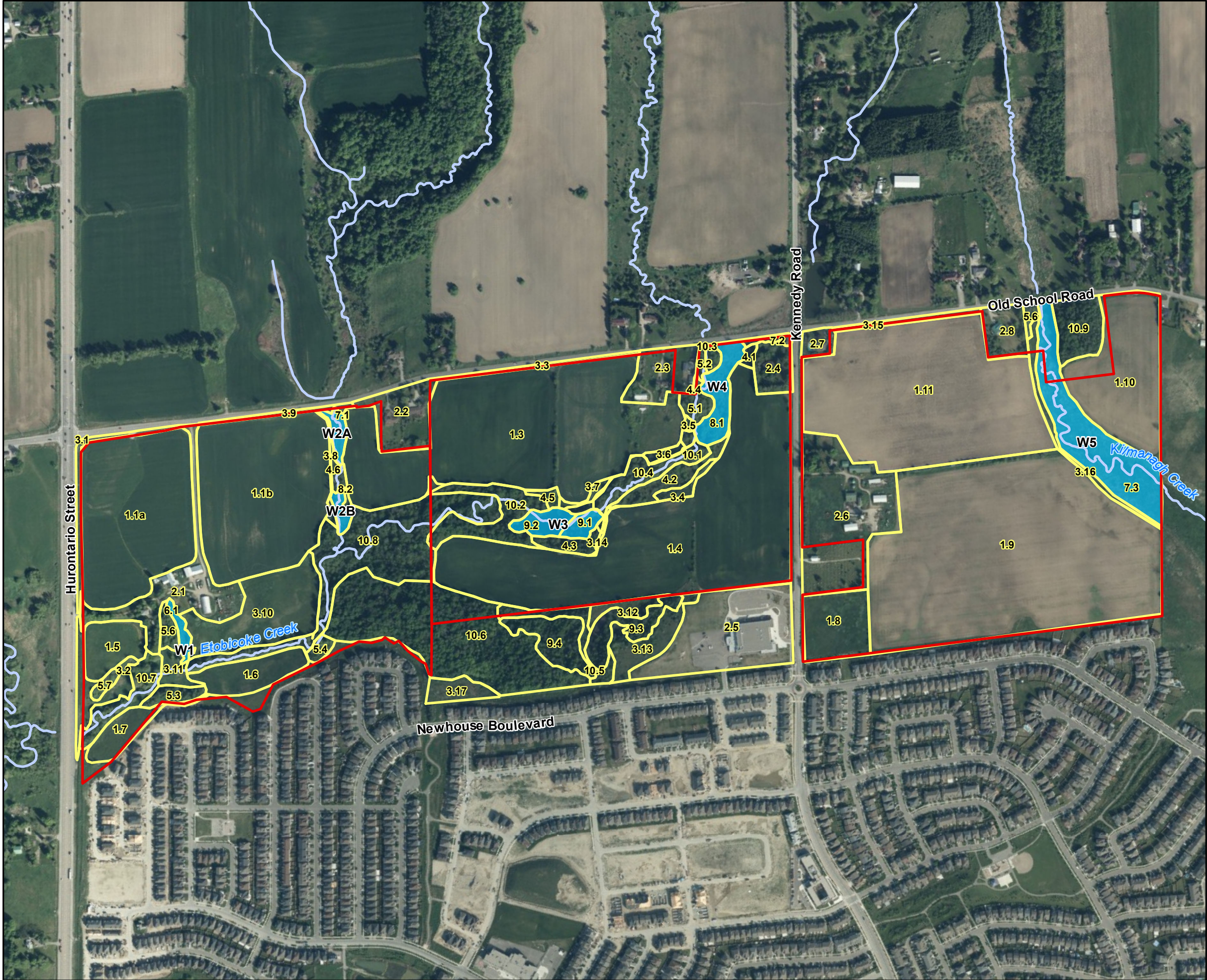
The ELC classification is based on vegetation data gathered from representative communities. Floristic surveys were conducted on June 25 and July 21, 2021, to document vegetation composition and structure for each representative community, including recording species relative abundance and ranking dominant species according to vegetation strata (canopy, subcanopy, understory, and ground layers).

A total of 10 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 6**. The locations of the communities and their corresponding polygon or unit identifiers are mapped in **Figure 4**.

Table 6. Ecological Community Descriptions

Unit	Type	Description
1.1 – 1.11	Agriculture (AG)	Active agricultural fields (row crops).
2.1 – 2.8	Anthropogenic (ANT)	Existing developed areas containing residential and commercial land uses.
3.1 – 3.16	Mineral Cultural Meadow (CUM1-1)	Meadow communities within the study area are dominated by Smooth Brome (<i>Bromus inermis</i>) with some Tall Goldenrod (<i>Solidago altissima</i>).
4.1 – 4.6	Mineral Cultural Thicket (CUT1)	This thicket community is dominated by Common Buckthorn (<i>Rhamnus cathartica</i>) but has rare to occasional stands of Sweet Cherry (<i>Prunus avium</i>), Green Ash (<i>Fraxinus pennsylvanica</i>) and Hawthorn species (<i>Crataegus</i> sp.). Wild Red Raspberry (<i>Rubus idaeus</i> ssp. <i>strigosus</i>), Common Buckthorn, and Tartarian Honeysuckle (<i>Lonicera tatarica</i>) are occasional in the understory. Ground covers include Tall Goldenrod, Smooth Brome Grass, Garlic Mustard (<i>Alliaria petiolata</i>), Thicket Creeper (<i>Parthenocissus vitacea</i>) is common in the ground layer.
5.1 – 5.2	Mineral Cultural Woodland (CUW1)	Cultural Woodlands within the study area are variously dominated by Manitoba Maple (<i>Acer negundo</i>), Common Apple (<i>Malus pumila</i>),

Unit	Type	Description
		Hawthorns, and Black Walnut (<i>Juglans nigra</i>). The understory is comprised of Common Buckthorn while the ground layer is abundant with Tall Goldenrod with Wild Red Raspberry (<i>Rubus idaeus</i> ssp. <i>strigosus</i>), Riverbank Grape (<i>Vitis riparia</i>) and Smooth Brome.
6.1	Reed-canary Grass Mineral Meadow Marsh (MAM2-2)	Meadow marsh community dominated by Reed Canary Grass (<i>Phalaris arundinacea</i>) in association with other wetland forbs and graminoids including Spotted Jewelweed, Lance-leaved Aster (<i>Symphyotrichum lanceolatum</i>), and Swamp Aster (<i>Symphyotrichum puniceum</i>).
7.1 – 7.2	Cattail Mineral Shallow Marsh (MAS2-1)	Marsh communities dominated by Cattail species (<i>Typha</i> sp.) and Reed Canary Grass, with various other wetland forbs and graminoids.
8.1 – 8.2	Willow Mineral Thicket Swamp (SWT2-2)	Balsam Poplar (<i>Populus balsamifera</i>), Scot's Pine (<i>Pinus sylvestris</i>), Manitoba Maple and Trembling Aspen (<i>Populus tremuloides</i>) are scattered and rare within this community, while Willow species (<i>Salix discolor</i> , <i>S. eriocephala</i> .) and Red-osier Dogwood (<i>Cornus sericea</i>) are abundant in the understory. Ground flora includes Lance-leaved Aster, Purple Loosestrife (<i>Lythrum salicaria</i>), Spotted Jewelweed,
9.1	Pondweed Mixed Shallow Aquatic (SAM1-4)	Ponded area created by a beaver dam dominated by pondweeds (<i>Potamogeton</i> spp.) and Duckweed (<i>Lemna minor</i>). Emergent vegetation along the margins includes Northern Water-plantain (<i>Alisma triviale</i>), Broad-leaved Arrowhead (<i>Sagittaria latifolia</i>), sedges (<i>Carex</i> spp.), and Swamp Aster.
9.2	Forb Mineral Meadow Marsh (MAM2-10)	The meadow marsh occurs behind the beaver pond (9.1) and is dominated by Spotted Jewelweed (<i>Impatiens capensis</i>), Lance-leaved Aster, Rice Cutgrass (<i>Leersia oryzoides</i>), Marsh Bedstraw (<i>Galium palustre</i>), with various other wetland forbs and graminoids.
9.3 – 9.4	Poplar Mineral Deciduous Swamp (SWD4-3)	Deciduous swamp dominated by Poplar species (<i>Populus</i> sp.), Green Ash, and Eastern Cottonwood (<i>Populus deltoides</i>). The understory consists of Red osier Dogwood, Pussy Willow, and Green Ash. Ground covers include sedges and Sensitive Fern (<i>Onoclea sensibilis</i>).
10.1, 10.7, 10.8	Fresh to Moist Willow Lowland Deciduous Forest (FOD7-3)	Crack willow (<i>Salix x fragilis</i>) dominates this lowland/floodplain forest community with some Manitoba Maple and Black Walnut associates in the canopy. The subcanopy consists of Crack Willow, Manitoba Maple, Black Walnut, and White Elm (<i>Ulmus americana</i>). The dense understory is comprised of Common Buckthorn. Ground covers include Ostrich Fern (<i>Matteuccia struthiopteris</i>), Tall Goldenrod, Spotted Jewelweed, Garlic Mustard, Enchanter's Nightshade (<i>Circaea canadense</i>), Avens (<i>Geum</i> spp.).
10.3, 10.5	Fresh to Moist Poplar Deciduous Forest (FOD8-1)	Deciduous forest dominated by Poplar species with hardwood associates in the canopy and subcanopy. Ground covers include Lance-leaved Aster, Thicket Creeper, and Common Buckthorn.
10.2, 10.6	Fresh to Moist Sugar Maple – Hemlock Mixed Forest (FOM6-1)	This community is dominated by Sugar Maple with Eastern Hemlock (<i>Tsuga canadensis</i>), America Beech (<i>Fagus grandifolia</i>), and Black Cherry associates in the canopy and subcanopy. The understory consists of Sugar Maple, Choke Cherry, and American Beech. Ground covers are sparse, but include Sugar Maple, Garlic Mustard, Zig-zag Goldenrod (<i>Solidago flexicaulis</i>), and Virginian Waterleaf (<i>Hydrophyllum virginianum</i>).
10.9	Fresh-moist Sugar Maple-Hardwood Deciduous Forest (FOD6-5)	Mid-aged forest consists of Sugar Maple, dead/dying ash trees, and American Basswood.



Ecological Communities

Figure 4

Mayfield West Phase 1 –
Stage 2 Expansion Area

Legend

Ecological Communities

Subject Property

Watercourse (MNRF 2019)

Unit Number(s)	ELC Code	Ecological Communities
1	AG	Agricultural (units 1.1 – 1.11)
2	ANT	Anthropogenic (units 2.1-2.8)
3	CUM1-1	Mineral Cultural Meadow (units 3.1-3.16)
4	CUT1	Mineral Cultural Thicket (units 4.1-4.6)
5	CUW1	Mineral Cultural Woodland
6	MAM2-2	Reed-canary Grass Mineral Meadow Marsh
7	MAS2-1	Cattail Mineral Shallow Marsh (7.1-7.3)
8	SWT2-2	Willow Mineral Thicket Swamp (8.1-8.2)
9.1	MAM2-10	Forb Mineral Meadow Marsh
9.2	SAM1-4	Pondweed Mixed Shallow Aquatic
9.3, 9.4	SWD4-3	Poplar Mineral Deciduous Swamp
10.1, 10.7, 10.8	FOD7-3	Fresh to Moist Willow Lowland Deciduous Forest
10.3, 10.5	FOD8-1	Fresh to Moist Poplar Deciduous Forest
10.6, 10.2	FOM6-1	Fresh to Moist Sugar Maple-Hemlock Mixed Forest
10.9	FOD6-5	Fresh to Moist Sugar Maple Hardwood Deciduous Forest

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GSAI

Glen Schnarr & Associates Inc.

Project: 219527.1 Last Revised: August 2021

Client: Argo Kennedy Limited

Prepared by: DU
Checked by: KU

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3.3.3 Wetland Boundary Delineation

All wetlands on the subject lands were staked by TRCA on March 30, 2021. The staked limits were surveyed by an OLS and geodetic data was provided to TRCA and used to prepare ELC mapping (refer to **Figure 4**).

3.3.4 Floristics

In a study done for the Region of Peel's NAI areas #8130, 9773 and 9779, 122 vascular plants were recorded, of which 15 species are listed as L3 by the TRCA, meaning they are Regional Species of Conservation Concern. Additionally, within the subwatershed study for the Settlement Area Boundary Expansion (Wood 2020), 125 vascular species were recorded, of which 59 are Regional Species of Conservation Concern. No SAR vascular species have been noted in the study area at this time.

A total 181 vascular plant species were recorded in the study area during ELC surveys conducted by Beacon in 2020 and 2021. A plant list is included in **Appendix G**. Of these, 65 (36%) are non-native to Ontario, which is reflective of the agricultural land use history of the study area. 115 of the species are considered provincially common and secure (ranked S5 or S4 provincially by NHIC), while 63 are considered provincially exotic (SE), and three don't have an S-Ranking (SNA). Additionally, all species are ranked L5 and L4 regionally by TRCA (also meaning they are regional common and secure, with the exception of White Spruce (*Picea glauca*), Michigan Lily (*Lilium michiganense*), Harlequin Blue Flag (*Iris versicolor*), and Running Strawberry-bush (*Euonymus obovatus*), which are listed by TRCA as L3 (Vulnerable). Although White Spruce have been introduced to the study area through plantings, and the remaining three L3 species are located within the natural heritage system.

3.3.5 Tree Resources

Beacon is currently in the process of characterizing the treed resources within the study area. An inventory and evaluation of the existing individual trees and tree groupings will be completed by an Arborist certified by the International Society of Arboriculture and presented in the Final CEISMP report.

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

The Russell parcel is not participating in the current study. As a result, trees located on non-participating landowner properties will not be included in the detailed tree inventory surveys of the Final CEISMP submission. It is anticipated that an inventory of trees on the Russell parcel will be completed at the Draft Plan stage.

3.3.6 Avifauna

In 2013, 42 species of bird were recorded by the Region of Peel within the study area (Peel NAI areas #8130, 9773 and 9779). Within these records, three SAR birds were included:

- Barn Swallow (*Hirundo rustica*) – Threatened;
- Bank Swallow (*Riparia riparia*) – Threatened; and
- Wood Thrush (*Hylocichla mustelina*) – Special Concern.

Wood Thrush is also ranked as L3 (Regional Species of Conservation Concern) by the TRCA. Another L3 ranked species was recorded in the study area in 2013: Mourning Warbler (*Geothlypis philadelphia*).

Within the subwatershed study for the Settlement Area Boundary Expansion (Wood 2020), 58 avian species were recorded of which 23 are considered Regional Species of Conservation Concern. Also, four SAR birds recorded by Wood (2020) included:

- Common Nighthawk (*Chordeiles minor*) – Special Concern;
- Bobolink (*Dolichonyx oryzivorus*) – Threatened;
- Wood Thrush – Special Concern; and
- Eastern Wood-pewee (*Contopus virens*) – Special Concern.

In 2021, Beacon completed breeding bird surveys in the Study Area. 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 H**). Survey details are presented in **Table 7**.

Table 7. Breeding Bird Survey Details 2021

Details	Survey 1	Survey 2	Survey 3
Date:	June 5, 2021	June 17, 2021	June 24, 2021
Start Time:	6:30	6:30	6:15
End Time:	9:30	9:30	7:15
Temperature (°C):	21-24	10-18	16-17
Wind speed (beaufort):	3-6	0-2	1
Cloud cover (%):	10-50	0	25-50
Precipitation:	None	None	None

A total of 49 species were documented during the 2021 breeding season (**Appendix I**). Of the 49 species documented, 44 exhibited evidence of breeding and are considered to be breeding on the subject lands. Species that were observed only migrating through, flying over or foraging within the Study Area included: Ring-billed Gull (*Larus delawarensis*), Chipping Sparrow (*Spizella passerina*), Mallard (*Anas platyrhynchos*), Turkey Vulture (*Cathartes aura*), and Horned Lark (*Eremophila alpestris*).

Species observed were generally associated with the following habitat types: agriculture/hedgerow, watercourse/wetland, forest, house/garden and meadow habitats. Field notes from the breeding bird

surveys in 2021 indicated where each species has been recorded, and has been included as **Appendix I**.

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 were farmed at the time of survey, and there are also residential areas nearby. Some of the more abundant species recorded included American Robin (*Turdus migratorius*) and Song Sparrow (*Melospiza melodia*).

Other species observed that are also tolerant of anthropogenically modified habitats include: Blue Jay (*Cyanocitta cristata*), American Crow (*Corvus brachyrhynchos*), House Wren (*Troglodytes aedon*), European Starling (*Sturnus vulgaris*), Northern Cardinal (*Cardinalis cardinalis*), Red-winged Blackbird (*Agelaius phoeniceus*), Brown-headed Cowbird (*Molothrus ater*) and American Goldfinch (*Spinus tristis*).

Additionally, forest bird species were detected breeding on the property within the treed habitats. These included such species as Red-bellied Woodpecker (*Melanerpes carolinus*), Downy Woodpecker (*Picoides pubescens*), Northern Flicker (*Colaptes auratus*), Eastern Wood-Pewee (*Contopus virens*), Great-crested Flycatcher (*Myiarchus crinitus*), Red-eyed Vireo (*Vireo olivaceus*) and American Redstart (*Setophaga ruticilla*).

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. Green Heron (*Butorides virescens*), Wood Duck (*Aix sponsa*), Spotted Sandpiper (*Actitis macularia*), Swamp Sparrow (*Melospiza georgiana*) and Common Yellowthroat (*Geothlyphis trichas*) were observed in the wetland habitats.

Of the 44 species that exhibited breeding evidence, all have a conservation rank of S5 (Secure), S4 (Apparently Secure) or SE (Exotic) (NHIC 2020). However, two avian species breeding in the Study Area are listed as Threatened under the *Endangered Species Act* (ESA 2007), including Barn Swallow (*Hirundo rustica*) and Eastern Meadowlark (*Sturnella magna*). Additionally, two species listed as Special Concern Provincially were recorded: Wood Thrush (*Hylocichla mustelina*) and Eastern Wood-Pewee (*Contopus virens*) however Special Concern wildlife are not afforded protection under the ESA.

Barn Swallow is an open country aerial insectivore that nests primarily in barns and similar structures and forages over fields, meadows and bodies of water. This species has been listed as threatened because it “has experienced very large declines that began somewhat inexplicably in the mid to late 1980s in Canada” (COSEWIC 2011a). Four Barn Swallow were observed foraging in close proximity to the barns on the Newhouse property, though due to access restriction, nesting was not confirmed. Beacon is of the opinion that it is very likely that they are nesting within the barns as this represents typically favoured and suitable habitat.

As discussed, Eastern Meadowlark are protected under the ESA and are additionally considered an area sensitive species that breeds in extensive agricultural grasslands or old fields with tall, lush forb vegetation, and has a tolerance for some shrubs within the meadow habitat (COSEWIC 2011b). One Eastern Meadowlark territory was observed in ELC Unit 3.10 (**Figure 4**).

Historically, in eastern North America, open country species such as 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 generally declining for a number of reasons including modern agricultural practices.

Wood Thrush is a somewhat common songbird species of woodlands, especially larger deciduous woodlands. It has been listed because of significant population declines due to habitat fragmentation and destruction within its breeding grounds. It is also vulnerable to nest predation and cowbird parasitism associates within the fragmentation of breeding habitat. Additionally, there is threat of habitat loss where it overwinters (COSEWIC 2012b). One Wood Thrush territory was located in ELC Unit 10.6 (**Figure 4**).

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 and mature forest stands with little understory vegetation. It is an aerial insectivore, a group of birds that has been declining rapidly in the past few decades to a variety of factors including potential changes in insect populations and loss of habitat on their wintering grounds in Latin America. Though Wood-pewee numbers have declined by about 25% in the past decade, they are still common in forests throughout eastern North America and seem to be able to breed in relatively small forest patches and woodlots (COSEWIC 2012a). One Eastern Wood-Pewee territory was located in ELC Unit 10.6 (**Figure 4**).

Further discussion for Barn Swallow and Eastern Meadowlark is provided in **Section 3.3.10.6**, while Wood Thrush and Eastern Wood-Pewee are discussed further in **Section 3.3.10.4**.

As previously mentioned, Eastern Meadowlark are threatened and 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. Other area-sensitive species noted included Hairy Woodpecker (*Dryobates villosus*), American Redstart (*Setophaga ruticilla*) and Savannah Sparrow (*Passerculus sandwichensis*). The Hairy Woodpecker and American Redstart are relatively tolerant of disturbance and occur somewhat regularly in fragmented woodlands throughout southern Ontario. Savannah Sparrow is very common and widespread and breeds in a variety of open field situations from agricultural fields to large cultural meadows.

TRCA ranks flora and fauna from L1 (highest concern, very uncommon) to L5 (least concern, very common and secure), with species between L1 and L3 considered species of regional conservation concern within the jurisdiction (TRCA 2016). Five of the species observed breeding are of regional concern and have rank of L3 meaning they can withstand minor disturbance, are generally secure in the natural matrix but are of regional concern. Species include Eastern Meadowlark, Wild Turkey (*Meleagris gallopavo*), Black-billed Cuckoo (*Coccyzus erythrophthalmus*), Wood Thrush (*Hylocichla mustelina*) and Vesper Sparrow (*Pooecetes gramineus*).

3.3.7 Herpetofauna

Anurans

In a study done for the Region of Peel's NAI areas #8130, 9773 and 9779, two anuran species were recorded in the study area, including Wood Frog (*Lithobates sylvaticus*), which is listed as L2 by the TRCA, meaning it is a Regional Species of Conservation Concern.

Within Wood's subwatershed study (2020), seven anuran species were recorded. Of these records, five are Regional Species of Conservation Concern, including:

- Gray Treefrog (*Hyla versicolor*);
- American Bullfrog (*Lithobates catesbeiana*);
- Wood Frog;
- Spring Peeper (*Pseudacris crucifer crucifer*); and
- Northern Leopard Frog (*Lithobates pipiens*).

No SAR anurans have been noted in the study area at this time.

Beacon ecologists completed breeding amphibian surveys according to Birds Canada's Marsh Monitoring Program protocol and consisted of auditory surveys undertaken during the prime breeding period to record calling males that are present. Species that were incidentally observed were included as well. Three surveys were spread throughout the breeding season in an attempt to include the short temporal peak for each species of interest. Survey dates are spaced so as to record different amphibian species that exhibit peak vocalization activity during different times in the spring. These surveys are conducted to record the presence or absence of breeding amphibians in potentially suitable habitat.

Breeding amphibian surveys on the subject area were completed after dusk and during suitable weather conditions. All areas that contained potential breeding amphibian habitat (i.e., wetlands) were surveyed from a distance that would enable calling amphibians to be heard. A total of 9 survey stations were established as illustrated and numbered on **Figure 3**. Survey conditions are provided in **Table 8**; wind conditions are provided using the Beaufort Scale.

Table 8. Breeding Amphibian Survey Conditions

Survey Date	Weather
April 5, 2021	Temp: 11°C Wind: 1 Precip: None
May 20, 2021	Temp: 25°C Wind: 1 Precip: None
June 14, 2021	Temp: 17°C Wind: 0 Precip: None

The results of the amphibian breeding surveys are summarized below in **Table 9**.

Table 9. Anuran Survey Results 2021

Station	Survey 1	Survey 2	Survey 3
1	-	-	-
2	WOFR 1(1)	-	-
3	-	GRTR 1(1)*	GRTR 2(2)
4	-	AMTO 1(1)* GRTR 1(1)*	-
5	-	-	-
6	-	-	-
7	-	AMTO 1(1)	-
8	SPPE 3	SPPE 3	-

Station	Survey 1	Survey 2	Survey 3
	WOFR 3	GRTR 1(2)	
9	SPPE 3 WOFR 3	SPPE 1(1)	

*= Call recorded from outside of station area

Results in **bold** are recorded within the subject lands

AMTO = American Toad, GRFR = Green Frog, GRTR = Gray Treefrog, SPPE = Spring Peeper, WOFR = Wood Frog

Code 0 - No calling detected

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.

Beacon ecologists surveyed for breeding amphibians at a total of nine stations throughout the study area (**Figure 3**). This included two stations with suitable breeding habitat in the study that were not directly accessible during the survey evenings due to impassible high-water conditions. Calling amphibians could be heard from these inaccessible stations while surveying from station 1 and were distinctly separate as staff inferred distance through auditory volume. A full chorus of Spring Peeper was heard from station 8 during the first and second surveys along with a full chorus of Wood Frog during the first round, and two Gray Treefrogs during the second visit. Similarly, both Wood Frog and Spring Peeper were recorded in full chorus during the first visit associated with station 9, along with one Spring Peeper continuing to vocalize during the second visit.

No amphibians were heard calling on any survey evenings within the survey area at stations one, five and six. All these stations were located within the riparian habitat along the creek. Water levels were noted to be high around station 1 and a pair of beavers were observed which has likely contributed to the water levels. The high water levels made the area unsuitable for early breeding amphibian species including Wood Frog and Spring Peeper. Conditions are however favourable to aquatically overwintering species, including Green Frog.

A total of four amphibian species were heard calling within the study area over the three survey evenings. Three of these species – Wood Frog, Spring Peeper and Gray Treefrog – were also recorded during Wood's subwatershed study (2020). The fourth species, American Toad, was not recorded during this subwatershed study, however this is a commonly occurring amphibian species and is not of regional conservation concern.

Reptiles

In 2013, two species of reptiles were recorded by the Region of Peel within the study area (Peel's NAI areas #8130, 9773 and 9779. These included Northern Red-bellied Snake (*Storeria o. occipitomaculata*) and Midland Painted Turtle (*Chrysemys picta marginata*).

Additionally, within the subwatershed study for the Settlement Area Boundary Expansion (SABE) (Wood 2020), four reptile species were recorded:

- DeKay's Brownsnake (*Storeria dekayi dekayi*);
- Eastern Gartersnake (*Thamnophis sirtalis sirtalis*);
- Midland Painted Turtle; and
- Northern Red-bellied Snake.

Midland Painted Turtle and Northern Red-bellied Snake are ranked as L3 by the TRCA and are Regional Species of Conservation Concern. No SAR reptiles were recorded within the study area at this time.

Beacon ecologists undertook reptile surveys in the study area in 2021. These surveys consist of slowly walking along the outer edge of the pond using binoculars to scan its perimeter and other potential basking sites within the pond. Surveys were completed between 8:00 am and 5:00 pm during sunny periods when the air temperature was greater than water temperature and after inclement weather.

Details of these surveys, including weather conditions, are included in **Table 10**

Table 10. Basking Turtle Survey Details

	Survey 1	Survey 2	Survey 3
Date:	May 6, 2021	May 13, 2021	May 18, 2021
Start time:	11:30 pm	1:45 pm	11:00 am
End time:	12:30 pm	2:15 pm	11:30 am
Temp:	12 °C	17 °C	22 °C
Wind (Beaufort Scale):	0-1	0-1	1
Cloud cover:	5%	40%	5%
Precipitation:	None	None	None

Snakes were searched for as incidental observations during other field surveys completed by Beacon in 2020-2021.

Over the three basking turtle surveys, two Midland Painted Turtles were observed during the first survey and one Midland Painted Turtle was seen on each the second and third surveys. The subject lands contain desirable turtle habitat within ELC Unit 9.2, where there is deep water and basking structures (i.e., logs, rocks). Additionally, it is possible that turtles are utilizing Etobicoke Creek and Kilmanagh Creek as a movement corridor.

Furthermore, no snakes were noted during any field visits in 2020-2021 in the subject lands.

3.3.8 Bats

Beacon considered the potential presence of SAR bats in accordance with MNRF Guidelines, which describe the recommended methods to investigate endangered bats and their treed habitat. As per Step 1 of the MNRF guidelines, candidate maternity roost habitat is assessed in treed vegetation communities, none of which are being removed by the proposed development. Accordingly, surveys within treed communities were not undertaken. A building on the Hicks property that is proposed for removal and could potentially provide roosting habitat for SAR bats were subject to exit surveys.

On July 28 and 29, 2021, visual and acoustic surveys using handheld detectors were undertaken to determine if the buildings proposed for removal provided roosting habitat for SAR bats. Based on a review of each the building during a reconnaissance field visit on May 6, 2021, it was determined that it could potentially provide habitat for bats.

Beacon staff completed bat exit surveys for this building using the methodology provided within the MNRF Guelph District's *Use of Buildings and Isolated Trees by Species at Risk Bats: Survey Methodology* (2014). Per the protocol, two persons completed each survey; survey locations were selected so that surveyors would have an unobstructed and comprehensive view of any bats that may be entering or exiting the building being surveyed.

Four species of bats were recorded by the handheld detectors in the vicinity of the building surveyed. This includes: Eastern Red Bat (*Lasiurus borealis*), Big Brown Bat (*Eptesicus fuscus*), Hoary Bat (*Lasiurus cinereus*), and Silver-haired Bat (*Lasionycteris noctivagans*). Notably, no bats were observed exiting the building during exit surveys.

3.3.9 Aquatic Habitat & Fish Communities

The CEISMP TOR requires that detailed studies and background review be undertaken to confirm which fish communities and aquatic habitats are present in the study area and according to creek system.

The MNRF Aquatic Resource Area (ARA; MNRF 2011a) database notes the following fish species as being associated with the broader Etobicoke Creek system:

- Blackchin Shiner;
- Blacknose Shiner;
- Bluntnose Minnow;
- Brook Stickleback;
- Brown Bullhead;
- Common Shiner;
- Creek Chub;
- Eastern Blacknose Dace;
- Fantail Darter;
- Golden Shiner;
- Johnny Darter x Tessellated Darter;
- Longnose Dace;
- Northern Redbelly Dace;
- Pearl Dace;
- Pumpkinseed;
- Rock Bass; and
- White Sucker.

The MNRF ARA (MNRF 2011b) database notes the following fish species as being associated with the broader Humber River system:

- Blackchin Shiner;
- Bluntnose Minnow;
- Brook Stickleback;
- Brook Trout;
- Common Shiner;
- Creek Chub;
- Eastern Blacknose Dace;
- Fantail Darter;
- Fathead Minnow
- Golden Shiner;
- Johnny Darter x Tessellated Darter;
- Largemouth Bass;
- Longnose Dace;
- Mottled Sculpin;
- Ninespine Stickleback;
- Northern Hog Sucker;
- Northern Redbelly Dace;
- Pearl Dace;
- Pumpkinseed;
- Redside Dace;
- Rock Bass;
- Slimy Sculpin; and
- White Sucker.

The ARA database classifies that all watercourse segments found within the Etobicoke Creek portion of the study area (refer to **Figure 3**) are supportive of a warmwater fishery. Whereas, all watercourse

segments found within the West Humber River watershed (i.e., Kilmanagh Creek) within the study area are supportive of a coldwater fishery.

Through correspondence with MECP staff (included in **Appendix C**) it was confirmed that the portion of Kilmanagh Creek that flows through the Russell parcel within the study area is considered occupied habitat for the endangered Redside Dace. 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*.

To date, Beacon has completed assessments of the various aquatic habitats in the study area lands located west of Kennedy Road (i.e., the Hicks and Newhouse parcels; refer to **Figure 1**). Due to landowner restrictions, the aquatic habitats located within the Russell parcel of the study area have not been ground-truthed to date and are limited to classification through background sources.

The completed aquatic investigations included the evaluation of the main watercourse segments as well as contributing headwater features that drain the tableland areas located north and south of the Etobicoke Creek corridor. In addition to the surface evaluations, DS consultants have instrumented the wetland segments of the Etobicoke Creek corridor, and various headwater features throughout the study area to help evaluate subsurface drainage conditions and interactions with surface flows. Subsurface hydrologic findings from these investigations are included in **Section 3.2.4** and will be integrated into the necessary Wetland Risk Evaluation and subsequent Wetland Feature Water Balance analyses in **Section 4.1.3**.

3.3.10 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 ten 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 11** below.

Table 11. 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)	x
Environmentally Significant Areas (ESAs)	x
Niagara Escarpment Natural Areas	x
Niagara Escarpment Protection Areas	x
Habitat of Threatened and Endangered Species	✓
Fisheries	✓
Wildlife Habitat	✓
Valley and Stream Corridors	✓
Groundwater	✓
Wellhead Protection Areas	x
Soils	✓
Natural Slopes	✓
Oak Ridges Moraine Key Natural Heritage Features	x
Oak Ridges Moraine Hydrologically Sensitive Features	x
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.

3.3.10.1 Wetlands

Through background review and field investigations, it has been confirmed that the Study Area supports a number of wetland communities. The locations of these wetlands are illustrated on **Figure 4**.

None of the wetlands on the subject lands have been evaluated, however portions of their boundaries were staked by TRCA on March 30, 2021. Portions of the provincially significant Etobicoke Creek Headwater Wetland Complex are located in the study area, adjacent to the subject lands.

In terms of establishing the significance of the wetland features on the subject properties, 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.

While unevaluated wetlands are not considered significant under the ROP, they are recognized 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.

The Town of Caledon Official Plan does not include a specific definition or criteria for identification of Significant Wetlands. Wetlands are however in the Town's Ecosystem Framework as Wetland Core Areas and Other Wetlands. Wetland Core Area includes wetlands that have been determined to be significant and approved by MNRF (i.e. provincially significant wetlands). Other Wetlands are defined as wetlands that have not identified as Wetland Core Areas (i.e., unevaluated wetlands and evaluated wetlands that are not provincially significant). 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. provincially significant wetlands), 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 are the portions of the provincially significant Etobicoke Creek Headwater Wetland Complex located in the study area, adjacent to 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.

3.3.10.2 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*
 - 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 plantanoides*), 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.

Based on the above woodland definition, the following treed communities would qualify as woodlands (Refer to **Figure 4**):

- Poplar Mineral Deciduous Swamp – ELC units 9.3, 9.4 (SWD4-3);
- Fresh to Moist Willow Lowland Deciduous Forest – ELC units 10.1, 10.7, 10.8 (FOD7-3);
- Fresh to Moist Sugar Maple - Hardwood Deciduous Forest – ELC units 10.9 (FOD6-5);
- Fresh to Moist Poplar Deciduous Forest – ELC units 10.3, 10.5 (FOD8-1); and
- Fresh to Moist Sugar Maple – Hemlock Mixed Forest – ELC units 10.6, 10.2 (FOM6-1).

Based on the application of the significance criteria noted above, the woodland communities listed above would be considered a significant woodlands because they are form part of a larger woodland that is greater than 2 ha in area and / or situated within 30 m of a watercourse feature.

3.3.10.3 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.

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.

Etobicoke Creek and Kilmanagh Creek would be a Valley and Stream Corridor due to their landform, inclusion of fish habitat and their permanent flow regime.

3.3.10.4 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 J**.

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 12**. 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.

Beacon ecologists are undertaking various wildlife surveys in 2021 to assist in evaluating which SWH may be present in the study area.

Table 12. List of Regional Significant Wildlife Habitat Criteria

Significant Wildlife Habitats Criteria*	Subject Lands	Study Area	Not Present	Not Applicable
A1. Deer Wintering Area			ü	
A2. Colonial Bird Nesting Sites (e.g., heronry, gull colony)			ü	
A3. Waterfowl Nesting Habitat			ü	
A4i. Migratory Landbird Stopover Areas				ü
A4ii. Migratory Bat Stopover Areas			ü	
A4iii. Migratory Butterfly Stopover Areas				ü
A4iv. Migratory Waterfowl Stopover and/or Staging (Terrestrial)			ü	
A4v. Migratory Waterfowl Stopover and/or Staging (Aquatic)			ü	
A4vi. Migratory Shorebirds Stopover Areas			ü	
A5. Raptor Wintering Areas (i.e., used for feeding and/or roosting)			ü	
A6. Snake Hibernacula	ü	ü		
A7. Bat Maternal Roosts and Hibernacula	ü	ü		
A8. Bullfrog Concentration Areas			ü	
A9. Wild Turkey Winter Range				ü
A10. Turkey Vulture Summer Roosting Areas			ü	
B1. Rare Vegetation Communities			ü	
B2. Forests Providing a High Diversity of Habitats (captured by Significant Woodlands)	ü	ü		
B3. Old-growth or Mature Forest Stands (captured by Significant Woodlands)			ü	
B4. Foraging Areas with Abundant Mast (i.e., nut bearing trees)			ü	
B5. Highly Diverse Areas			ü	
B6. Cliffs and Caves			ü	
B7. Seeps and Springs			ü	
B8i. Amphibian Breeding Habitat - Forested Sites (e.g., vernal pools)	ü	ü		
B8ii. Amphibian Breeding Habitats - Non-forested Sites (e.g., marshes)			ü	
B9. Turtle Nesting Habitat and Turtle Overwintering Areas	ü	ü		
B10. Habitat for Area-Sensitive Forest Interior Breeding Bird Species			ü	
B11. Habitat for Open Country and Early Successional Breeding Bird Species			ü	
B12. Habitat for Wetland Breeding Bird Species			□	
B13i. Raptor Nesting Habitat - Wetlands, Pond and Rivers			ü	
B13ii. Raptor Nesting Habitat - Woodland Habitats			ü	
B14. Mink, River Otter, Marten and Fisher Denning Sites			ü	
B15. Mineral Licks				ü
C1. Species identified as Nationally Endangered or Threatened by COSEWIC which are not listed as Endangered or Threatened under Ontario's <i>Endangered Species Act</i>			ü	

Significant Wildlife Habitats Criteria*	Subject Lands	Study Area	Not Present	Not Applicable
C2. Species identified as Special Concern based on Species at Risk in Ontario List that is periodically updated by the MNRF/MECP	ü	ü		
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	ü	ü		
C4. Species whose populations appear to be experiencing substantial declines in Ontario	ü	ü		
C5. Species that have a high percentage of their global population in Ontario and are rare to uncommon in the Regional Municipality of Peel			ü	
C6. Species that are rare to uncommon in the Regional Municipality of Peel, even though they may not be provincially rare	ü	ü		
C7. Species that are subject of recovery programs	ü	ü		
C8. Species considered important to the Regional Municipality of Peel, based on recommendation from a local Conservation Advisory Committee				ü
D1. Animal Movement Corridors	ü	ü		

*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 12**), the preliminary SWH evaluation 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 support the following SWH types:

- Bat Maternity Colony within the forested communities;
- Turtle Overwintering within wetlands with permanent open water and the Etobicoke Creek Headwater PSW Complex; and
- Snake Hibernacula within natural, semi-natural communities and areas with old anthropogenic foundations.

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. However, the following potential SWH types could be found in the study area:

- Amphibian Breeding Habitat (Woodland) within ELC units 10.6 and 9.3.

Habitat for Species of Conservation Concern

Based on a review of evaluation criteria related to Habitat for Species of Conservation Concern and the field studies conducted by Beacon in 2020-2021, it was determined that the study area supports the following listed Special Concern species:

- Eastern Wood-Pewee within forest habitat; and
- Wood Thrush within forest habitat.

Animal Movement Corridor

Animal movement corridors in the study area are limited to the communities associated with the watercourses. These linear features likely support local scale animal movements, however their function as linkage corridors is impaired by the presence of barriers such as roads. Nevertheless, they have been identified as potential candidate SWH. 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 preliminary analysis of Candidate SWH that has been identified through this CEISMP is limited to features that will ultimately form part of the future NHS. However, snake hibernacula could exist outside the NHS and for this reason it is recommended that this be confirmed through further study at the draft plan stage,

3.3.10.5 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.

Following review of available background materials, it is determined that all segments of the Etobicoke Creek tributaries and Kilmanagh Creek within the study area are considered fish habitat. As for the headwater features located upon the tablelands, it was determined following the 2021 site investigations that the EC-1A and EC1-C reaches may provide seasonal (i.e., springtime) fish habitat as these reaches are directly connected to the main branch of Etobicoke Creek. No other headwater features within the

Hicks or Newhouse properties were identified as suitable habitat for fish and only provide contributing functions to Etobicoke Creek such as allochthonous materials. The headwater features identified through aerial interpretation within the Russell parcel were not evaluated in 2021 due to restricted access by the current landowner and will require additional investigation once land access is granted.

3.3.10.6 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 undertaking the review for this CEISMP, Beacon also reviewed all available background information pertaining to Threatened and Endangered Species 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 fifteen endangered and threatened species in the vicinity of the study area.

Beacon ecologists are undertaking various wildlife and vegetation surveys in 2021 assist in evaluating which Threatened and Endangered Species may be present in the study area. The following evaluation presented below **Table 13** and in **Appendix D** describes that eleven of the fifteen Threatened and Endangered Species identified through the background review could be utilizing the study area.

Table 13. Potential for Habitats of Threatened and Endangered Species

Species	ESA Status	Subject Lands	Study Area
Bank Swallow (<i>Riparia riparia</i>)	Threatened	Species recorded previously in 2003. The species was not observed during breeding bird investigations in 2021.	Same
Barn Swallow (<i>Hirundo rustica</i>)	Threatened	Nests located on subject lands in 2020. Breeding activity was observed during 2021 Breeding Bird investigations within ELC Unit 2.1.	Same
Bobolink (<i>Dolichonyx oryzivorus</i>)	Threatened	Potentially suitable habitat may be present within the field habitat. The species was not observed during breeding bird investigations in 2021.	Species located within the study area in 2020.
Chimney Swift (<i>Chaetura pelagica</i>)	Threatened	Potentially suitable habitat may be present within the anthropogenic structure or within tree cavities. The species was not observed during breeding bird investigations in 2021.	Same
Eastern Meadowlark (<i>Sturnella magna</i>)	Threatened	Breeding activity was observed in ELC Unit 3.10 during the 2021 breeding bird investigations.	Same
Redside Dace (<i>Clinostomus elongatus</i>)	Endangered	The KC-1 reach of Kilmanagh Creek was confirmed through correspondence with MECP to be occupied habitat for Redside Dace.	Same

Species	ESA Status	Subject Lands	Study Area
Eastern Small-footed Myotis (<i>Myotis leibii</i>)	Endangered	All FO- and SW- communities could provide suitable habitat. All buildings and structures to be screened for potential habitat and exit surveys completed where applicable. These surveys are to be completed for buildings being removed by Beacon in 2021.	Same
Little Brown Myotis (<i>Myotis lucifugus</i>)	Endangered	Same as above	Same as above
Northern Myotis (<i>Myotis septentrionalis</i>)	Endangered	Same as above	Same as above
Tricoloured Bat (<i>Perimyotis subflavus</i>)	Endangered	Same as above	Same as above
Butternut <i>Juglans cinerea</i>	Endangered	Not located during previous surveys for the study area. The species was not observed during vegetation investigations in 2021.	Same

*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 through the land use planning for the study area is provided in **Section 4.1.4.4**.

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 completed to date, 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 completed by DS (2021), 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 about 262.7 to 272.0 masl on the Hicks property and from 258.0 to 261.1 on the Newhouse property. In comparison to ground surface, water levels ranged from about 1.0 m (Elev. 264.80 masl) above ground surface (ags), south of Etobicoke Creek on the Hicks property to about 4.1m (Elev. 263.7 masl) below the existing ground surface (bgs) north of Etobicoke Creek on the Hicks property. The highest measured groundwater level of 1.0 m ags is considered to be localized in the south-central portion of the Hicks property within the area of a proposed SWM pond. Seasonal variations of water levels are expected to range from about 1 to 2 m across the subject lands. Continued groundwater monitoring through 2021 and winter and spring of 2022 will confirm seasonal high groundwater levels.

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, with exception of those on the Russell parcel, are being assessed using the TRCA HDFA Guidelines (2014b). HDFs on the Russell parcel are being assessed through background review. As a result, there are twelve (12) drainage features on the subject lands that have been identified; nine (9) are headwater features to Etobicoke Creek watershed and three (3) are headwater features to the West Humber River watershed. For the purposes of the HDFA, the twelve HDFs were subdivided into twenty-one (21) reaches (**Figure 3**). Following the 2021 HDFA field investigations as completed by Beacon, management recommendations were 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 six (6) HDF reaches that have been identified as No Management (ref. **Table 3**). These reaches can be removed without any need for mitigation or management, and it is therefore recommended that they be classified as low constraint features for the purposes of the CEISMP constraint analysis.

There is one (1) HDF reach that has been identified as Maintain Recharge (ref. **Table 3**). This reach can be removed provided maintenance of any baseflow contribution is maintained. Verification of baseflow contribution is to be determined through an accompanying groundwater analysis. It is therefore recommended that this reach be classified as a low to moderate constraint features for the purposes of the CEISMP constraint analysis, depending on baseflow contributions.

There are seven (7) HDF reaches that have been identified as Mitigation (ref. **Table 3**). If necessary, the reaches within the proposed within the future development area 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 two (2) HDF reaches (EC1-A and EC1-C) that have been identified as Protection. These reaches are 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.

There are five (5) HDF reaches that were not assessed as part of the 2021 investigations completed by Beacon due to site access restrictions as associated with the Russell parcel (ref. **Figure 1**). Through background aerial imagery it is determined that three HDF features composed of the five (5) HDF reaches exist upon the landscape, and the property is confirmed to be actively tile drained (OMAFRA 2020). Going forward, it is expected that these features will be subject to detailed assessments as part of a future draft plan submission.

4.1.2.2 *Geomorphological Hazards*

As was discussed in **Section 3.2.5.3** meander belts were delineated for Reaches TEC1 and KC1 based on the lateral extent of the outermost meander bends along the reach over the available historical record. The resultant 25 m and 54 m dimensions for Reaches TEC1 and KC1, respectively, were then reviewed relative to available topographic mapping and field observations to ensure that it was sufficient to capture the active (bankfull) channel and evidence of lateral occupation of the floodplain at the reach scale. A 20% factor of safety (10% either side) was then applied to this preliminary meander belt in order to account for long-term adjustments in channel form (channel erosion and migration), as well as potential post-development changes in hydrologic regime. The resultant recommended meander belt dimensions for Reaches TEC1 and KC1 of 30 m and 65 m, respectively, are illustrated in Figure 3 of the Geomorphic Assessment Report (**Appendix F**).

As Reaches EC1, EC2 and EC3 are situated within a confined valley (valley corridor), meander belt limits were not delineated. The regulatory floodline represents a more appropriate tool for delineating the hazard limits of these channel reaches.

4.1.2.3 *Flood Hazards*

The existing floodplain model for Etobicoke Creek has been refined through the subject lands. The base model was provided by the TRCA and reaches of the model through the subject lands were updated based on site-specific survey information and LiDAR data. Reaches were modified from their confluence on the subject lands to the upstream crossings of Old School Road. An additional reach was added to

the model to define flood levels between the confluence of the two reaches and the downstream crossing of Highway 10 / Hurontario Street. Culvert details of the crossings of Old School Road were added based on survey information or culvert replacement details shown on the design drawings of the imminent reconstruction of Old School Road, as appropriate. Manning's roughness coefficients were reviewed and refined. The existing beaver dam was included in the model as an inline structure based on survey data.

Based on the above, design water levels and velocities under existing conditions for Etobicoke Creek were determined and incorporated into the development limit constraint mapping and overall design of the site. This regional flood mapping was used to identify the limits of existing flood hazards and is shown on the comprehensive constraint map (**Figure 5**). Details of the floodplain assessment is provided in the FSR (DSEL 2021).

4.1.2.4 Slope Hazards

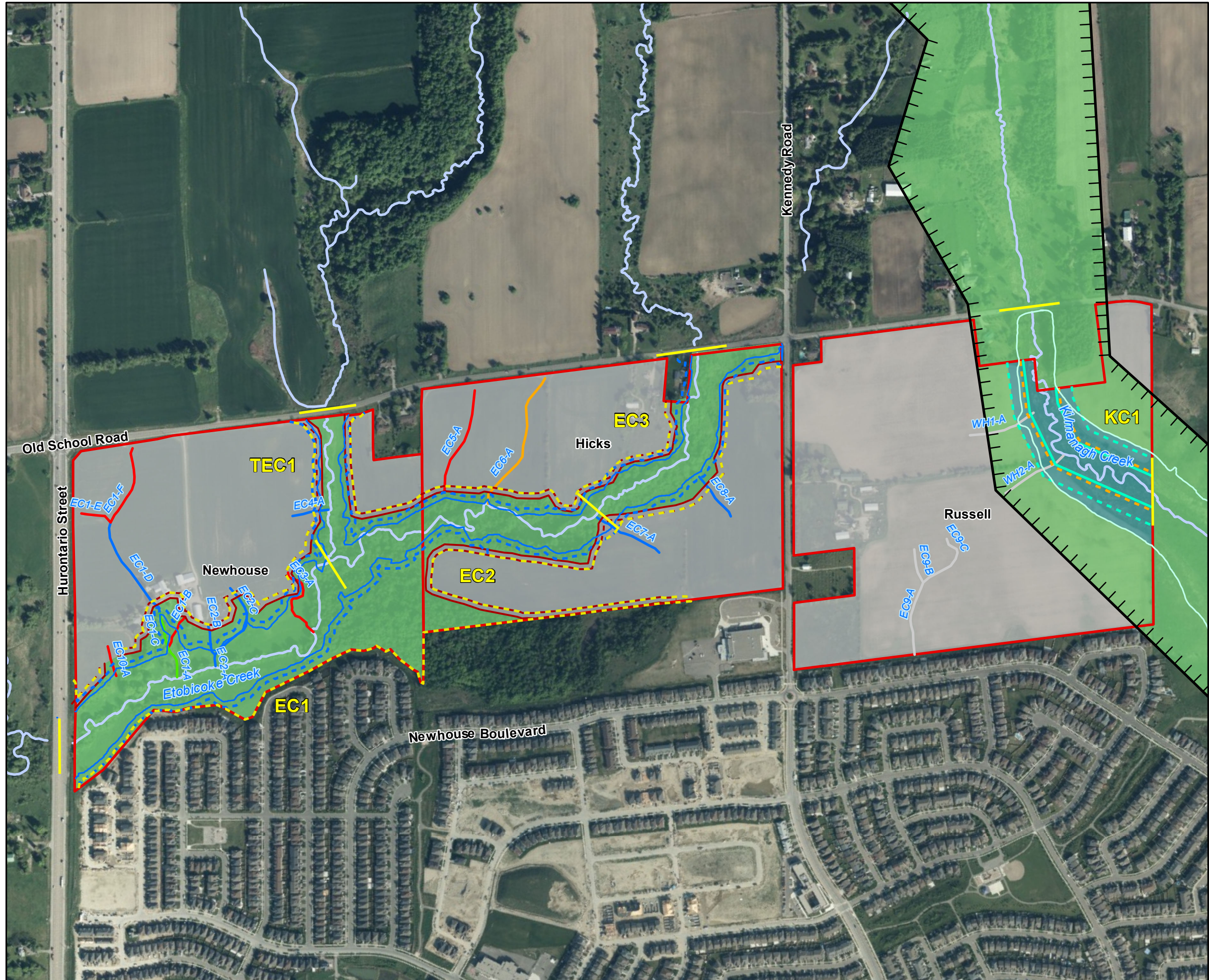
There are valleylands and some steep slopes associated with the subject lands that would represent a slope hazard. As such, a slope stability assessment is currently being completed by DS Consultants Ltd. A preliminary assessment by DS concluded that there are three areas on the subject lands that would require further investigation regarding potential slope instability. In general, slopes are considered stable in terms of long-term stability. The line staked out (agreed) by TRCA during the site walk on March 30, 2021, is considered to be the long-term stable top of slope (LTSTOS) line or constraint to development limits, except for the three local areas where the slopes are 2H:1V or steeper. The ongoing slope evaluation will provide an updated LTSTOS for these areas which is expected to be a small deviation from the staked limits.

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** 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 generated were calculated as follows in **Table 14**:



Constraint Map

Figure 5

Mayfield West Phase 1 –
Stage 2 Expansion Area

Legend

- Subject Property
- Comprehensive Ultimate Constraint
- Floodline
- Floodline + 10 m
- DSEL Floodplain
- TRCA Staked Feature Limit
- TRCA Staked Feature Limit + 10 m
- Reach Break
- Green Belt
- Russell Constraints
- Proposed NHS
- Outside NHS
- Watercourse (MNR 2019)
- Meander Belt (54 m)
- Meander Belt + 30 m
- Meander Belt + FOS 65 m
- HDF Management Recommendations**
 - Protection
 - Maintain Recharge
 - Mitigation
 - No Management Required
 - Not

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GSAI
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Project: 219527.1 Last Revised: August 2021

Client: Argo Kennedy
Limited

Prepared by: DU
Checked by: KU



1:7,000

0 100 200 m

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Ontario Orthoimagery Baselayer: FBS Peel 2020

Table 14. Summary of Water Balance Analysis- Pre-Development and Post-Development

Characteristic	Pre-Development	Post-Development (no mitigation)	Change (Pre- to Post Development)
Hicks			
Proposed Development Area (m ²)	303,566	303,566	0
Precipitation (m ³ /year)	273,695	273,695	0
Total Evapotranspiration (m ³ /year)	165,174	93,132	-72,042
Total Evaporation (m ³ /year)	500	36,282	35,782
Total Infiltration (m ³ /year)	56,181	47,190	-8,991
Total Runoff (m ³ /year)	51,840	97,092	45,251
Newhouse			
Proposed Development Area (m ²)	321,393	321,393	0
Precipitation (m ³ /year)	289,768	289,768	0
Total Evapotranspiration (m ³ /year)	170,269	107,440	-62,829
Total Evaporation (m ³ /year)	2,329	33,917	31,588
Total Infiltration (m ³ /year)	58,830	45,723	-13,107
Total Runoff (m ³ /year)	58,340	102,688	44,347
Russell			
Proposed Development Area (m ²)	368,572	368,572	0
Precipitation (m ³ /year)	332,305	332,305	0
Total Evapotranspiration (m ³ /year)	197,966	110,440	-87,526
Total Evaporation (m ³ /year)	1,437	44,915	43,478
Total Infiltration (m ³ /year)	65,721	50,298	-15,424
Total Runoff (m³/year)	67,180	126,652	59,472

Based on the results of the site water balance, there is an overall infiltration deficit for the site including 8,991 m³/yr for the Hicks property, 13,107 m³/yr for the Newhouse property and 15,424 m³/yr for the Russell Property.

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 LID measures to provide increased infiltration across the post-development subject lands is dependent on the permeability of underlying native soils. In-situ infiltration testing should be completed in areas proposed for receiving LID measures to remove infiltration deficits. 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 W5) 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 5.0 of the Preliminary Hydrogeological Investigation provides the criteria and evaluation for determining the magnitude of potential hydrological impact to Wetlands W1 through W5 (DS 2021). The analysis completed shows there is a Low magnitude of hydrological change as a result of Impervious Cover Score (ICS) and a Low magnitude of hydrological change as a result of Changes to Catchment Size for Wetland 2 through 5 and a Medium magnitude of hydrological change for Wetland 1. The overall magnitude of hydrological change is provided in **Table 15** below.

Within **Table 15** 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 4**;
- High Sensitivity Fauna Species: **Sections 3.3.6, 3.3.7** and **Appendices I and K**;
- High Sensitivity Flora Species: **Section 3.3.4** and **Appendix G**;
- Significant Wildlife Habitat: **Section 3.3.10.4** and **Appendix J**; and
- Hydrological Classification Considering Ecology: **Figure 4**.

Table 15. Wetland Water Balance Risk Evaluation Summary

Hydrological Considerations						
Wetland Number	Impervious Cover Score		Change in Catchment Area (%)		Overall Magnitude of Hydrological Change	
W1	9.3		12.4 % decrease		Medium	
W2	2.2		3.3 % decrease		Low	
W3	1.7		2.6 % decrease		Low	
W4	0.5		0.7 % decrease		Low	
W5	0.7		1.1 % decrease		Low	
Ecological Considerations						
Wetland Number	Vegetation Community Type (ELC)	High Sensitivity Fauna Species	Flora Species	Significant Wildlife Habitat*	Hydrological Classification Considering Ecology	Overall Ecological Wetland Sensitivity
W1	Low	Medium	Two medium sensitivity species	None	Medium	Medium
W2A & W2B	Medium	None	Four medium sensitivity species	None	Low	Medium
W3	Low to Medium	High	Eight medium sensitively species	High	Low	High
W4	Medium	High	Seven medium sensitive species	High	Low	High
W5	Medium	High	Eleven medium sensitivity species	None	Low	High
Overall Wetland Risk Ranking						
Wetland Number	Overall Wetland Risk Ranking					
W1	Medium					
W2	Medium					
W3	High					
W4	High					
W5	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 3.3.10**, it was determined that significant natural heritage features in the study area are primarily associated with the valley corridors, wetlands and woodlands on the subject lands and within the 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 4.4.1.4**);
- Provincially Significant Wetlands;

- 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

A portion of the eastern subject lands, associated with the Kilmanagh Creek valley corridor, is located within the Greenbelt Plan area, and is recognized as part of the provincial Growth Plan Natural Heritage System and Region of Peel Greenlands System. Kilmanagh Creek and the segments of Etobicoke Creek within the study area are both recognized as being within the Town of Caledon Environmental Policy Area.

The western subject lands, west of Kennedy Road, feature stream corridors associated with Etobicoke Creek. These stream segments although not designated as Core Areas of the Region's Greenlands System, are recognized as Environmental Policy Area on Schedule B of the Town of Caledon's Official Plan.

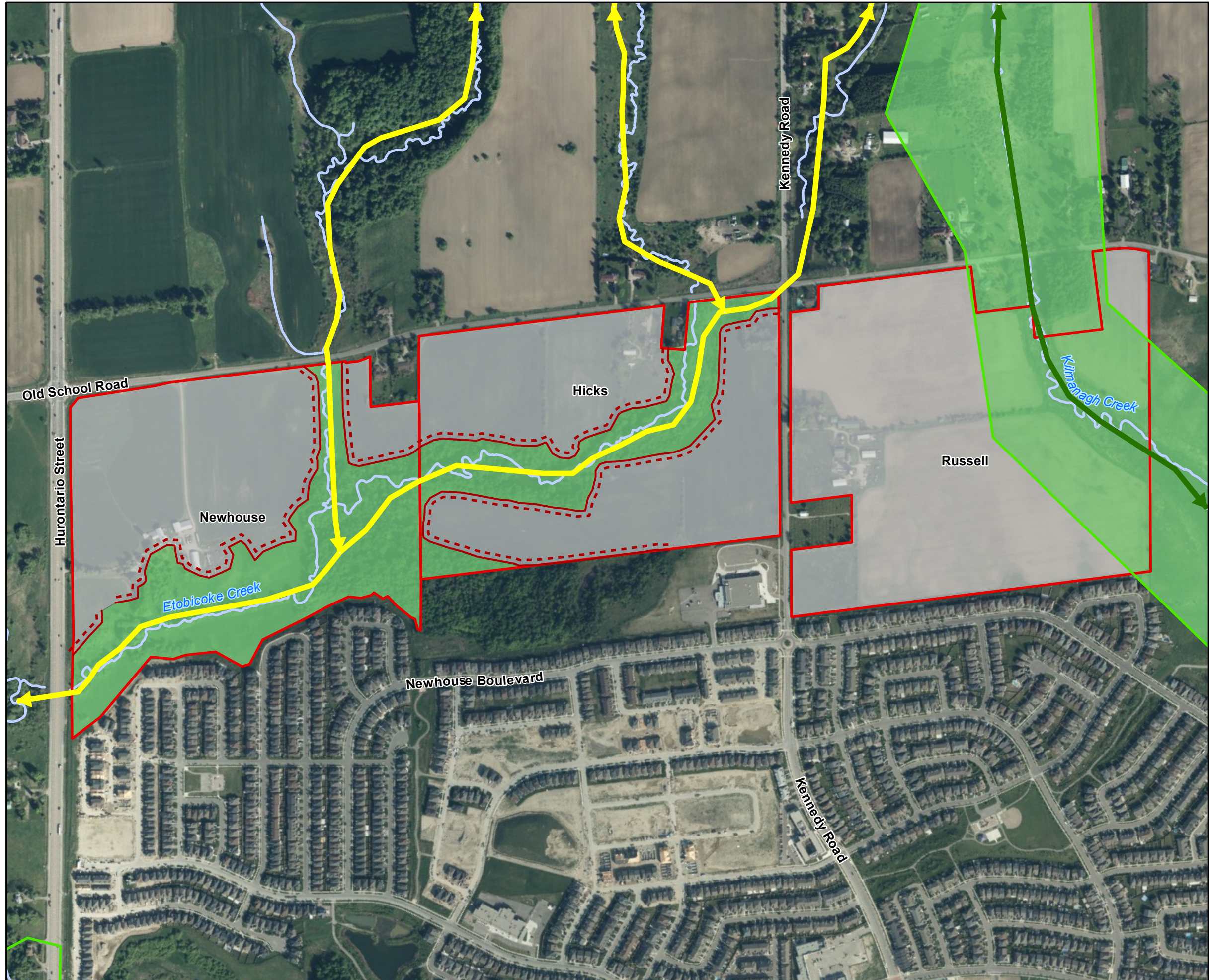
Through the additional work completed as part of this CEISMP, a natural heritage system has been developed for the Study Area. The proposed natural heritage system is discussed in **Section 5.2** and present on **Figure 6**.

4.1.4.3 Provincially Significant Wetlands

Along the southern boundary of the subject lands, adjacent to the existing school block, is a portion of the Provincially Significant Etobicoke Creek Headwaters Wetland Complex (identified as #160 and #161 of the Provincially Significant Etobicoke Creek Headwaters Wetland Complex South Eastern Portion; MNRF 2014a).

As currently mapped by MNRF, the PSW extends approximately 350 m along the southern border of the subject lands, with a small gap located between the two wetland polygons. Through field investigation it was identified that the eastern lobe of the PSW that extends towards Kennedy Road is in fact raised and does not exhibit wetland vegetation. With this adjustment the PSW is found to extend approximately 315 m along the southern border of the subject lands. Additionally, the adjacent cultural meadow (ELC Unit 3.12 on **Figure 4**) contains a raised overgrown laneway which impedes drainage between the subject lands and the PSW.

To adequately protect this portion of the PSW a variable buffer has been applied to the northern limit of the PSW that achieve a total overall buffer area equivalent to the application of 30 m buffer, but no less than 10 m. More specifically, the 315 m length with a 30 m buffer would require an area of approximately 9,450m² and Beacon is proposing an equivalent buffer area of approximately 9,575m². This approach is consistent with the setback methodology outlined in the *Southfield Village No.2 Public School Mayfield West Community EIS* prepared by Dillon Consulting (2017) for the adjacent school block property located immediately to the east of the PSW.



**Proposed Natural
Heritage System**

Figure 6

Mayfield West Phase 1 –
Stage 2 Expansion Area

Legend

- Subject Property
- Local Landscape Linkage
- Regional Landscape Linkage
- TRCA Staked Feature Limits
- TRCA Staked Feature Limits + 10 m
- Proposed NHS
- Outside NHS
- Provincial and Regional Scale Natural Heritage System
- Watercourse (MNRF 2019)

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BEACON
ENVIRONMENTAL

GSAI
Glen Schnarr & Associates Inc.

Project: 219527.1 Last Revised: August 2021

Client: Argo Kennedy
Limited

Prepared by: DU
Checked by: KU



1:7,000

0 100 200 m

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4.1.4.4 Species at Risk

As noted in **Section 3.3.10.6** and detailed in **Appendix D**, the following endangered and threatened and/or their habitat is present on the subject lands:

- Barn Swallow (*Hirundo rustica*) – Threatened;
- 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**.

Barn Swallow

Barn Swallow has been observed in the Study Area by the Region of Peel (Peel NAI areas #8130, 9773 and 9779). Four Barn Swallow were observed foraging in close proximity to the barns on the Newhouse property (within ELC Unit 2.1 on **Figure 4**), though due to access restriction, nesting was not confirmed. Beacon is of the opinion that it is very likely that they are nesting within the barns as this represents typically favoured and suitable habitat. Additional work at the draft plan stage will be required to confirm breeding of Barn Swallow on the Newhouse and Russell property.

Eastern Meadowlark

Eastern Meadowlark Barn Swallow has been observed in the Study Area by the Region of Peel (Peel NAI areas #8130, 9773 and 9779). One Eastern Meadowlark territory was observed in ELC Unit 3.10 (**Figure 4**) during the breeding bird surveys conducted in 2021. Therefore, ELC Unit 3.10 is constrained within the proposed development area of the Newhouse property.

Redside Dace

Redside Dace is a federally and provincially endangered fish species that occupies the reach of Kilmanagh Creek that flows through the study area; as confirmed through correspondence with MECP's Shamus Snell on March 9, 2021. The reaches of Etobicoke Creek within the subject lands are not considered habitat for Redside Dace.

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).

For the purposes of determining regulated Redside Dace habitat limits associated with Reach KC1 of Kilmanagh Creek, the 30 m setback was applied to the preliminary meander belt (54m) (**Section 4.1.2.2**), as this dimension accounts for existing and historic trends in channel planform. Figure 3 from the Geomorphic Assessment Report (**Appendix F**) identifies all lands within 30 m of the meander belt for Kilmanagh Creek as they pertain to the Russel Property. Field-based confirmation of the recommended meander belt dimension is recommended.

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

Ontario's bat species at risk became listed as endangered in 2013. These listed species include:

- Little Brown Myotis or Little Brown Bat (*Myotis lucifugus*);
- Northern Myotis (*Myotis septentrionalis*);
- Tri-colored Bat (*Perimyotis subflavus*); and
- Eastern Small-footed Bat or Eastern Small-footed Myotis (*Myotis 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 the following ELC communities in the Study Area would qualify as providing potential maternity roost habitat: 10.1, 10.2, 10.3, 10.5, 10.6, 10.7, 10.8, 10.9 (refer to **Figure 4**). It is anticipated that this communities will be protected within the future natural heritage system.

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 if listed species are present or absent. This should be completed through site-specific studies at the draft plan stage for the Newhouse and Russell properties (as discussed in **Section 9**).

Beacon completed bat exit surveys for the Hicks property in 2021. The four bat species noted during these surveys are not listed as endangered under the ESA.

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 Mayfield West Phase 1 – Stage 2 Expansion Area 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 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 of No Management;
- Agricultural Lands; and
- Cultural Vegetation Communities.

A Comprehensive Constraints and Opportunities Map is presented in **Figure 5**.

5. Development of the Argo Kennedy Land Use Plan and Preliminary Framework Plan

The study area for the Mayfield West Phase 1 – Stage 2 Expansion Area overlaps in part with the study area captured by Dillon Consulting in the 2007 Mayfield West Community Development Plan Area (Dillon *et al.* 2007). The Dillon CEISMP was prepared in support of a Town of Caledon Official Plan Amendment to establish a Secondary Plan for the community of Mayfield West. Argo Kennedy Limited is proposing an amendment to the Mayfield West Secondary Plan in the Town of Caledon Official Plan to expand the Mayfield West community for the development a range of residential and open space uses with internal public road network.

The goal for the Mayfield West Phase 1 – Stage 2 Expansion Area Land Use Plan is to create a complete, compact, livable, walkable, cyclable community area with opportunities for transit access, which integrates and protects the study area's headwaters, woodlands and wetlands into a natural heritage system. The Mayfield West Phase 1 – Stage 2 Expansion Area Land Use Plan was developed in accordance with the environment first principal and is based on the proposed natural heritage system that was established for the lands which is described in **Section 5.1**.

5.1 Natural Heritage System

As was discussed in **Section 3.3.1**, the subject lands are primarily under agricultural use and natural heritage resources are centred around the stream valleys of Etobicoke Creek and Kilmanagh Creek. 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 3.3.3.10**. 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 Preliminary Framework Plan.

The proposed natural heritage system has been designed to include all the significant natural heritage resources identified on the subject lands (**Figure 6**). The proposed natural heritage system is comprised of two separate blocks focused on the valley corridors of Etobicoke Creek and Kilmanagh Creek. The two natural heritage system blocks are to be shown as Environmental Policy Area on the Land Use Plan and Preliminary Framework Plan (ref. **Figures 7 & 8**, respectively).

Within the subject lands, the proposed natural heritage system is comprised of the following features:

- Unevaluated wetland features W1, W2, W3, W4, and W5;
- Tributaries EC1, TEC1, EC2, EC3 and KC1;
- Headwater Reaches (EC1-A, EC1-C);
- Direct Fish Habitat (Etobicoke Creek tributaries, Kilmanagh Creek, EC-1A and EC1-C);
- Habitat for Endangered Redside Dace (Meander Belt to Tributary KC1 + 30 m);
- Significant Wildlife Habitat – (Bat Maternity Roost – FO- and SW- communities; Turtle overwintering & nesting – ELC Unit 9.2 ; Amphibian Breeding Habitat (Woodland) ELC Units 10.6 and 9.3 ; Species of Special Concern [Eastern Wood-Pewee and Wood Thrush] – ELC Units 10.8 and 10.6); and
- Habitats of Endangered and Threatened Species (Barn Swallow – ELC Unit 2.1; Eastern Meadowlark – ELC Unit 3.10; Redside Dace – location; SAR Bats – ELC Units 9 and 10).

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 proposed natural heritage system were staked alongside TRCA in the spring of 2021 and represent the outermost components of natural features within the subject lands, the application of a 10 m buffer to the surveyed limits 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 small, isolated headwater drainage features.

5.2 Description of the Land Use Plan and Preliminary Framework Plan

The Mayfield West Phase 1 – Stage 2 Expansion Area Land Use Plan (**Figure 7**) has been designed to build off the existing community structure established in Mayfield West by adding and integrating environmental policy areas, mixed housing types, high quality architecture, and walkable streetscapes. Land Use Designations on the Land Use Schedule include Residential, Mixed High/Medium Density Residential, Open Space Policy Area, Institutional, Environmental Policy Area, and Stormwater Pond Facility.

These Land Use Designations have been implemented through the Preliminary Framework Plan (**Figure 8**), where various types of residential built forms at varying densities have been integrated into the Plan layout. The subject lands have a gross site area of approximately 100 hectares, however, after deducting the area of the NHS, including buffers and the area of the existing cemetery, as defined under the Growth Plan (2019), the net developable area of the subject lands is approximately 68.00 hectares (ha). The Mayfield West Phase 1 – Stage 2 Expansion Area Land Use Plan (**Figure 7**) and Preliminary Framework Plan (**Figure 8**) were developed with extensive input from the multi-disciplinary project study team to ensure consistency with the Town's principles, strategic directions, and goals.

The design of the Mayfield West Phase 1 – Stage 2 Expansion Area 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 5.1**) 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 generally 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, trails, 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.

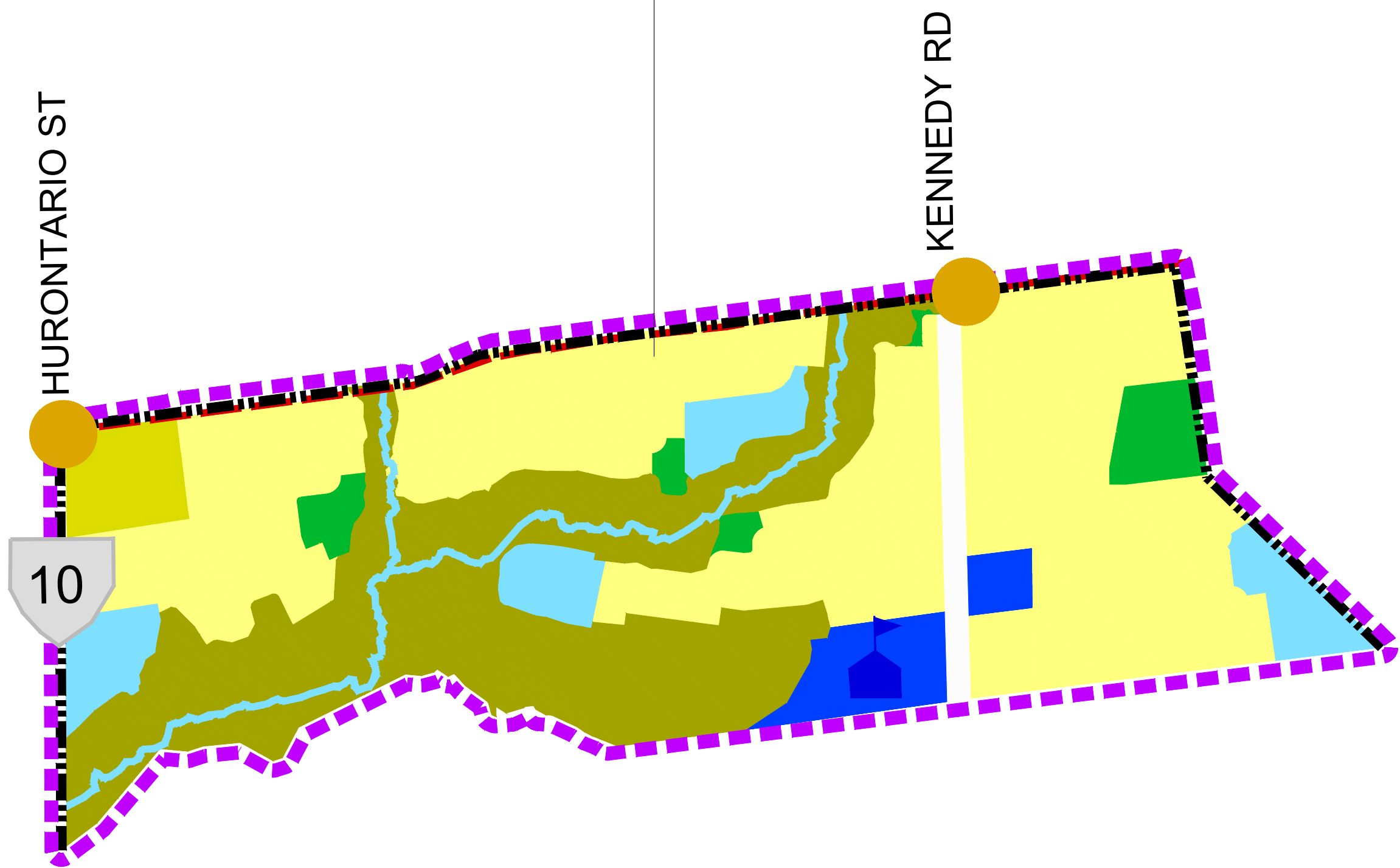
The Mayfield West Phase 1 – Stage 2 Expansion Area community has been designed to achieve the following objectives:

- Allow for growth in Mayfield West in accordance with the policies of the Town's Official Plan, as amended, and its role as a Rural Service Centre;
- Expand the existing Mayfield West Community to accommodate approximately 19,000 people in total;
- Create a community that builds off the existing Mayfield West Community which continues to recognize the existing Village Centre as the central focus which includes a traditional main street, commercial and institutional uses, appropriate residential uses, and a town commons, town square or market place;
- Develop a vibrant, compact and mixed-use community that contributes to the residential, employment and commercial development already established in Mayfield West;
- Create opportunities for a broad mix and range of housing types that are suitable for different income, age levels, lifestyles, and household structures of the future residents;
- Establish a pedestrian-oriented community focused on a 5-10 minute walking radius to key community elements such as the Village Centre, community facilities, schools, public open spaces and public transit facilities;
- Provide a high-quality built form character and architectural design that exemplifies and promotes the identity of Caledon;
- Create a walkable, pedestrian-scale neighbourhood with amenities and potential transit stops within walking distance and a safe, comprehensive path and trail system that links with the broader community 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; and
- Integrate appropriate low-impact development strategies as a key component of open space and built form design.

Environmental constraints were a primary consideration when developing a framework for the Land Use Plan. Infrastructure considerations, including stormwater management, roads and servicing have also been considered as early components affecting the plan layout.

The primary function of the proposed Stage 2 area is to expand the existing Mayfield West community, while maintaining the Village Centre as the central hub for a mix of land uses, higher density, and community interaction.

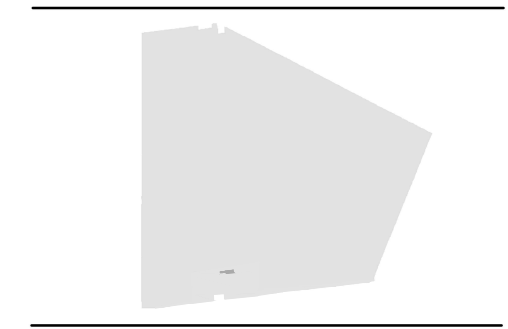
To be re-designated from "Prime Agricultural Area" and "Environmental Policy Area" to "Residential Area", "Mixed High/Medium Density Residential", "Institutional", "Open Space Policy Area", "Environmental Policy Area" and "Gateway Feature"



Schedule B

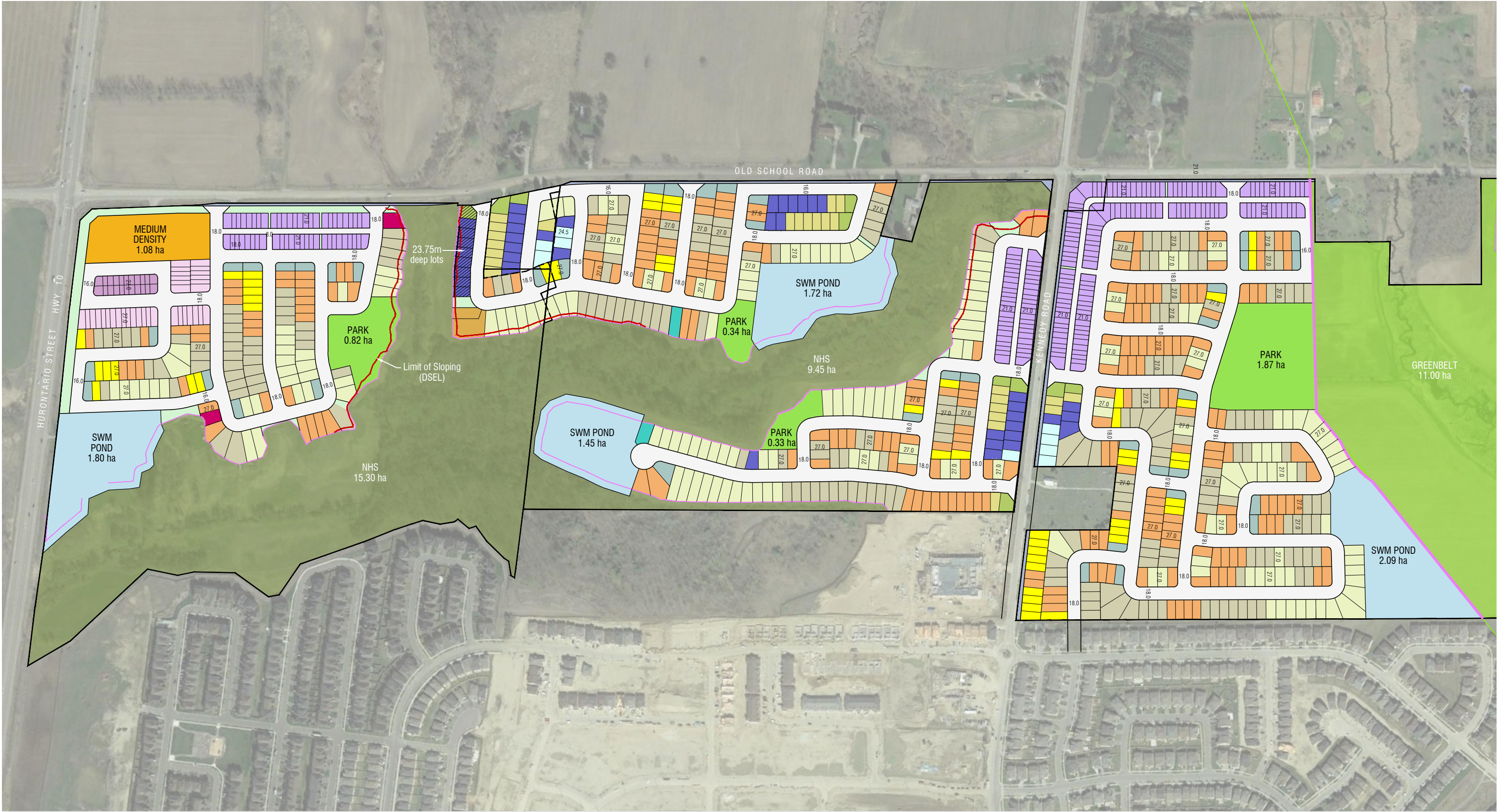
FIGURE 7 MAYFIELD WEST LAND USE PLAN

- Prime Agricultural Area
- Residential Area
- Residential Policy Area
- Environmental Policy Area
- Open Space Policy Area
- General Commercial
- Institutional
- Mixed High/Medium Density Residential
- Academic/Research Campus
- Prestige Industrial
- General Industrial
- Highway Right-of-Way
- Village Centre Area
- Settlement Boundary 2051
- Mayfield West Study Area
- Boundary of Greenbelt Plan Area
- Greenway Corridor
- Lot and Concession Lines
- Elementary School
- Gateway Feature
- Potential Future Interchange
- Conceptual Road Network
- Provincial Road
- Regional Road
- Local Road
- Railway
- Stage 2 Planning Area



Base Data Source: Town of Caledon





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.
- Aerial Photo: Google Earth



MAYFIELD WEST PHASE I SECONDARY PLAN AMENDMENT | Caledon, Ontario
PRELIMINARY LOTTED DEVELOPMENT CONCEPT

Figure 8



APR 29, 2021
PROJECT 2087
SCALE 1:5000

As the existing surrounding arterial roads will provide for future transit routing, the land use plan introduces some higher density and transit-oriented built form along these roads to optimise the opportunity for transit-use and the implementation of a transit-oriented community. The balance of the community can be characterised as containing 4 sub-neighbourhoods each with a central neighbourhood/community park and separated from one another through natural open space areas. However, the proposed community continues to provide for strong pedestrian and cyclist-oriented connections through an extensive multi-use trail system within the natural open space which link each of the sub-neighbourhoods together and to the existing Mayfield West community to the south.

5.3 Stormwater Management Strategy

Under existing conditions, the majority of the subject lands (consisting of all lands west of Kennedy Road, and approximately half of the lands located east of Kennedy Road) drain to into the Etobicoke Creek watershed, with the remainder draining eastwards to Kilmanagh Creek. Surface drainage currently flow overland and leaves the subject lands either via culverts underneath Hurontario Street (Highway 10) or via the surface flow of Kilmanagh Creek.

The subject lands will be developed using a treatment-train approach for addressing stormwater runoff generated by the proposed development, consisting of source control and LID measures as appropriate, conveyance techniques, and end of pipe wet pond facilities for additional quantity, quality, and erosion control.

The major and minor drainage system designed by DSEL (2021) will convey storm runoff to four (4) proposed end of pipe stormwater management facilities. Pond 1 services the south portion of the Hicks parcel. Pond 2 services the majority of the Newhouse property, while Pond 3 treats drainage from the north portion of the Hicks parcel. The Russell lands are generally serviced by Pond 4. Ponds 1, 2, and 3 are tributary to Etobicoke Creek while Pond 4 outlets to the West Humber River.

The watershed divide between Etobicoke Creek and the Humber River traverses the non-participating Russell property east of Kennedy Road. For the area within the Russell lands draining to Etobicoke Creek, the majority is conveyed to existing residential development to the south where it is captured in the storm sewer system of Bonnieglan Farm Boulevard as pre-development drainage. No accommodation was made in the existing downstream storm pipes and stormwater management facility for post-development flows from the Russell lands. As such, the proposed grading and stormwater drainage concept has minimized the area draining to Bonnieglan Farm Boulevard. This results in a localized diversion of flows from the Etobicoke Creek watershed to the Humber River but reduces the number of SWM facilities and minimizes the condition of mixing clean flows with untreated drainage in the downstream system.

5.3.1 Quantity Control

Quantity control target release rates were determined based on unit flow rates for the 2-year to 100-year storm and Regional events. For Pond 1, 2, and 3 the rates were derived from the Etobicoke Creek Hydrology Update (TRCA 2013). For Pond 4, target release rates were determined from the West Humber River Hydrology Update (TRCA; Civica 2018). SWM pond outlets will be designed to ensure that post-development peak flow rates for the 2-year to 100-year storm events do not exceed the pre-development conditions at each of the modelled Flow Node locations. Facilities will have multiple outlet

controls including an extended detention outlet, quantity control, emergency spillway and a maintenance sump.

The conceptual pond outfall locations are illustrated on Drawing2 of the FSR (DSEL 2021). At detailed design, in accordance with the TRCA (2012) Stormwater Management Criteria document, the outfall will be 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.

5.3.2 Quality Control

SWM Pond forebays will be 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. The forebays are designed with a length to width ratio of approximately 3:1 and do not exceed one third of the permanent pool surface area, as required in the MOE SWM Planning and Design Manual. The forebays have a depth of 1.5 m to minimize the potential for re-suspension.

5.3.3 Erosion Control

Stormwater erosion criteria for proposed SWM facilities were established based on the TRCA SWM Criteria (2012) and MOE (2003) requirement for extended detention volume based on detention of the 25mm storm event over a period of 48 hours. This level of design was sufficient to develop preliminary sizing of stormwater facilities in support of the land use plan. Through subsequent stages of this study, consultation will be undertaken with TRCA to confirm additional erosion analysis scope requirements for stormwater management, such as determination of an appropriate erosion threshold and exceedance analysis, in coordination with the geomorphic assessment.

The extended detention volumes within the ponds will outlet through a reverse graded pipe. An orifice will be provided to discharge the extended detention volume at the allowable release rate. When used in connection with a perforated pipe outlet configuration, the minimum orifice size as per the is 50mm. If this is not possible, an alternative option such as using a custom inlet control device (e.g., Hydrovex) may be reviewed at the detailed design stage.

5.3.4 LID and Site Water Balance

To promote infiltration and achieve water balance requirements, the FSR (DSEL 2021) suggested the following Low Impact Development (LID) measures for application in the subject lands:

- Increased topsoil depths on all detached product and conventional townhouse product (private property);
- Increased topsoil depths in the boulevard (public property);

- Increased topsoil depth in channel/parks/pond (public property);
- Disconnected roof leaders to discharge to rear yards in low and medium density blocks (private property);
- Swales where feasible in NHS areas, parks, downstream of stormwater management outfalls, adjacent to rear lots located within buffers, overland flow easements, and private side yard / rear yard swales;
- Sub-Surface Infiltration LIDs:
 - Infiltration trenches or galleries in parks and parkettes (public property); and
 - Infiltration trenches in rear yards (private property).

The list above is based on a combination of LIDs that are applicable in private property and public property. It is possible to provide additional LIDs in open space area or buffers subject to approval. The list above is not meant to be exhaustive or preclude other LID measures. Further LID considerations can be reviewed for individual draft plans as part of the Functional Servicing Reports prepared in support of draft plans.

The proposed LID features 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

The development is within Region of Peel's Pressure Zone 7. In the vicinity of the development area, the Region currently provides supply to Pressure Zone 7 through a 400 mm main along the east side of Kennedy Road. A 300mm watermain is located within Old School east of Kennedy Road. In addition, a 600 mm feedermain main is located within Kennedy Road and connects to the Mayfield West Elevated Tank located south of King Street.

The subject lands will be serviced via three (3) connections to the existing 400 mm Kennedy Road watermain and one (1) connection at the intersection of Kennedy Road at Old School Road. The Russell lands east of Kennedy Road will also connect to the existing 300mm watermain within Old School Road.

An external watermain within Old School Road west of Kennedy Road will be required to service the Hicks North and Newhouse parcels. This watermain is identified in the Peel Region Master Plan (Project ID W-D-229) and the Peel 2021 Capital Budget Water DC Map (Project ID 26-1199, 51587). Further discussion with the Region is required to confirm the ultimate size and to advance the currently identified in-service date of 2035.

The preliminary hydraulic capacity and model analysis included in FSR (DSEL 2021) confirms the Average Day Demand (ADD) and Peak Hourly Demand (PHD) service pressures are expected to be within the Region of Peel guidelines for water distribution systems. All fire flows are achievable with residual pressures exceeding 20 psi and no watermain will reach a velocity in excess of 3.0 m/s. External trunk watermain including a new 400mm or 600mm watermain within Old School Road will

adequately service the development. No watermain crossings of the natural heritage system within the Hicks and Newhouse properties are required.

5.4.2 Wastewater

The proposed development is within the G.E. Booth Sewershed. A 300mm diameter sanitary trunk sewer is located within Kennedy Road, approximately 45m north of Bonnieglenn Farm Boulevard, in the vicinity of the subject lands. This trunk sewer was sized to accommodate portions of the Hicks and Russell properties. The north portion of the Hicks parcel and the Newhouse property were not accommodated in the original design of this trunk sewer.

The existing 300mm-525mm trunk sewer within Kennedy Road extends through the Mayfield West Phase 1 - Stage 1 lands and crosses Highway 410. South of Mayfield, the Region is currently advancing a 1200mm trunk sewer within Kennedy Road to mitigate capacity constraints to Conservation Drive. The trunk then connects to the main trunk system within the Etobicoke Creek valley known as the West Brampton 2 trunk, which is part of the Etobicoke Creek trunk sewer system.

The subject lands will be serviced by a network of local gravity sewers designed in accordance with Region of Peel criteria. A proposed pump station will accept flows from the Hicks and Newhouse parcels and convey wastewater through a forcemain to the existing 300mm sanitary trunk sewer within Kennedy Road, north of Bonnieglenn Farm Boulevard. The southwest corner of the Russell property will be conveyed to Bonnieglenn Farm Boulevard through extension of a sanitary sewer within an unopened ROW near the intersection of Kennedy Road. The remaining portions of the Russell lands will be conveyed easterly to the Dixie Road trunk system.

The FSR (DSEL 2021) completed a preliminary downstream capacity analysis to identify constraints with the proposed drainage to the Kennedy Road trunk. The assessment concluded some minor surcharging of the trunk sewer may occur but would not impact basements.

The majority of the Russell property is to be directed to the Dixie Road trunk sewer in accordance with the overall concept for the area developed as part of the Mayfield West Phase 1 – Stage 1 development. This trunk sewer within Dixie Road currently extends to approximately 475m north of Mayfield Road. The Peel Master Plan and the 2021 Wastewater DC Map confirm this trunk sewer will be extended further north on Dixie Road, westerly through future development lands to Heart Lake Road where it will extend northly to service lands north of Campbell's Cross Creek. Connecting to the trunk sewer on Heart Lake Road from the Russell property will require an easement through external private lands. It is anticipated the sewer would generally follow an alignment adjacent to the Greenbelt limit but could be incorporated within future external ROW's if adjacent lands proceed to development in a similar timeframe as the Russell property.

6. Impact Assessment

6.1 Approach

The CEISMP TOR requires that an impact assessment for the natural features associated with the study area be completed. More specifically, the impact assessment, through an analysis of the dynamics and interrelationships of the ecosystem, 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 Preliminary Framework Plan for the Mayfield West Phase 1 – Stage 2 Expansion Area 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, any impacts resulting from development are generally limited to indirect impacts which can be easier 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 16** 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 proposed Land Use Plan 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.

Table 16. 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 20 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. 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.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> 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 <i>Preserving and Restoring Healthy Soil: Best Practices for Urban Construction</i> (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.	<ul style="list-style-type: none"> 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 west to southwest direction towards Etobicoke Creek 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 southwest, however a local groundwater divide is noted east of Kennedy Road between Etobicoke Creek and the Humber River to the east. 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.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Implement the Erosion and Sediment Control Plan (ESC Plan) as outlined in the FSR (DSEL 2021). Implement the Stormwater Management Strategy as outlined in the FSR (DSEL 2021). Implement Low Impact Development (LIDs) Strategy as outlined in the FSR (DSEL 2021). 	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.	<ul style="list-style-type: none"> Develop and implement a Dewatering Management Plan (DMP) at the detailed design stage to ensure groundwater is managed appropriately. <ul style="list-style-type: none"> 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 adjacent watercourses or aquatic systems. 	7.6	Neutral
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 , it is anticipated that there will be a runoff surplus 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.	<ul style="list-style-type: none"> 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

Category	Feature/Function	Proposed Activity	Potential Impacts	Recommended Mitigation/Management	EMP Section	Effect
	Headwater Drainage Features	Grading, Servicing and Development	HDFs in the study area, with the exception of the Russell parcel, 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 , 6 of the 21 HDF reaches require no mitigation and another 8 are low functioning and will be removed but have their conveyance functions replicated by maintaining downstream flows through the development design. Two (2) HDF reaches (EC1-A and EC1-C) were classified as protection and will both be retained in-situ and may be subject to natural channel design and/or wetland enhancement.	<ul style="list-style-type: none"> Maintain existing water balance to HDF reaches identified as protection (EC1-A and EC1-C) and maintain recharge (EC6-A). Replicate the ecological functions of any HDFs ranked as maintain recharge or mitigation. 	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.	<ul style="list-style-type: none"> Implement SWM plan. Refer to FSR (DSEL 2021) 	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.	<ul style="list-style-type: none"> Refer to FSR (DSEL 2021) For drainage to be directed to Kilmanagh Creek, implement BMPs outlined in the Guidance for Development Activities in Redside Dace Protected Habitat (MNR 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.	<ul style="list-style-type: none"> Implementation of Thermal Mitigation techniques as outlined in the FSR (DSEL 2021) 	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.	<ul style="list-style-type: none"> Surficial LID techniques recommended for the study area include: <ul style="list-style-type: none"> 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
	Wetland Water Balance Risk Evaluation	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 probability and magnitude of hydrological change is low for impervious cover score and also low for changes to the catchment area size, with the exception of W1 which scored medium risk.	<ul style="list-style-type: none"> 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 – 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	Following preliminary guidance from the draft SABC study (Wood 2020) two landscape linkages are identified within the subject lands; a major linkage associated with the Kilmanagh Creek (i.e., West Humber tributary) valley corridor and a minor linkage associated with the Etobicoke Creek valley corridor. As described in the draft SABC natural environment report, major landscape linkages such as Kilmanagh Creek require a Minimum Vegetated Width (MVW) of 100m and a Permeable Landscape Zone (PLZ) of 60m, whereas a minor landscape linkage requires a MVM of 60m and a PLZ of 30m. The purpose of	<ul style="list-style-type: none"> Implement the proposed NHS as per Figure 6 which provides an average overall linkage width that is greater than the dimensions proposed within the SABC study as it pertains to major and minor landscape linkages. Design PLZs to include buffers, setbacks, SWM blocks and parks as a means of reducing the potential for vehicular impacts. 	7.1	Neutral

Category	Feature/Function	Proposed Activity	Potential Impacts	Recommended Mitigation/Management	EMP Section	Effect
			<p>the PLZ is to facilitate animal movements by limiting certain types of development to those that do not introduce landscape resistance (i.e. SWM facilities, parks, trails, etc.)</p> <p>Under current policies, 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.</p>			
	Significant Woodlands	Grading, Servicing and Development	<p>Significant woodlands are identified along portions of the watercourse corridors located within the subject lands and along the southern property boundary, south of the EC1 and EC2 reaches of the Etobicoke Creek corridor.</p> <p>The proposed pedestrian trail system plans to intersect various portions of the Significant Woodland areas within the subject lands, all other development is restricted.</p>	<p>Potential impacts to Significant Woodlands can be reduced by implementing the following impact avoidance and mitigation measures:</p> <ul style="list-style-type: none"> • Respect appropriate Buffers and avoid adjacent construction activities that may damage canopy, stem or root systems; • Naturalize adjacent Buffers using native species; • Implement recommendations from the ESC Plan including measures as outlined in the <i>Guidance for Development Activities in Redside Dace Protected Habitat</i> (MNRF 2016) and <i>Erosion and Sediment Control Guideline for Urban Construction</i> (2019) to be provided at the detailed design stage; • Implement ESC Plan as outlined in the FSR (DSEL 2021). Measures at limit of development in advance of site preparation activities and outside the wetland boundaries when constructing SWM outfalls and bridge abutments; • Restore any affected areas with native vegetation. 	N/S	Neutral
	Wetlands	Grading, Servicing and Development	<p>There are no provincially significant wetlands associated with the subject lands, however provincially significant wetlands are located directly north and south of the subject lands.</p> <p>All wetlands on the subject lands are unevaluated and will be protected within the proposed natural heritage system.</p> <p>No crossings or development are proposed to intersect within any of the wetland communities identified on Figure 4.</p>	<p>Potential impacts to wetlands can be reduced by implementing the following impact avoidance and mitigation measures:</p> <ul style="list-style-type: none"> • Naturalize Buffers using native species; • Avoid directing untreated runoff to the wetlands; • Implement recommendations from the ESC Plan including measures as outlined in the <i>Guidance for Development Activities in Redside Dace Protected Habitat</i> (MNRF 2016) and <i>Erosion and Sediment Control Guideline for Urban Construction</i> (2019) to be provided at the detailed design stage; • Implement ESC Plan as outlined in the FSR (DSEL 2021). 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; • Restore affected areas with native vegetation. 	7.1	Positive
	Valleylands	Grading, Servicing and Development	Significant valleylands associated with Etobicoke Creek and Kilmanagh Creek overlap the subject lands. These valleylands are entirely contained within the boundaries of the proposed NHS and no new development is proposed within the valleylands with the exception of several SWM outfall structures, a proposed pedestrian trail and clear span crossing structures over reaches TEC1 and EC1 of Etobicoke Creek. For portions of the valleylands with a defined top of slope, a Long-Term Stable Slope (LTSS) analysis is underway; any changes to the LTSS line following the results of this analysis will be provided an appropriate buffer and the NHS delineation will be updated accordingly.	<p>Potential impacts to the valleylands can be eliminated or minimized by implementing the following mitigation measures:</p> <ul style="list-style-type: none"> • Establish fencing at limits of developments to reduce human disturbances and encroachments; • Naturalize the area between the development and the valleyland; and • No storage of equipment, materials, or fill is to occur within the natural heritage system or its buffer. 	7.1	Neutral
	Trees	Grading, Servicing and Development	The majority of the subject lands outside of the proposed NHS are comprised of agricultural land and are 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-	It is anticipated that many more trees will be planted and restored to the site than will be removed to accommodate the Land Use Plan. To quantify tree compensation requirements an arborist survey of the subject lands will be completed, followed by the preparation of an Arborist Report.	7.1	Positive

Category	Feature/Function	Proposed Activity	Potential Impacts	Recommended Mitigation/Management	EMP Section	Effect
			appropriate native and non-invasive species. No trees will be removed from the proposed NHS.			
Wildlife	Birds	Grading, Servicing and Development	<p>Through the breeding bird surveys completed by Beacon in 2021, it was determined that the majority of the species observed in the proposed development area will consist of open land bird species commonly found in agricultural settings.</p> <p>The open land bird species likely 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 edge species that occur within the NHS are expected to remain subject to the usual annual variation.</p>	<ul style="list-style-type: none"> Undertake vegetation / tree clearing between August and April so as not to impact breeding birds and not contravene the <i>Migratory Birds Convention Act</i>. 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 wooded valley feature (except where trails allow). 	7.1	Neutral
	Reptiles	Grading, Servicing and Development	Basking surveys to investigate potential turtle habitat associated with Pondweed Mixed Shallow Aquatic (ELC Unit 9.2) and the Willow Mineral Thicket Swamp (ELC Unit 8.1) were completed by Beacon in 2021. Through this work, it was determined that Midland Painted Turtle is associated with ELC Unit 9.2	<ul style="list-style-type: none"> The loss of potential foraging habitats for snakes can be mitigated by retaining meadow and other types of habitats within the NHS. The nearby PSW will be protected from development, which provides great habitat for reptile use. It is recommended that reptile protection be specifically addressed at the Draft Plan stage. 	7.1	TBD, Neutral
	Amphibians	Grading, Servicing and Development	Surveys to investigate breeding amphibian habitat within the subject lands were completed by Beacon in 2021. A total of four amphibian species were heard calling within the study area over the three survey evenings.	<ul style="list-style-type: none"> 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. It is recommended that amphibian protection be specifically addressed at the Draft Plan stage. 	7.1	TBD, Neutral
	Mammals	Grading, Servicing and Development	<p>Bat species are likely utilizing ELC Units 9 and 10, which will be protected from development.</p> <p>Presence of mammalian species within the subject lands was compiled from existing background resources and incidental observations from field surveys completed to date. 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. 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.</p> <p>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 valleyland corridors associated with Etobicoke Creek and Kilmanagh Creek.</p>	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Implement and naturalize Buffers as recommended in this EIS. Install fencing between rear lots and the NHS to limit encroachments. Through the Draft Plan stage, we recommend snake surveys. 	7.1	Neutral-Positive

Category	Feature/Function	Proposed Activity	Potential Impacts	Recommended Mitigation/Management	EMP Section	Effect
Fish Habitat	Fish Habitat	Grading, Servicing and Development	<p>No development is proposed within any of the watercourses within the subject lands. Watercourse features have been classified as Fish Habitat. Fish Habitat associated with Etobicoke Creek is to be protected within the proposed Natural Heritage System.</p> <p><i>For Kilmanagh Creek, see Section on Redside Dace below.</i></p>	<p>Potential impacts to fish habitat can be reduced by implementing the following measures:</p> <ul style="list-style-type: none"> • 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. <p>Mitigation measures for flood control, water quality, temperature impacts, and erosion are noted above under Surface Water.</p> <p><i>For mitigation measures specific to Kilmanagh Creek see section on Redside Dace below.</i></p>	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 Barn Swallow has been observed in the study area by the Region of Peel (Peel NAI areas #8130, 9773 and 9779). One Eastern Meadowlark territory was observed in ELC Unit 3.10 (Figure 4) during the breeding bird surveys conducted in 2021.	It is recommended that Eastern Meadowlark be surveyed for at the at the Draft Plan stage on the Newhouse and Russell properties. 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.	7.1	Neutral
	Barn Swallow	Grading, Servicing and Development	Barn Swallow is an open country aerial insectivore that nests primarily in barns and similar structures and forages over fields, meadows and bodies of water. Barn Swallow has been observed in the Study Area by the Region of Peel (Peel NAI areas #8130, 9773 and 9779). Four Barn Swallow were observed foraging in close proximity to the barns on the Newhouse property (within ELC Unit 2.1 on Figure 4), though due to access restriction, nesting was not confirmed. Beacon is of the opinion that it is very likely that they are nesting within the barns as this represents typically favoured and suitable habitat.	It is recommended that Barn Swallow be surveyed for at the at the Draft Plan stage. The removal of the Barn Swallow 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.	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 work completed, it was determined that all FO- and SW- communities could provide suitable habitat, all which are protected within the proposed NHS. Additionally, anthropogenic structures on the subject lands on the Newhouse and Russell properties have the potential to provide SAR bat maternity roost habitat.	It is recommended that SAR bats be surveyed for at the at the Draft Plan stage on the Newhouse and Russell properties. The removal of the SAR Bat habitat will require a permit under the <i>Endangered Species Act</i> and regulations pertaining to this species.	7.1	Neutral

Category	Feature/Function	Proposed Activity	Potential Impacts	Recommended Mitigation/Management	EMP Section	Effect
	Redside Dace	Site Preparation, Grading, Servicing and Development	<p>Context for Redside Dace Impact Assessment Redside Dace is a Provincially and Federally endangered fish species. Kilmanagh Creek has been confirmed by MECP as Occupied Redside Dace habitat.</p> <p>The proposed development will be designed to the greatest extent possible so as to not overlap with the regulated habitat of Redside Dace. The only component that will overlap with the regulated habitat of Redside Dace is the storm sewer outfall from the proposed stormwater management pond that outlets to Kilmanagh Creek. The impact assessment of this development component is described below.</p> <p>No development or site alteration is proposed within the watercourse or adjacent lands of Kilmanagh Creek, and a protective buffer of the meander belt plus 30 metres has been implemented to protect the habitat of Redside Dace, as required by MECP. Additionally, the surrounding lands associated with Kilmanagh Creek are further protected by the Greenbelt Protect Habitat designation (refer to Figure 5). All grading, servicing and development will occur outside all regulated habitat for this species and will therefore not have a direct impact on the identified habitat.</p> <p>Potential residual indirect impacts that may result from the proposed development are outlined below:</p> <p>Grading</p> <ul style="list-style-type: none"> • Potential to introduce sediments and nutrients to the watercourse. • 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. <p>Servicing</p> <ul style="list-style-type: none"> • Installation of underground services has the potential to alter groundwater flows and pathways, which may reduce baseflow to the watercourse, 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. <p>Development:</p> <ul style="list-style-type: none"> • Development will create impervious surfaces that will increase overall runoff volumes and decrease infiltration within the catchment areas of the watercourse. • Decreases to infiltration can reduce base flow contributions to the watercourse and impact fisheries through reduced flow and elevated temperatures. • Increased runoff and flows to the downstream drainage features can result in erosion and flooding. 	<p>Mitigation measures will be implemented in accordance with the <i>Guidance for Development Activities in Redside Dace Protected Habitat</i> (MNRF 2016). Potential impacts to Redside Dace in downstream reaches can be reduced by implementing the following measures:</p> <ul style="list-style-type: none"> • 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 occupied 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 occupied 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 or indirectly to occupied Redside Dace habitat, all plans must be approved by MECP. <p>Mitigation measures for flood control, water quality, temperature impacts, and erosion are noted above under Surface Water.</p> <p>Mitigation related to SWM Pond 4 The location of the storm sewer outfall for SWM Pond 4 will be selected to be proximal to the SWM Pond and to minimize the overall area of disturbance on the Kilmanagh Creek valleylands, including on the floodplain and channel.</p> <p>SWM Pond 4 will be designed with extra depth (3.0 m) for extra temperature mitigation.</p>	7.1, 7.3, 7.5	Neutral

7. Environmental Management Plan

The CEISMP TOR requires that an environmental management strategy be prepared as part the development of the CEISMP report. More specifically, the CEISMP report 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 Mayfield West Phase 1 – Stage 2 Expansion Area Land Use Plan and Preliminary Framework Plan were designed with the objective of 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 the 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 16** 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 Mayfield West Phase 1 – Stage 2 Expansion Area Land Use Plan and Preliminary Framework Plan. The natural heritage system is comprised of two blocks. The western block is located west of Kennedy Road and generally outlines the valley corridors and associated wetlands and woodlands of the Etobicoke Creek tributaries. The eastern block is located east of Kennedy Road and is delineated by the Greenbelt Designated Protected Countryside associated with Kilmanagh Creek valley corridor.

Under the proposed Land Use Plan and Preliminary 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 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 Western Natural Heritage System

The western natural heritage system is anchored by two tributary systems of Etobicoke Creek (refer to **Figure 5**; EC, which is composed of three reaches, and TEC which is composed of one reach). Associated with the Etobicoke Creek tributaries are a complex of wetland communities 7.1-7.2, 8.1-8.2, and 9.1-9.2. These wetlands are comprised mainly of reed canary grass and cattail marshes and Manitoba Maple and Willow thicket 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 Etobicoke Creek and contribute to more perennial flows and cooler stream temperatures. For this reason, the Etobicoke tributaries and their associated wetlands have been identified as fish habitat.

In summary, protection, maintenance, and enhancement of the Western NHS can be achieved as follows:

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, turtle nesting area);
- Enhance fish habitat by providing more diverse riparian cover and removing barriers to fish passage;
- 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 Eastern Natural Heritage System

The eastern natural heritage system is anchored by the valley corridor of Kilmanagh Creek (refer to **Figure 5**). Associated with the Kilmanagh Creek is the wetland community 7.3. This wetland is comprised of a reed canary grass wetland community. This wetland communities is 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.

In summary, protection, maintenance, and enhancement of the Eastern NHS can be achieved as follows:

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

- Prohibiting development and site alteration within the natural heritage features;
- Implementing mitigation strategies as outlined in the Guidance for Development Activities in Redside Dace Protected Habitat (MNR 2016);
- Maintaining the existing water balances of the natural heritage features by implementing the recommendations in the SWM Management Plan, and LID Management Plan;
- Applying a 30 m buffer to the limit of the established meander belt as defined by Beacon geomorphologists (**Appendix F**); 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, turtle nesting area);
- Enhance fish habitat by providing more diverse riparian cover and removing barriers to fish passage;
- 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**.

7.2 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 6-2 of the Preliminary Hydrogeological Investigation (DS 2021). Components of this

plan have been incorporated into the integrated multi-disciplinary Impact Assessment Matrix provided in **Table 16** 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 4.3 of the Preliminary Hydrogeological Investigation shows there is an overall decrease in evapotranspiration (AET) and infiltration in comparison to pre-development conditions across the subject lands (DS 2021). A summary of the results without mitigation is provided in Table 4-4 of section 4.3.3 of the Preliminary Hydrogeological Investigation (DS 2021)

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. To minimize the effects of increased impervious area, LID measures which promote onsite infiltration should be incorporated into the development plan. Currently, the following LID measures are under consideration to meet the water balance deficit:

- Downspout Disconnection;
- Additional Topsoil Depth;
- Swales; and
- Infiltration Facilities.

Stormwater management practices for the developed subject lands should include directing clean sources of storm water (e.g., roof and pervious area) towards the above considered LID facilities to allow for storage and gradual re-infiltration of collected storm water. It should be noted that if any stormwater is collected from surface runoff over impervious lands, then pre-treatment of the collected water will be required prior to permitting infiltration into the ground through any LID facilities.

At this stage, a detailed LID plan was not available for review. For this reason, a post-development water balance with mitigation, to account for the effectiveness of the proposed LID mitigation measures to meet the water balance deficit, could not be completed. During the detailed design stage, a water balance assessment which takes into account actual mitigation plans will need to be completed.

7.3.1.2 Feature Based Water Balance

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 most features fall within the low to medium- risk category and require further investigation.

As baseline hydrogeological data is still being gathered, it is not yet possible to complete the Wetland Water Balance Analysis in accordance with TRCA guidelines. It is recommended that the baseline monitoring continue over the spring and summer of 2021, and that this data be used along with a feature water balance assessment to refine mitigation measures and tools required to address potential deficits or surpluses.

7.4 Stormwater Management Plan

7.4.1.1 SWM Strategy and Objectives

Under existing conditions, the majority of the subject lands (consisting of all lands west of Kennedy Road, and approximately half of the lands located east of Kennedy Road) drain to into the Etobicoke Creek watershed, with the remainder draining eastwards to Kilmanagh Creek. Surface drainage currently flow overland and leaves the subject lands either via culverts underneath Hurontario Street (Highway 10) or via the surface flow of Kilmanagh Creek.

The subject lands will be developed using a treatment-train approach for addressing stormwater runoff generated by the proposed development, consisting of source control and LID measures as appropriate, conveyance techniques, and end of pipe wet pond facilities for additional quantity, quality, and erosion control.

The watershed divide between Etobicoke Creek and the Humber River traverses the non-participating Russell property east of Kennedy Road. For the area within the Russell lands draining to Etobicoke Creek, the majority is conveyed to existing residential development to the south where it is captured in the storm sewer system of Bonnieglenn Farm Boulevard as pre-development drainage. No accommodation was made in the existing downstream storm pipes and stormwater management facility for post-development flows from the Russell lands. As such, the proposed grading and stormwater drainage concept has minimized the area draining to Bonnieglenn Farm Boulevard. This results in a localized diversion of flows from the Etobicoke Creek watershed to the Humber River but reduces the number of SWM facilities and minimizes the condition of mixing clean flows with untreated drainage in the downstream system.

The major and minor drainage system designed by DSEL (2021) will convey storm runoff to four (4) proposed end of pipe stormwater management facilities. Pond 1 services the south portion of the Hicks parcel. Pond 2 services the majority of the Newhouse property, while Pond 3 treats drainage from the north portion of the Hicks parcel. The Russell lands are generally serviced by Pond 4. Ponds 1, 2, and 3 are tributary to Etobicoke Creek while Pond 4 outlets to the West Humber River.

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; and
- To optimize land use by maximizing tableland and serviceable area.

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.

7.4.1.2 Quantity Control

Quantity control target release rates were determined based on unit flow rates for the 2-year to 100-year storm and Regional events. For Pond 1, 2, and 3 the rates were derived from the Etobicoke Creek Hydrology Update (TRCA 2013). For Pond 4, target release rates were determined from the West Humber River Hydrology Update (TRCA; 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. This ensures that existing flow rates downstream of the subject lands are not exceeded under post-development conditions, thereby providing flood protection for properties downstream of the subject lands;

SWM pond outlets will be designed to ensure that post-development peak flow rates for the 2-year to 100-year storm events do not exceed the pre-development conditions at each of the modelled Flow Node locations. Facilities will have multiple outlet controls including an extended detention outlet, quantity control, emergency spillway and a maintenance sump.

Regional control of post-development flow rates to pre-development levels is provided as per direction from the TRCA.

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); and
- **Extended Detention / Erosion Control** – The extended detention volume for erosion control is based on detention of the 25mm storm event for 48 hours for controlled release from the SWM ponds.

7.5 Low Impact Development (LID) Plan

To achieve the water balance targets, 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. To promote infiltration and achieve water balance requirements, the FSR (DSEL 2021) suggested the following Low Impact Development (LID) measures for application in the subject lands:

- Increased topsoil depths;
- Disconnected roof leaders to discharge to rear yards;
- Swales where feasible in NHS areas, parks, downstream of stormwater management outfalls, adjacent to rear lots located within buffers, overland flow easements, and private side yard / rear yard swales;
- Sub-Surface Infiltration LIDs;
 - Infiltration trenches or galleries in parks and parkettes; and
 - Infiltration trenches in rear yards.

The list above is based on a combination of LIDs that are applicable in private property and public property. It is possible to provide additional LIDs in open space area or buffers subject to approval. The list above is not meant to be exhaustive or preclude other LID measures. Further LID considerations can be reviewed for individual draft plans as part of the Functional Servicing Reports prepared in support of draft plans.

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; and
- 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.

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 Permanent Drainage (Long-term Discharge)

Based on the preliminary designs, the proposed plans for development will consist of low-rise residential blocks, 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.

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 272 masl to 258 masl in the southwest 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 low-rise residential development and storm water management ponds are prepared based on inference from nearby boreholes and monitoring wells in the locality of these proposed structures.

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 7.0×10^{-7} m/sec.

The dewatering estimates for the site servicing and residential block developments also includes 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 Preliminary Hydrogeological Investigation (DS 2021). Considering the unsealed excavation method, the total estimated steady-state flow rates for temporary dewatering volumes for each development type was estimated as follows in **Table 17**.

Table 17. Estimated Preliminary Construction Dewatering Volumes

	Dewatering Q (m ³ /day)	Storm Water (m ³ /day)	Dewatering Q (100% safety factor & Storm Water) (m ³ /day)	Zone of Influence (m)
Site Servicing Trench	32	2	66	33
SWM Pond- Newhouse	111	592	814	95
SWM Pond A- Hicks	99	453	651	85
SWM Pond B- Hicks	115	629	859	97
SWM Pond -Russell	116	648	880	98
Detached Residential Block	88	248	424	55

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 6.0 of the Preliminary Hydrogeological Investigation deviate from the finalized developmental designs, DS should be consulted to revise the estimated groundwater seepage rates and permitting requirements (DS 2021).

7.7.1.2 Permanent Drainage (Long-term Discharge)

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. For this reason, all low-rise residential blocks 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 6.0 of the Preliminary Hydrogeological Investigation deviate from the finalized developmental designs, then DS should be consulted to revise the estimated permanent drainage rates and permitting requirements (DS 2021).

7.7.1.3 Permit Requirements

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

The subject lands are located within the Etobicoke Creek and 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.

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

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 18** below. For continuity, the table follows as similar framework used in the Impact Assessment Matrix (**Table 16**).

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Table 18. 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.	<ul style="list-style-type: none">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.
		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.
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.
Surface Water Quantity	To assess potential changes in flow conditions in surface water features (HDFs or watercourses).	3. HDF and Watercourse 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 or watercourse flow in comparison to baseline conditions.	Apply findings and results to future development to reduce long-term impact. Modify outflow rates as necessary to optimize: <ul style="list-style-type: none">Storm flow rate control	DS Consultants Ltd.

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			
									<ul style="list-style-type: none">Base flow augmentationSeasonal stormwater management considerations <p>Opportunity to re-assess SWM Plan for enhanced infiltration or redirection of stormwater.</p>	
Surface Water Quality	To assess changes to water quality.	4. Surface Water Quality: Temperature	No specific targets or thresholds. Will be assessed relative to baseline conditions.	Temperature loggers installed in selected locations along select HDFs and watercourses.	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 or watercourse 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.
	To provide reference data for assessing water quality in relation to SWM outfall locations.	5. Surface 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 along HDFs or watercourses. 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 or watercourse water chemistry in comparison to PWQO Limits for Ontario and baseline conditions.		DS Consultants Ltd.
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	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. Modify outflow rates as necessary to optimize: <ul style="list-style-type: none">Storm flow rate controlBase flow augmentationSeasonal stormwater	DS Consultants Ltd.

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			
				the established hydroperiods and to determine the effectiveness of the mitigation measures (including the LIDs).					management considerations Opportunity to re-assess SWM Plan for enhanced infiltration or redirection of stormwater.	
Stormwater Ponds	To confirm SWM Ponds meet Town of Caledon design criteria, including inspection monitoring.	7. SWM Ponds Design (including landscape 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 construction and, as such, are built in accordance with the approved design.	Not Applicable	Survey and certification of SWM Ponds required once after construction, including assessment of plantings once each year as per warranty.	Inspection monitoring 4 times per year or following significant rainfall events for at least 2 years following 85% build-out, or every second year until Town assumption. Qualitative monitoring of landscape plantings once at 5 years following 85% build-out.	SWM Pond not built in accordance with the approved design. Decline of vegetation in comparison to initial planting conditions.	SWM Pond to be redesigned to meet the design criteria of the Town of Caledon. Refine vegetation management strategies to achieve desired natural cover, including additional plantings as required. Apply findings and results to future development phases.	DS Consultants Ltd., DSEL and Beacon
	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: <ul style="list-style-type: none">Storm flow rate controlBase flow augmentationSeasonal stormwater management considerations Opportunity to re-assess SWM Plan for enhanced infiltration or redirection of stormwater.	DS Consultants Ltd. and DSEL
	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	Not Applicable	Continuous readings at 15-minute intervals from April/May to October/November starting once the pond has been constructed and	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	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.

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			
				frequency set at 15-minute intervals. One oxygen/temperature profile to be completed in mid-August of year 2.		filled until 85% build-out.	Town after 3 years, continuous hourly readings may be required every second year until Town assumption or as agreed by the Town.			
		10. SWM Ponds Water Quality: General Chemistry (Laboratory and <i>in situ</i>)	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. <i>In situ</i> 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.
	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 DSEL
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.	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	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,	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.

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			
				Water quality measurements (specifically temperature with temperature loggers) will be obtained from the outflow drains from neighbourhood park to storm sewer, if feasible.		construction and certification of the trenches.	summer, fall and winter) at years 1 and 3 following 100% buildout if deficiencies identified.			
		13. Surface Water Quality Downstream of LIDs	See Monitoring Parameters 5a. Surface Water Quality: General Chemistry – Lab Analysis and 5b. Surface Water Quality: General Chemistry – In Situ Analysis	DS Consultants						DS Consultants Ltd.
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 ponds 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 RESOURCES										
Fluvial Geomorphology and Aquatic Habitat	To assess conformance of the constructed SWM and monitor for adjustments in channel form/function.	15. Stream Morphology and Aquatic Habitat Conditions	Overall maintenance of channel form (I.e., minimal evidence of active erosion, bankfull dimensions/cross-sectional area remain generally	The following monitoring protocols will be implemented at approximately the same time (summer or fall) of each year: <ul style="list-style-type: none">As-built survey for the constructed low flow channel.	Once prior to construction to confirm baseline conditions and establish vantage points for repeated photographs.			Significant changes in channel form/cross-sectional area. Design enhancement element failure or	Opportunity to re-assess SWM Plan to evaluate storm flow rate control or seasonal stormwater management considerations. Design remediation to address areas of concern.	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			
	<p>To assess changes to aquatic habitat in the study area over the established monitoring period.</p> <p>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.</p>		<p>consistent over monitoring period).</p> <p>Channel design enhancement elements are performing as intended.</p> <p>Overall maintenance and/or enhancement of aquatic habitat over monitoring period</p>	<ul style="list-style-type: none">General field reconnaissance to identify areas of potential concernRepeated photographs from known vantage points.				<p>evidence of excessive erosion.</p> <p>Significant evidence of erosion or aggradation.</p>		
Buffer Areas – Naturalization Plantings	<p>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</p>	16. Buffer Zone Naturalization Plantings	<p>Plantings healthy, well-established and in general conformance with the landscaping plans.</p>	<p>The condition of these plantings will be assessed using visual assessments and comparisons with contractor drawings.</p>	Not Applicable	<p>Once at time of installation, and annually for 2 years following installation in fall.</p>	<p>Once at 5 years following 85% build-out.</p>	<p>Significant change in health of vegetation plantings in comparison to established conditions.</p>	<p>Refine vegetation management strategies to achieve desired vegetation diversity, including additional plantings as required.</p> <p>Apply findings and results to future development phases.</p>	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			
	become self-sustaining naturalized communities.									
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 relative to baseline conditions.	The floristic quality of vegetation communities within the natural heritage system will be determined by undertaking a floristic quality assessment (FQA). These values can be compared over time to identify trends.	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. Apply findings and results to future development phases.	Beacon
	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 (Russell Parcel).	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	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			
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 review 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. Future Work

This CEISMP and companion FSR (DSEL 2021) 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 the Site-Specific level. 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, preparing site-specific studies 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 a Compliance Letter to the satisfaction of the Town, Region of Peel and TRCA summarizing how the proposed development plan conforms to the goals, objectives, targets, environmental management and monitoring plans outlined in this CEISMP and associated FSR (DSEL 2021).

For future development applications that have a high level of conformity with the CEISMP and FSR (DSEL 2021), the Compliance Letter could take the form of a checklist. For development applications that deviate substantially from the recommendations, the Compliance Letter may need to be accompanied by technical briefs or studies. It is also recommended that applicants prepare and submit Terms of Reference for the Compliance Letter to the Town, Region of Peel and TRCA for their review and approval to ensure the scope and content of each Compliance Letter is consistent with agency expectations.

As is noted in the CEISMP, there are a few outstanding information and data gaps related to property access and/or seasonal monitoring constraints. It is anticipated that these data gaps will be filled when access is provided or through ongoing monitoring work. These information gaps are not significant and should not affect the community design or the recommended Environmental Management Plans.

The gaps should be filled through the Draft Plan level or through future site-specific investigations to be included with the Compliance Letters described above.

Future work to be completed at the secondary plan as well as at the site-specific levels is provided below in **Table 19**.

Table 19. Summary of Future Work to be Completed at Draft Plan and Site-Specific Levels

Draft Plan Level		
1. All recommended LTEMP-CAMP monitoring to be completed at Draft Plan level unless otherwise specified.		
2. Ongoing Hydrogeological monitoring		
3. Completion of Feature Based Wetland Water Balance once hydrogeological monitoring data for continuous modelling is available.		
4. Prepare ESC Plans		
Site-Specific Level – Compliance Letter		
Properties (refer to Fig. 3)	Study Type	Details
Newhouse, Hicks and Russell	Snake Hibernacula Surveys	Cover board surveys and/or inspection of likely sites during emergence.
Newhouse and Russell	Bat Maternity Colony Surveys	Exit surveys for all structure with potential habitat.
Newhouse, Hicks and Russell	Tree Inventories and Preservation Plans	Fill in gaps for trees not assessed by Beacon.
Newhouse	Eastern Meadowlark Surveys	Survey for Eastern Meadowlark and its habitat
Newhouse and Russell	Barn Swallow Surveys	Survey for Barn Swallow and its habitat

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 Mayfield West Phase 1 – Stage 2 Expansion Area Land Use Plan and Preliminary Framework Plan comply with the applicable environmental policies and legislation is summarized below in **Table 20**.

Table 20. Policy Compliance Assessment

Applicable Policy / Legislation	Relevant Ceismp Findings	Compliance
Federal <i>Fisheries Act</i> (1985) and Fisheries Protection Policy Statement (2019)	Reaches EC1 to EC3 and TEC1 of Etobicoke Creek provide fish habitat. Additionally, HDF reaches EC1-A and EC1-C provide fish habitat and will be protected within the proposed NHS and their hydrologic functions protected or enhanced through implementation of LID controls. Reach KC1 of Kilmanagh Creek provides fish habitat including regulated habitat for Redside Dace (<i>Clinostomus elongatus</i>).	No impacts to fish habitat. HDF Reaches EC1-A and EC1-C will be protect and enhanced. Potential indirect impacts to fish habitat will be mitigated by implementing a range of measures (see Table 16 , including, but not limited to: <ul style="list-style-type: none"> 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 <i>Species at Risk Act</i> (2002)	The KC1 reach supports occupied habitat for the Federally Endangered Redside Dace. ELC Unit 3.10 (as shown on Figure 4) was found to support breeding activity of the Eastern Meadowlark (<i>Sturnella magna</i>).	No development is proposed within the KC1 reach or its meander belt + 30 m. If any stormwater management discharge is proposed to be directed to the KC1 reach, all plans must be reviewed and approved by MECP and DFO. The cultural meadow habitat within ELC Unit 3.10 (Figure 4) is contained within the proposed NHS and is therefore protected.
Provincial <i>Endangered Species Act</i> (2007)	The study area supports occupied habitat of one Provincially Endangered fish species (Redside Dace). The study area supports breeding habitat for two Provincially Threatened bird species (Eastern Meadowlark and Barn Swallow, <i>Hirundo rustica</i>). Potentially suitable habitat for Provincially Endangered bats may also be present in the Study Area with ELC Units 9 and 10 as well as anthropogenic structures.	For Redside Dace see <i>Fisheries Act</i> and <i>Species at Risk Act</i> above. For Eastern Meadowlark see <i>Species at Risk Act</i> above. For Barn Swallow, sufficient compensation habitat will be constructed, as determined through the species at risk registry process, prior to any habitat structures (i.e., barns) being removed on the subject lands. Newly constructed compensation habitat will be monitored following construction. Future work will be required at the Site-Specific Level to demonstrate compliance with <i>Endangered Species Act</i> . 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 <i>Endangered Species Act</i> (see above).	See <i>Endangered Species Act</i> above.
2. Significant Valleylands	Significant valleylands associated with Etobicoke Creek and Kilmanagh Creek are present within the subject lands.	No impacts to significant valleylands.
3. Significant Wetlands	There are no Provincially Significant Wetlands on the subject lands, however, a portion of the Etobicoke Creek Headwaters Wetland Complex occurs within the study area. 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. See Town of Caledon Policy Conformity below.	No impacts to significant wetlands.
4. Significant Woodlands	Significant woodlands are present within the subject lands and study area. All woodlands within the subject lands are contained within the proposed NHS.	No impact to significant woodlands.
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: <ul style="list-style-type: none"> Snake hibernacula; Bat maternal roosts and hibernacula; Amphibian breeding habitat; Overwintering turtles; Habitat for species of conservation concern; and Animal movement Corridors. 	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. Wildlife Habitat shall be studied and evaluated through site specific studies at the Draft Plan stage of the application. Refer to Section 9 .

Applicable Policy / Legislation	Relevant Ceismp Findings	Compliance
6. Significant Areas of Natural and Scientific Interest	There are no Areas of Natural or Scientific Interest associated with the study area.	N/A
7. Fish Habitat	See text above re: <i>Federal Fisheries Act</i>	See text above re: <i>Federal Fisheries Act</i>
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 Reaches TEC1 and KC1, of Etobicoke Creek and Kilmanagh creek, respectively, as they are situated within an unconfined valley system (stream corridor). Reaches EC1, EC2 and EC3 are situated within a confined valley (valley corridor), meander belt limits were not delineated.	A meander belt width of 30 m was recommended for Reach TEC1; and A meander belt width of 65 m was recommended for Reach KC1. As Reach KC1 is located within nonparticipant lands, field confirmation of the 65 m meander belt dimension is recommended.
Region of Peel Official Plan	<p>Policy 2.3.2.6 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.</p> <p>Core Areas of the Regional Greenlands System that overlap with the study area include:</p> <ul style="list-style-type: none"> Significant Wetlands (north and south of the subject lands within the study area); Significant Habitat of Threatened and Endangered Species (SAR Bats, Eastern Meadowlark, Redside Dace); and Stream Corridor on the Russell parcel (Reach KC1). <p>Natural Areas and Corridors (NACs) that overlap with the study area include: Significant Wildlife Habitat and Fish Habitat.</p> <p>Potential Natural Areas and Corridors that overlap with the Study Area include: Unevaluated wetlands.</p> <p>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.</p>	<ul style="list-style-type: none"> No impacts to significant wetlands. Refer to <i>Endangered Species Act</i> above. Development will occur outside of floodplains. Unevaluated Wildlife Habitat shall be studied and evaluated through site specific studies at the Draft Plan stage of the application. Refer to Section _. See text above re: <i>Federal Fisheries Act</i> Other Wetlands within the subject lands will be protected and incorporated into the proposed NHS as shown on Figures 5 and 6. Cultural meadow habitat (ELC Unit 3.10) for Eastern Meadowlark will be protected and incorporated into the proposed NHS.
Town of Caledon – Environmental Performance Measures	<p>Town of Caledon's Performance Measures (Official Plan Section 3.2.5) deals with Environmental Performance Measures. As per the assessment in Section 3.3.10, the Study only supports 10 of 17 of the Performance Measures:</p> <ul style="list-style-type: none"> Woodlands; Wetlands; Habitat of Threatened and Endangered Species; Fisheries; Wildlife Habitat; Valley and Stream Corridors; Groundwater; Soils; Natural Slopes; and Greenbelt Key Natural Heritage and Key Hydrologic Features. <p>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:</p> <p><u>Policy 3.2.5.3 – Woodlands</u> New development is prohibited in Woodland Core Areas, and new development will also not be permitted in Other Woodlands unless it can be demonstrated that the development will not degrade the ecosystem integrity.</p> <p><u>Policy 3.2.5.4 - Wetlands</u></p>	<ul style="list-style-type: none"> No development will occur within a Wetland Core Area, and Other Wetlands will be protected within the proposed NHS area; No development will occur within the habitat of a Threatened or Endangered species without <i>Endangered Species Act</i> permitting (refer to <i>Endangered Species Act</i> 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 16); 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 ; 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. Slopes adjacent to the proposed NHS have been evaluated alongside TRCA and appropriate development limits have been established. Development is proposed within 120 m of the Greenbelt Key Hydrologic Feature associated with reach KC1 of Kilmanagh Creek but is located outside of the feature itself and its associated Vegetation Protection Zone.

Applicable Policy / Legislation	Relevant Ceismp Findings	Compliance
	<p>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.</p> <p><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.</p> <p><u>Policy 3.2.5.10 - Fisheries</u> 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.</p> <p><u>Policy 3.2.5.11 - Wildlife Habitat</u> 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.</p> <p><u>Policy 3.2.5.12 - Valleyland and Stream Corridors</u> 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.</p> <p><u>Policy 3.2.5.13 - Groundwater</u> 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.</p> <p><u>Policy 3.2.5.14 - Soils</u> 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.</p> <p><u>Policy 3.2.5.15 – Natural Slopes</u> The Town encourages the conservation of steep slopes and slope instability. Slopes located outside of valley and stream corridors and not identified as EPA shall be assessed to evaluate their ecosystem form, function and integrity.</p> <p><u>Policy 3.2.5.18 – Greenbelt Key Natural Heritage and Key Hydrologic Features</u> New development within 120 m of Key Hydrologic Features within the Protected Countryside designation, but outside the features themselves and the related Vegetation Protection Zones may be permitted.</p>	
Toronto and Region Conservation Authority (TRCA) Regulations	The subject lands include valleylands, watercourse, drainage features, floodplains and fish habitat, all subject to TRCA policies and regulations.	Regulated natural heritage features (watercourses, valleylands, wetlands and HDF's) 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 NHS. Permits will be applied for as required.

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11. Summary and Conclusions

This CEISMP report and the companion FSR (DSEL 2021) and Hydrogeological Investigation (DS Consultants 2021) have been prepared in support of the proposed LOPA Mayfield West Phase 1 – Stage 2 Expansion Area Use Plan and Preliminary Framework Plan.

This CEISMP report was prepared in accordance with Terms of Reference (TOR) that were previously submitted to TRCA staff. This CEISMP builds upon and integrates the findings of the various technical studies previously completed by DSEL, DS Consultants and Beacon in 2020 and 2021. It also addresses items identified through TRCA comments on 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 development of the Mayfield West Phase 1 – Stage 2 Expansion Area. 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 report 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 Mayfield West Phase 1 – Stage 2 Expansion Area as well as a Preliminary 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 accordance with the Town's ecosystem framework and environmental performance measures. As the proposed Land Use Plan and Preliminary Framework plans have been developed to integrate most of the existing natural heritage features, impacts to natural features and their functions have generally be avoided. The proposed natural heritage system has been developed to comprehensively include the stream valley corridors of Etobicoke Creek and Kilmanagh Creek, certain headwater drainages features, significant woodlands, unevaluated wetlands, as well as fish and wildlife habitat.

This CEISMP report assesses the potential impact impacts of the proposed Land Use Plan and Preliminary 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 (DSEL 2021) 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 report demonstrates that the Mayfield West Phase 1 – Stage 2 Expansion Area Land Use Plan can be implemented while 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 report 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 this CEISMP iteration 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 Preliminary Framework Plan or the Limits of Development that have been established through this report. This future work is summarized and described in the previous sections of this CEISMP report, and it is anticipated that most can be completed at the detailed design stage and provided to the Town and agencies in the form of a Compliance Letter.

In conclusion, it is the opinion of the project study team that the proposed Land Use Plan and Preliminary 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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This report has also been developed with technical input and contributions from John Tjeerdsma of David Schaeffer Engineering Limited; Scott Watson of DS Consultants Ltd.

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Appendix A

Terms of Reference for Argo Kennedy Limited

March 11, 2021

BEL 219527

Ms. Stephanie McVittie
Development Review Services
Town of Caledon
6311 Old Church Road
Caledon East, ON L7C 1J6

Mr. Jason Wagler
Development Planning and Permits
Toronto and Region Conservation Authority
101 Exchange Avenue
Vaughan, ON L4K 5R6

Re: Proposed Terms of Reference, Comprehensive Environmental Impact Study and Management Plan (CEISMP), Argo Kennedy Limited – Town of Caledon, Regional Municipality of Peel

Dear Ms. McVittie and Mr. Wagler:

On behalf of Argo Kennedy Limited, Beacon Environmental Limited (Beacon) has prepared the following Terms of Reference (TOR) for a Comprehensive Environmental Impact Study and Management Plan (CEISMP) in support a Local Official Plan Amendment (LOPA) application for three land parcels and identified as Parts of Lot 22, Concession 1 and 2 East of Centre Road Chinguacousy in the Town of Caledon, Regional Municipality of Peel (hereafter referred to as the “subject lands”).

The subject lands are bordered by Highway 10 to the west, Old School Road to the north and the Brampton Fairgrounds to the east. The limits of the subject lands and delineation of the three land parcels are identified on **Figure 1**. The lands are situated within the Mayfield West Study Area immediately to the north of the existing Mayfield West Phase 1 Community. The purpose of the LOPA is to bring the subject lands into the Rural Settlement Boundary.

Most of the subject lands are currently under agricultural use. Natural heritage features are present and include woodlands and wetlands associated with tributaries of Etobicoke Creek and the West Humber River. Schedule B of The Town of Caledon Official Plan designates most of the subject lands as ‘Prime Agricultural’. It also identifies the forest, wetlands, watercourses as ‘Environmental Policy Area’ (EPA). Additionally, the West Humber tributary are designated as Greenbelt Protected Countryside. Both tributaries are recognized as an ‘Environmentally Sensitive Area’ and represent ‘Core Areas’ that are part of the Region of Peel ‘Greenlands System’. The portion of the West Humber tributary that traverses the Russell parcel is identified as part of the Greenbelt Plan Area as per the Town’s OP. Portions of the Etobicoke Creek Headwater Provincially Significant Wetland (PSW) Complex are located to the north and south of the subject lands.

The Newhouse and Hicks parcels are associated with a tributary of East Etobicoke Creek and the Russell property is associated with a tributary of the West Humber River (**Figure 1**). Russell is a non-participating landowner, so investigations will be limited primarily to background review.

Town of Caledon policies require that a CEISMP be prepared in support of applications for settlement area expansion or development that are adjacent to EPA. The purpose of a CEISMP is to characterize exiting biophysical conditions and ecological functions, identify constraints and opportunities to future development, describe the proposed land use plan and associated environmental management plans, assess potential impacts, identify mitigation and monitoring requirements and evaluate conformity with applicable environmental protection policies and regulations.

The lands immediately to the south of the subject property were recently developed. This CEISMP, as well as the companion Functional Servicing Report (FSR) being prepared by David Schaffer Engineering Ltd. (DSEL), will have regard for the environmental protection, management and monitoring strategies and plans outlined in the Mayfield West Community Development Plan Area CEISMP and FSR.

Study Approach

A CEISMP report typically consists of three parts as follows:

- Part A - Existing Conditions and Biophysical Characterization
- Part B - Impact Assessment and Detailed Studies
- Part C - Implementation

Given that the subject lands consist of a relatively small area compared to the overall Mayfield West Study Area which has already been subjected to extensive study, it is proposed that the CEISMP be prepared and submitted as a single comprehensive document inclusive of all three parts. We believe this approach is similarly comprehensive but more efficient. Additionally, it is proposed that the CEISMP be submitted in two phases by preparing an initial report followed by a final report.

The Initial CEISMP will be based primarily on available background information from previous studies including the Mayfield West Community Development Plan Area CEISMP, available field data and analyses collected to date, as well as feature staking and confirmation. The Final CEISMP will fill in any gaps by supplementing the initial report with information gathered through seasonal surveys, monitoring and water balance analyses. The outline of both reports will be identical as is described further below.

This proposed approach allows for a land use plan to be developed early in the process once development limits have been established and confirmed. The land use plan will be supported by preliminary stormwater management, servicing, and grading plans. This land use plan will be used for the LOPA application submission. Concurrent with the LOPA application submission, there will be further technical investigations, analyses and monitoring work that will be undertaken and integrated into the Final CEISMP. It is not anticipated that the additional technical information will result in changes to the land use plan or the established development limits. If there are changes, these will be addressed through the Draft Plan process and detailed design.

CEISMP Study Process

The CEISMP reports will include a detailed account of the study area, study team, and provide an outline of the study's goals and objectives. The study goals and objective will be related to satisfying the Town's Environmental Performance Measures.

CEISMP Study Team

The CEISMP will be prepared using an integrated approach with input from a multi-disciplinary project team, including some that were directly involved with the Mayfield West Community directly to the south. The project team is comprised of experts in the fields of land use planning, ecology, hydrology, hydrogeology and fluvial geomorphology. The following consultants will contribute to sections of the CEISMP. A summary of their project roles is provided below.

Glenn Schnarr & Associates (GSAI) will be coordinating the LOPA application, prepare the Planning Justification Report and Secondary Plan policies for the LOPA.

Beacon will be the lead author of the CEISMP and will also undertake various ecological investigations, tree inventories and geomorphic assessments.

David Schaeffer Engineering Limited (DSEL) will be preparing the Functional Servicing Report, Stormwater Management Plans, Servicing Plans, Grading and Drainage Plans, and Low Impact Development (LID) Plans. In addition, DSEL will work with DS Consultants Ltd. to complete a wetland water balance risk evaluation and modeling to support the wetland water balance analysis and to devise strategies for maintaining the wetland water balance.

DS Consultants Ltd. will be completing a Hydrogeological Investigation for the study area. This will include characterization of groundwater resources, and a site water balance. DS will establish a surface water and groundwater monitoring program and will work with DSEL to support the wetland water balance risk evaluation and wetland water balance analysis. DS Consultants Ltd. will also prepare a Slope Stability Analysis where applicable.

Study Area

The main study area for this CEISMP will include the subject lands as well as adjacent lands within 120 m. However, depending on discipline, the study area may be larger to allow for characterization and consideration of groundwater and surface water catchment areas, and the broader Natural Heritage System (NHS).

Feature Staking with TRCA – March 2021

One of the first steps in the CEISMP process is to stake the limits of natural features and natural hazards with representatives from the TRCA. A site visit will be scheduled. To facilitate this, features such as top of slope, woodland dripline, and wetlands will be pre-staked in advance. During the site visit, an

Ontario Land Surveyor (OLS) will be available to survey the stakes once confirmed by TRCA. The survey file will be provided to TRCA.

Initial CEISMP Report – Submission May 2021

- Characterize the biophysical resources associated with the study area using primary and secondary data sources;
- Evaluate the significance and sensitivities of the biophysical resources in the study area;
- Identify natural heritage and natural hazard constraints to development and identify opportunities for ecological enhancement;
- Establish development limits for the land use plan based on approved limits of staked features and application of required buffers and setbacks;
- Provide environmental input to the design of the land use plan;
- Describe the proposed land use plan and associated environmental management systems and strategies (i.e., NHS, SWM & Servicing Strategies, etc.);
- Assess potential impacts of the land use plan on the natural heritage features and ecological functions;
- Prepare Environmental Management Plans (NHS Plan, SWM Plans, LID Plans, etc.);
- Prepare Long-Term Environmental Monitoring Plan (LTEMP) and Comprehensive Adaptive Management Plan (CAMP);
- Evaluate compliance of the land use plan with applicable environmental policies and regulations; and
- Summarize data gaps to be filled by Final CEISMP.

Final CEISMP Report – September 2021

- Fill in gaps in the Initial CEISMP by integrating supplemental information gathered through seasonal field investigations and ongoing monitoring;
- Refine Environmental Management Plans;
- Refine Long-Term Environmental Monitoring Plan (LTEMP) and Comprehensive Adaptive Management Plan (CAMP); and
- Summarize future work/studies required for at the LOPA and site-specific scale.

CEISMP Report Outline

The following is a proposed outline for the CEISMP report. As was discussed above, the outline of the Initial and Final reports will be identical.

1.0 Introduction

This section of the report will include descriptions of the following:

- Planning Context;

- Study Goals and Objectives;
- Study Area; and
- Study Team.

2.0 Policy Framework

To ensure that applicable environmental policies and regulations are considered, all federal, provincial, municipal and agency legislation and policies relevant to the subject property and proposed development will be reviewed and summarized. Consideration will be given to the following:

- *Fisheries Act* (2019);
- *Migratory Birds Convention Act* (1994);
- *Endangered Species Act* (2007)
- Provincial Policy Statement (2014);
- Greenbelt Plan (2017);
- Greater Golden Horseshoe Growth Plan (2017);
- Region of Peel Official Plan (2014);
- Town of Caledon Official Plan – Office Consolidation (2018); and
- Toronto and Region Conservation Policies and Regulations.

3.0 Characterization of the Existing Biophysical Environment

3.1 Background Review

This report section will include a summary of all available background information and data relevant to the characterization of natural heritage resources in the study area. This information will be reviewed and integrated into the CEISMP as applicable. Background information to be reviewed will include, but not be limited to, the following:

- Region of Peel Scoped Subwatershed Study (Preliminary Draft) as prepared by Wood PLC (2020);
- TRCA's Natural Heritage System Strategy (2007);
- Etobicoke Creek Headwaters Synthesis Report (2008);
- Mayfield West Natural Features Study (1998);
- Mayfield West Community Development Plan Area CEISMP and FSR studies;
- 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); and
- Historical and current aerial photography (1956 – 2018).

Background information will be reviewed in conjunction with information collected as part of ongoing field studies to characterize the environmental features and their functions in the CEISMP study area. A description of the various biophysical resources that will be characterized using primary and secondary sources is provided in the following sections.

4.0 Physical Resources

Bedrock Geology

Published mapping will be used to characterize the bedrock resources present in the study area. This information will be used along with data collected through borehole investigations to be completed by DS Consultants Ltd.

Physiography & Surficial Geology

The physiography of the study area will be characterized using available background information sources (i.e. Physiography of Southern Ontario – Chapman and Putman 1984).

Topography, Slopes and Soils

The topography of the study area will be characterized based on topographical surveys of the subject lands. Areas of steepened slopes will be identified using the topographical mapping. Soil conditions on the property will be characterized using available soil mapping and confirmed through the geotechnical investigations.

Groundwater Resources

DS Consultants Ltd. is preparing a Hydrogeological Investigation that will characterize the following:

- Groundwater Levels & Gradients;
- Areas of Recharge/Discharge;
- Hydraulic Conductivity;
- Groundwater Chemistry; and
- Site Water Balance.

The Hydrogeological Investigation will rely on available background information that will be supplemented with information gathered through a field monitoring program consisting of shallow and deep monitoring wells.

Surface Water Resources

DSEL Consultants Limits will characterize surface water resources by identifying existing drainage catchment areas and identifying drainage nodes using various mapping and modelling tools, including hydraulic assessment to confirm the extent of the existing floodplain.

Geomorphic Assessment

The subject lands support drainages features including tributaries of the West Humber River and Etobicoke Creek. These tributaries generally are associated with confined valley systems, however there is one tributary reach to Etobicoke Creek that appears to be unconfined. For this unconfined reach, Beacon proposes to complete a meander belt assessment to identify the limits of potential constraints.

4.1 Natural Heritage Resources

To supplement the available background information related to natural heritage resources, a number of ecological investigations are proposed or are currently underway. These are described below.

Endangered and Threatened Species Screening

General habitat assessment for Endangered or Threatened species will be undertaken to compare conditions within the subject property to the habitat preferences of Endangered or Threatened species that are known to occur in the general vicinity.

Aquatic Habitat & Headwater Drainage Feature Evaluation (April/June/July)

To characterize the aquatic resources associated with the subject lands the habitats associated with the tributaries will be assessed using modified procedures from the *Ontario Stream Assessment Protocol* (Stanfield et al. 2017). Additionally, any headwater drainage features associated with the subject lands will be evaluated and classified using the *Evaluation, Classification and Management of Headwater Features* (TRCA and CVC 2014).

Amphibian Surveys – 3 Visits (April – June)

To confirm the presence/absence of amphibian species and breeding sites, we propose to do surveys of potentially suitable habitat using the standardized Marsh Monitoring Protocols. Amphibian surveys will be conducted at potential breeding areas identified on aerial photography and confirmed through site reconnaissance. Amphibian surveys will consist of auditory surveys undertaken during the prime breeding period to record calling male frogs and toads that are present. This will be repeated three times during the season at least 15 days apart to include the short temporal peak for each species of interest, in accordance with the established protocols.

Breeding Bird Surveys - 2 visits (May-July)

To confirm the presence of significant or sensitive species or populations of birds, two breeding bird surveys will be completed between late May and early July. These surveys will take place in the early morning on days with low winds (1 on the Beaufort scale), temperatures within 5 °C of normal and no precipitation. Properties within the study area for which access permissions have been granted will be walked so all singing birds can be heard or observed and recorded on an aerial photograph of the site. All birds observed in suitable habitat and showing evidence of breeding (e.g., territorial behaviour) will be assumed to be breeding.

Ecological Land Classification (ELC) and Floristic Surveys - 2 visits (June and August/September)

To assess the significance and sensitivity of the various ecological communities associated with the subject lands, vegetation and soil surveys will be completed to classify the communities in accordance with the protocols of the *Ecological Land Classification (ELC) System for Southern Ontario* (Lee *et al.* 1998).

Ecological communities within the study area will be mapped and described. This will involve delineating vegetation communities on aerial photos of the property. For each vegetation community information on dominant species cover, community structure, level of disturbance, presence of indicator species, and other notable features will be recorded on properties where access is provided.

Floristic surveys will also be completed as part of the ELC. All portions of the properties that access has been provided to will be surveyed to document vascular plant species populations.

A checklist of all vascular plant species observed will be compiled for each ecological community type. Rare or sensitive communities and plants will be determined in accordance with Scoring and Ranking TRCA's Vegetation Communities, Flora, and Fauna Species (TRCA 2019)

Tree Inventory & Assessment

To identify possible opportunities for preserving and integrating existing trees into the land use plan an inventory of all trees > 15 cm dbh will be completed for portions of the subject lands outside the natural heritage system. The health and condition of the trees will be assessed to determine where preservation/integration opportunities exist.

4.2 Evaluation of Significance and Sensitivities

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 will rely upon the significance criteria outlined in the PPS (2020) and associated Natural Heritage Reference Manual (2010), Region of Peel's Greenlands System policies, and the Town of Caledon's Environmental Performance Measures policies. Information from the background review and ecological investigations will be used to determine which features satisfy the established significance criteria.

5.0 Identification of Constraints and Opportunities

The purpose of the 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 will be 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 based on the current policy and regulatory regimes, these features or areas will be identified as potential constraints to development.

It is important to note that while certain features or areas may be identified as a potential constraint, this does not always mean the area cannot be developed. Constraints are treated variably according to their significance and sensitivity as well as the regulatory requirements applicable to them. For example, areas that are currently subject to flooding and represent a constraint can be modified and designed to reduce the extent of area being constrained.

6.0 Description of the Proposed Land Use Plan

This section of the report will describe the proposed land use plan and how it was developed with consideration of key elements such as the NHS and Stormwater Management (SWM) Strategy. A copy of the land use plan and site statistics will be included.

Proposed Natural Heritage System (NHS)/ Environmental Policy Area (EPA)

This section will include an explanation of how the proposed NHS/EPA for the subject lands was determined and how it relates to the Town's Environmental Performance Measures, Ecosystem Framework, and protection objectives.

Proposed Stormwater Management Strategy

This section will include an explanation of how the various SWM ponds were designed to meet the required quantity and quality controls and how the ponds were sized and located, and outfall locations selected.

Proposed Servicing Strategy

This section will include an explanation of how the various servicing requirements for the proposed community were designed and the locations of connections to existing infrastructure.

Other Elements of the Proposed Land Use Plan

Other elements of the proposed land use plan such as LID's, Parks, Trails, etc. will also be described in this section as applicable.

7.0 Impact Assessment and Mitigation

This section of the report will include an assessment of potential development related impacts to existing natural heritage features and their ecological functions. Impacts related to future development will be assessed and summarized in a matrix format as outlined in TRCA's EIS Guidelines.

The impact assessment matrix will:

- 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); and
- Describe the net effect on the biophysical environment.

The impact assessment matrix will be structured according to ecosystem components (e.g., geology, landforms, hydrogeology, hydrology, aquatic systems, terrestrial systems, etc.). The matrix will describe 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.

The impact assessment will be based on:

- The most current and detailed level of information available related to biophysical resources based on primary and secondary data and analyses; and
- The findings of the constraint analyses 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.

Where potential impacts are identified recommendations for suitable mitigation measures will be proposed. The various mitigation measures identified in the impact assessment will refer to the Environmental Management Plans that will be outlined in Section 7.0 and describe in greater detail how mitigation measures will be implemented.

The net or residual effect of potential impacts, after mitigation measures are applied, will be determined, and noted as negative, neutral, or positive.

8.0 Environmental Management Plans

This section of the report 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 overall environmental strategy will incorporate a number of plans to ensure the proposed land use plan meets the strategy's goals. As protection and management of ecosystems requires an integrated approach, it is proposed that the several environmental management plans be developed including the following:

- Natural Heritage System Management Plan;
- Water Resources Management Plan; and
- Construction Management Plan.

9.0 Long-term Environmental Monitoring Plan and Comprehensive Adaptive Management Plan

This section of the report will include a proposed Long-term Environmental Monitoring Plan (LTEMP) and Comprehensive Adaptive Management Plan (CAMP).

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

The 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. The CAMP will ensure that these measures and strategies are performing as intended and will incorporate an adaptive process through which adjustments can be made should monitoring reveal that these measures and strategies are not performing as intended.

As the LTEMP and CAMP are highly inter-related, it is proposed that these monitoring items be combined and presented together and coupled to the impact assessment matrix as the proposed monitoring relates to mitigation of impacts. We believe this approach will more clearly describe the relationship between monitoring, impact mitigation and any adaptive management.

10.0 Future Work

While the proposed CEISMP Reports will comprehensively integrate information from primary and secondary sources, it is anticipated that the complete results of certain monitoring programs may not be immediately available for integration. As a result, future monitoring work will be undertaken, and the results of that work will be provided through addendum reports. It is also anticipated that the proposed CEISMP Report submissions will contain sufficient information to not only support the land use plan, but also the draft plans. It is anticipated that comprehensive site-specific EISs may not be warranted in the future and that these plans could be addressed through a CEISMP Addendum or as Compliance Letters.

This section of the report will be used to summarize this future work as follow:

1. The Initial CEISMP will contain certain data gaps since specific studies and monitoring activities will be ongoing. When this work is substantially completed, the information will be integrated into the Final CEISMP; and
2. While the Final CEISMP will fill in most data gaps, it is anticipated that there will be some ongoing longer-term monitoring and study. The Final CEISMP will summarize this additional work and outline a process by which this work can be presented in the future.

11.0 Policy Conformity

This section of the report will include a table summarizing how the proposed land use plan conforms with applicable environmental legislation, regulations, and policies.

We trust that the information provided in this letter and the report outline can serve as Terms of Reference for the CEISMP.

Should you have any questions, please do not hesitate to contact me at (519) 826-0419 x31. We look forward to your comments.

Prepared by:
Beacon Environmental





Joel Davey, B.BRM, M.E.S., CISEC
Aquatic Ecologist, Environmental Inspector

Reviewed by:
Beacon Environmental



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



Site Location		Figure 1
Argo Kennedy		
		Project: 219527 Last Revised: March 2021
Client: Argo Kennedy		Prepared by: DU Checked by: JD
	1:15,000	Inset Map: 1:80,000
Contains information licensed under the Open Government License— Ontario Orthoimagery Baselayer: FBS Peel 2019		

Appendix B

Terms of Reference Comment Response Matrix

Appendix B

Terms of Reference Comment Response Matrix

Agency/ Dept	Reviewer	No.	Comments/Conditions	Consultant	Response	Status
Conservation Authority (TRCA)			Proposed Settlement Area Boundary Expansions (SABEs) require the prior completion of a comprehensive subwatershed study (SWS) under the Growth Plan. The lands are located within the Focused Study Area for the Region's SABE study currently underway. TRCA staff have reviewed and commented on the first draft submission of the SWS, prepared by Wood Environmental. We understand that the completion of this study and associated ROPA approval by the Region is required.	Beacon	The draft comprehensive SWS document (as prepared by Wood and dated October 2, 2020) has been reviewed and the general language, particularly around development limits, included in the draft CEISMP report considers the direction provided by the draft SWS.	
Conservation Authority (TRCA)			Note that the Region's scoped SWS, once approved, would be sufficient for the purposes of a boundary expansion exercise, but would not be detailed enough in scope to consider secondary plans/LOPAs. A more detailed SWS or MESP/Comprehensive Environmental Impact Study and Management Program (CEISMP) is required to satisfy applicable Provincial/Regional/Municipal/TRCA policies.	Beacon	Noted. The CEISMP report is intended to support the LOPA.	
Conservation Authority (TRCA)			Note that Campbell's Cross Creek, located at the Eastern limit of the landholdings, is occupied/contributing Redside dace habitat. We understand that a 30m setback from the meander belt of the creek is typically required. Please consult MECP on this proposal and include any documentation in the required CEISMP study.	Beacon	MECP was consulted, and a response received on March 9, 2021 (from Mr. Shamus Snell) confirming that the reach of Campbell's Cross Creek (identified in the CEISMP report, as well as by MECP, as Kilmanagh Creek) is occupied Redside Dace habitat. The required meander belt plus 30 m setback, as required under the ESA, is identified (Figure 5) and adhered to in the draft CEISMP report.	
Conservation Authority (TRCA)			The site concept plan identifies Beacon verified wetland limits and respective buffers. The legend notes preliminary 10m protection zones for wetlands outside of the greenbelt plan area and 30m for wetlands within the Greenbelt. Like the ORMCP and Greenbelt Plan, wetlands are KHFs/KNHFs under the Growth Plan. Also like the ORMCP and Greenbelt, where lands in the Growth Plan are in an already designated settlement area, an MVPZ of less than 30m may be permitted if approved through a prior comprehensive environmental study. These lands are outside of the rural service centre of Mayfield West. As such, wetlands, whether Provincially Significant or Locally Significant, have an associated 30m MVPZ. Also, the wetlands immediately South of 3431 Old School Road form part of the Etobicoke Creek Headwaters Provincially Significant Wetland Complex. Please ensure 30m MVPZs are included for all wetlands	Beacon	This CEISMP has been prepared with the understanding that the subject lands will be brought into the urban/settlement boundary to which the Growth Plan NHS policies do not apply.	
Conservation Authority (TRCA)			Reductions in buffers are proposed to the preliminary limits of development in many locations without corresponding compensation areas. Please ensure full buffers are provided in accordance with applicable policies.	Beacon	Appropriate buffers are assigned to the various natural features located within the subject lands. See response above with regards to buffers associated with onsite wetlands and the PSW located adjacent to the School Block. No compensation areas are required.	

Agency/ Dept	Reviewer	No.	Comments/Conditions	Consultant	Response	Status
Conservation Authority (TRCA)			Terrestrial linkages – The Region’s SABE SWS draft Part B identifies two linkages that pertain to these lands: one a major linkage through the Campbell’s Cross Creek valley system and the other through a smaller Etobicoke Creek valley system. The linkages proposed in the SABE include a minimum vegetated width (100m for a major corridor and 60m for a local link) and a permeable landscape zone (60m for a major and 30m for a local link). The plans should incorporate these linkages to ensure species movement over the long-term.	Beacon	The proposed Natural Heritage System, as shown on Figure 6 of the Draft CEISMP report, protects a considerably larger area along Kilmanagh Creek (i.e., Campbell’s Cross Creek) than the required width of 160 m (100 m MVW + 60 m PLZ) for Major Landscape Linkages as detailed in Table 2.4.2.12 of the SWS Part B Detailed Study and Impact Assessment. For the Local Landscape Linkage associated with the main valley of Etobicoke Creek, the proposed NHS, as shown on Figure 6 of the Draft CEISMP report, provides an overall area larger than the equivalent 90 m width (60m MVW + 30 m PLZ) required in Table 2.4.2.12 of the SWS Part B Detailed Study and Impact Assessment	
Conservation Authority (TRCA)			The majority of the lands are situated in the Etobicoke Creek Watershed, with a small portion at the Eastern end of the landholdings within the Humber River Watershed. The lands in the Humber watershed drain to Campbell’s Cross Creek, which is also within the Natural Heritage System (NHS) overlay of the Protected Countryside of the Greenbelt Plan. Stormwater management proposals must meet the TRCA’s criteria for each respective watershed. It is strongly recommended that the proponent contacts TRCA’s engineering staff to understand the criteria to be utilized before completing required studies as criteria have recently changed for the Humber River watershed for example.	Beacon	Noted.	

Agency/ Dept	Reviewer	No.	Comments/Conditions	Consultant	Response	Status
Conservation Authority (TRCA)			<p>Submission Requirements:</p> <ul style="list-style-type: none"> - Delineation/verification of limits of features on site (top of valley slope, wetlands, and woodlands/contiguous vegetation). The applicant is advised to contact TRCA staff prior to the first submission to arrange dates for delineating features. - Completion of the Region's Scoped Subwatershed Study - Submission and approval of a Terms of Reference for the detailed SWS, especially the Natural Heritage and Hydrology/Hydraulics components - Submission of a detailed Scoped Subwatershed study or Comprehensive Environmental Impact Study and Management Plan (CEISMP) containing three parts: <ul style="list-style-type: none"> A) Part A – Characterization/Existing Conditions and Baseline Inventory <ul style="list-style-type: none"> - includes necessary supporting studies and cross-synthesis (Natural Heritage, HDF assessment and Aquatics, Feature-Based Water Balance evaluation and assessment if required, Geomorphic Analysis and Erosion Hazard delineation, Slope Stability Analysis (where applicable), Floodplain Analysis and Mapping to TRCA's standards, Hydrogeological investigation/Overall Water balance, and Functional Servicing Report) B) Part B – Land Use Impact Assessment <ul style="list-style-type: none"> Evaluation of existing conditions, potential impacts based on the proposed development, and mitigation/implementation/management plans for the development area. C) Part C - Comprehensive Implementation Plan Includes a framework (targets, goals and objectives) for a long-term monitoring plan Includes guidelines for future site-specific studies or briefs - Identifies a comprehensive restoration strategy - With the above study, submission of all models digitally, submission of any supporting field sheets, etc. - Proposed OPA schedules illustrating NHS in a protective environmental protection land use/zoning category to prohibit development - Submission of required TRCA Application and MESP fees (see fee breakdown below). Current fees will apply. Based on the current 2018 fee schedule, \$97894.93 of the total \$129,492.75 is due at the time of first submission. Note that TRCA staff are currently undertaking a fee update that may be approved in early-mid 2021. <p>Base Fee >25 ha: Total TRCA Fee - \$15750, Due at First Submission \$34994.93 \$475 per gross ha (72.09 ha): Total TRCA Fee - \$ 34242.75, Due at First Submission - NA- Complex Subdivision Fee >25ha: Total TRCA Fee - \$62900.00, Due at First Submission - \$62900.00 Subdivision Clearance Fee: Total TRCA Fee - \$16600, Due at first Submission - NA Total TRCA Fee: 129492.75; Due at First Submission : \$97894.93</p>	Beacon/Argo	<p>TRCA staff have been contacted and site features were delineated alongside TRCA staff on March 30, 2021. The limits of the feature staking exercise helped generate development constraints as shown on Figure 5 and the proposed NHS on Figure 6 of the draft CEISMP.</p> <p>With regards to completion of the Region's Studies, the Region's SABE and associated SWS were given consideration in preparing the CEISMP. The CEISMP has been prepared to include Parts A,B & C under one cover. This approach is more efficient in the opinion of the study team. The CEISMP report addresses the various ecological, hydrologic, hydrogeological, and engineering considerations of a development proposal for the purposes of a LOPA application. Any outstanding gaps will be addressed through subsequent submissions and/or compliance letters.</p>	

Agency/ Dept	Reviewer	No.	Comments/Conditions	Consultant	Response	Status
Engineering Services	Drew Haines Office: 905.584.2272 x4188 Email: drew.haines@caledon.ca		<p><u>Required Supporting Documents:</u></p> <p><i>Planning</i> Proposed Draft Plan, Plan of Survey</p> <p><i>Engineering</i> Existing Conditions/Contour Plan, Conceptual ESC Plan, Conceptual Grading Plan, Conceptual Servicing Plan, Pre & Post Storm Drainage/Tributary Plan, Functional Servicing Report / SWM Report, ESA I & ESA II (if required), Acoustic/Noise Report, Geotechnical Report (Including Slope Stability), Hydrogeological Impact Report, Arborist Report, Open Space Design Requirement), Traffic Impact Study Report (FIS Traffic Requirement), Environmental Impact Study (Conservation Authorities Requirement)</p> <p><i>Maps & Plans</i> Aerial Photo, Topographic Survey Plan, Soil and Soil Drainage Classification Map, Surface Hydrology Map, Environmental Summary Map, Forest Management Plan,</p> <p><i>Other Agency Approvals</i> MOECC, ECA, Peel Region Conservation Authority, MTO</p>	DSEL / BA Group / Beacon / DS Consultants / Argo	To be provided by Beacon, Argo, DSEL, and DS Consultants. Arborist report to be finalized during the draft plan stage.	
Open Space Design			<p><i>Required LOPA Submission Item's:</i> 1. A vegetation analysis shall be included in the Environmental Impact Study (EIS) or equivalent document.</p>	Beacon	Noted.	

Appendix C

Correspondence with MECP Regarding Redside Dace

Jessica Fintelman

From: Snell, Shamus (MECP) <Shamus.Snell@ontario.ca>
Sent: March 9, 2021 7:22 PM
To: Joel Davey
Cc: Carolyn Glass
Subject: 219527 - Campbell's Cross Creek Redside Dace Habitat
Attachments: Guidance_For_Development_Activites_Rediside_Dace_Protected_Habitat.pdf; Aquatic_Habitat_BMP.pdf

Hi Joel,

I have this creek recorded in my records as Kilmanagh Creek (different common name perhaps?) and it is listed as being the occupied habitat of Redside Dace and as such is protected by the [habitat regulation](#).

Given you are going to be doing work in the vicinity of regulated habitat I have included couple of documents you may find useful.

Regards,

Shamus Snell
A/ Management Biologist
Species at Risk Branch
Ministry of Environment, Conservation and Parks
Email: shamus.snell@ontario.ca

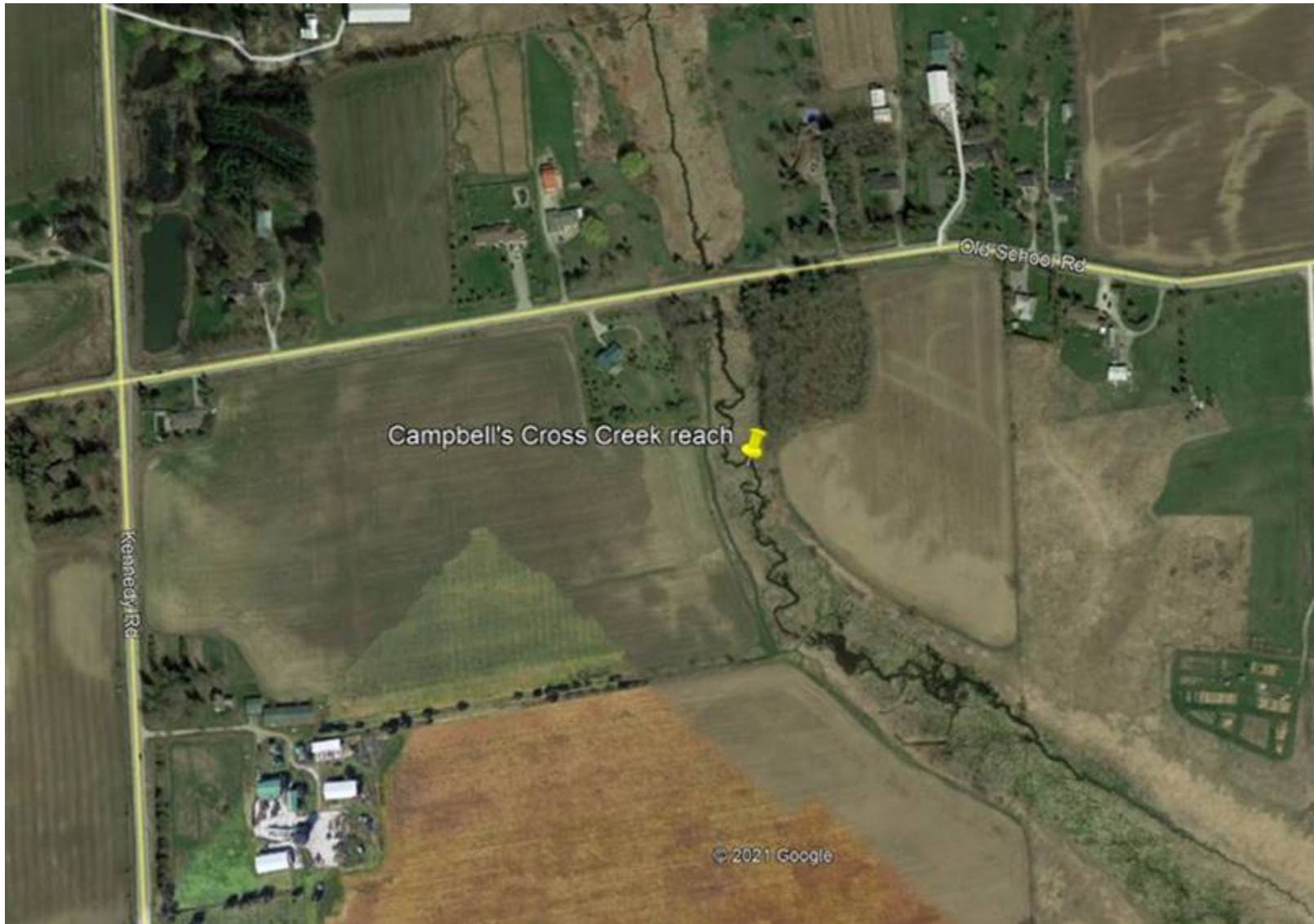
From: Joel Davey <jdavey@beaconenviro.com>
Sent: March 9, 2021 8:59 AM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Cc: Martin, Christopher (MECP) <Christopher.Martin@ontario.ca>; Carolyn Glass <cglass@beaconenviro.com>
Subject: 219527 - Campbell's Cross Creek Redside Dace Habitat

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good Morning,

We have been asked to complete an environmental study for an area in proximity to Campbell's Cross Creek (tributary to the West Humber River) in the Town of Caledon. As part of this study, we are reaching out to identify the category of Redside Dace habitat within the reach upstream and downstream of UTM coordinates 17T 593665m E 4846526m N (southeast of the intersection of Kennedy Road and Old School Road).

Many thanks,



Joel Davey, B.BRM, MES, CISEC
Aquatic Ecologist, Environmental Inspector
BEACON ENVIRONMENTAL
373 Woolwich Street, Guelph, ON N1H 3W4
T) 519.826.0419 x36 C) 519.760.4899
www.beaconenviro.com

To protect our staff, families, clients and the greater community all Beacon staff are working remotely. We will continue to provide timely communications via email and telephone and are committed to providing the highest level of service possible during this challenging time. I can be reached at 519-760-4899.

Appendix D

Species at Risk (SAR) Screening for Argo Kennedy Limited

Appendix D

Species at Risk (SAR) Screening for Argo Kennedy Lands

Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{1, 2}	Known Species Range ^{1, 2}	Potentially Suitable Habitat Present within the Subject Lands and Study Area	Likelihood of Presence
Jefferson Salamander <i>Ambystoma jeffersonianum</i>	END	THR Schedule 1	END	Adults live in moist, loose soil, under logs or in leaf litter. Your best chance of spotting a Jefferson salamander is in early spring when they travel to woodland ponds to breed. They lay their eggs in clumps attached to underwater vegetation. By midsummer, the larvae lose their gills and leave the pond and head into the surrounding forest. Once in the forest, Jefferson salamanders spend much of their time underground in rodent burrows, and under rocks and stumps. They feed primarily on insects and worms.	In Canada, it is found only in southern Ontario, mainly along the Niagara Escarpment.	Yes Potentially suitable habitat is present within the wetland and forested habitat on the subject lands and within the study area.	Not present (species record located >2.5 km from the subject lands)
Western Chorus Frog <i>Pseudacris triseriata</i>	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 wetlands within the study area.	Not present (species not located on subject lands or within the study area during targeted field surveys in 2003 and 2020– to be confirmed through Beacon field studies in 2021)
Bank Swallow <i>Riparia riparia</i>	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).	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 during field visit in 2003 – to be confirmed through Beacon field studies in 2021)
Barn Swallow <i>Hirundo rustica</i>	THR	THR Schedule 1	THR	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.	Present (species located on the Subject Lands and within the Study Area during field visit in 2020– to be confirmed through Beacon field studies in 2021)
Bobolink <i>Dolichonyx oryzivorus</i>	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 within the Study Area during targeted field surveys in 2020– to be confirmed through Beacon field studies in 2021)

Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{1, 2}	Known Species Range ^{1, 2}	Potentially Suitable Habitat Present within the Subject Lands and Study Area	Likelihood of Presence
Canada Warbler <i>Wilsonia canadensis</i>	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.	-
Chimney Swift <i>Chaetura pelagica</i>	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 2020– to be confirmed through Beacon field studies in 2021)
Common Nighthawk <i>Chordeiles minor</i>	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.	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 field surveys in 2020– to be confirmed through Beacon field studies in 2021)
Eastern Meadowlark <i>Sturnella magna</i>	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.	Not Present (species not located on Subject Lands or within the Study Area during targeted field surveys in 2020 – to be confirmed through Beacon field studies in 2021)
Eastern Whip-poor-will <i>Caprimulgus vociferus</i>	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 <i>Contopus virens</i>	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.	Yes Potentially suitable habitat may be present within the forest 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 2020– to be confirmed through Beacon field studies in 2021)

Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{1, 2}	Known Species Range ^{1, 2}	Potentially Suitable Habitat Present within the Subject Lands and Study Area	Likelihood of Presence
Evening Grosbeak <i>Coccothraustes vespertinus</i>	SC	SC Schedule 1	SC	Evening Grosbeak is generally found in open, mature mixed-wood forests dominated by fir species, White Spruce and/or Trembling Aspen in the breeding season. Its abundance is strongly linked to the cycle of its primary prey, the Spruce Budworm. Outside the breeding season, the species depends mostly on seed crops from tree species in the boreal forest such as firs and spruces. It is also attracted to ornamental trees that have seeds or fruit, and may visit bird feeders.	The Evening Grosbeak is found in all Canadian provinces and territories except Nunavut. In Ontario, it breeds in coniferous forests across northern Ontario, as far south as southern Georgian Bay. It is estimated that there are roughly 500,000 adult birds in Ontario.	No Potentially suitable habitat is not present on the Subject Lands or within the Study Area.	-
Golden-winged Warbler <i>Vermivora chrysoptera</i>	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 <i>Ammodramus savannarum</i>	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.	Present (species located on the Subject Lands and within the Study Area during targeted field surveys in 2020– to be confirmed through Beacon field studies in 2021)
Louisiana Waterthrush <i>Parkesia motacilla</i>	THR	SC Schedule 1	THR	The Louisiana Waterthrush is usually found in steep, forested ravines with fast-flowing streams. Although it prefers running water, especially clear, coldwater streams, it also less frequently inhabits heavily wooded, deciduous swamps having large pools of open water. It nests among the roots of fallen trees, in niches of stream banks, and in or under mossy logs.	In Canada, the Louisiana Waterthrush breeds only in southern Ontario, along the Niagara Escarpment, in woodlands along Lake Erie and scattered locations elsewhere. It probably nests sporadically in southwestern Quebec but breeding there has never been confirmed.	No Potentially suitable habitat is not present on the Subject Lands or within the Study Area	-
Prothonotary Warbler <i>Protonotaria citrea</i>	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 <i>Melanerpes erythrocephalus</i>	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 birds will stay the winter in woodlands in southern Ontario if there are adequate supplies of nuts.	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.	-
Wood Thrush <i>Hylocichla mustelina</i>	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	Yes Potentially suitable habitat may be present within the forest 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 2003 and

Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{1, 2}	Known Species Range ^{1, 2}	Potentially Suitable Habitat Present within the Subject Lands and Study Area	Likelihood of Presence
					been scattered sightings in the mixed forest of northern Ontario.		2020– to be confirmed through Beacon field studies in 2021)
Redside Dace <i>Clinostomus elongatus</i>	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)
Eastern Small-footed Myotis (Bat) <i>Myotis leibii</i>	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 forest and buildings on the Subject Lands and within the buildings in the Study Area.	Very Low
Little Brown Myotis (Bat) <i>Myotis lucifugus</i>	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 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.	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 forest and buildings on the Subject Lands and within the buildings in the Study Area.	Moderate
Northern Myotis (Bat) <i>Myotis septentrionalis</i>	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 forest and buildings on the Subject Lands and within the buildings in the Study Area.	Low
Tricoloured Bat <i>Perimyotis subflavus</i>	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 forest and buildings on the Subject Lands and within the buildings in the Study Area.	Very Low
Butternut <i>Juglans cinerea</i>	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 2003 and 2020 – to be confirmed through Beacon field studies in 2021)

Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat ^{1, 2}	Known Species Range ^{1, 2}	Potentially Suitable Habitat Present within the Subject Lands and Study Area	Likelihood of Presence
Eastern Ribbonsnake <i>Thamnophis sauritus</i>	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 Study Area.	Not present (species not located on Subject Lands or within the Study Area during targeted field surveys in 2003 and 2020 – to be confirmed through Beacon field studies in 2021)
Snapping Turtle <i>Chelydra serpentina</i>	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 Study Area.	Not present (species not located on Subject Lands or within the Study Area during targeted field surveys in 2003 and 2020– to be confirmed through Beacon field studies in 2021)

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	<i>Endangered Species Act</i> (Provincial)
SARA	<i>Species at Risk Act</i> (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.

Appendix E

Headwater Drainage Feature Assessment Photo Log



Photograph 1. (Location 1)
Reach EC1
Looking downstream at the extent accessed.



Photograph 2. (Location 1)
Reach EC1
Looking downstream at right bank valley wall contact located immediately downstream of the Reach TEC1 confluence.



Photograph 3. (Location 2)
Reach EC2
Looking upstream at a tree root knickpoint with scour pool and flow diversion.



Photograph 4. (Location 3)
Reach EC2
Looking upstream at left bank floodplain oxbow feature.



Photograph 5. (Location 3)
Reach EC2
Looking upstream at confluence of flow split.



Photograph 6. (Location 4)
Reach EC2
Looking downstream at start of flow split.



Photograph 7. (Location 5)
Reach EC2
Looking upstream at Large woody debris jam.



Photograph 8. (Location 6)
Reach EC2
Looking upstream at pool with left bank undercut and right bank point bar.



Photograph 9. (Location 7)

Reach EC2

Looking upstream at left bank valley wall contact



Photograph 10. (Location 7)

Reach EC2

**Looking upstream at confluence of flow split.
Source of flow split is a large beaver dam across
the valley.**



Photograph 11. (Location 8)

Reach EC2

**Looking upstream medial bar and large undercut
along the right bank.**



Photograph 12. (Location 9)

Reach EC2

**Looking upstream at drainage feature on the right
bank.**



Photograph 13. (Location 10)
Reach EC2
**Looking upstream large beaver dam, extending
across the entire valley width.**



Photograph 14. (Location 11)
Reach EC2
**Looking downstream at the backwatered
floodplain due to the beaver dam.**



Photograph 15. (Location 12)
Reach EC2
**Looking upstream at the extent of backwater from
the beaver dam.**



Photograph 16. (Location 13)
Reach EC3
Looking upstream at second beaver dam.



Photograph 17. (Location 14)
Reach EC3
Upstream view of run feature.



Photograph 18. (Location 15)
Reach EC3
Looking downstream at riffle substrate and pool with slumping outside bank.



Photograph 19. (Location 15)
Reach EC3
Looking upstream at left bank slumping with ponding water (photo right).



Photograph 20. (Location 16)
Reach EC3
Looking upstream valley wall contact with undercut.



Photograph 21. (Location 17)

Reach EC3

Looking upstream at Old School Road box culvert crossing.



Photograph 22. (Location 18)

Reach TEC1

Upstream view of confluence into Reach EC1.



Photograph 23. (Location 18)

Reach TEC1

Looking downstream at valley wall contact with leaning and fallen trees.



Photograph 24. (Location 19)

Reach TEC1

Looking upstream pool feature with densely vegetated banks.



Photograph 25. (Location 20)
Reach TEC1
Looking downstream at pool with undercut
outside banks and point bar.



Photograph 26. (Location 21)
Reach TEC1
Downstream view of riffle with left bank undercut.
Floodplain vegetation transitions to



Photograph 27. (Location 22)
Reach TEC1
Looking upstream at head cutting into
consolidates till at the Reach transitions from a
herbaceous swale into a well defined channel with
woody riparian vegetation.



Photograph 28. (Location 23)
Reach TEC1
Looking downstream at general conditions from
Old School Road.



Photograph 29. (Location 23)

Reach TEC1
Looking double plastic corrugated pipes under
Old School Road.



Photograph 30. (Location 24)

Reach TEC1
General reach conditions upstream of Old School
Road.



Photograph 31. (Location 25)

Reach KC1
Looking down stream at general conditions from
Old School Road.



Photograph 32. (Location 26)

Reach KC1
General reach conditions upstream of Old School
Road.

Appendix F

Geomorphic Assessment Report for Argo Kennedy Limited



GUIDING SOLUTIONS IN THE
NATURAL ENVIRONMENT

Geomorphic Assessment

Argo Kennedy Limited

Town of Caledon, Regional Municipality of Peel

Prepared For:

Argo Kennedy Limited

Prepared By:

Beacon Environmental Limited

Date: *Project:*

August 2021 219527.1

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Appendix A. Historical Aerial Imagery
Appendix B. Photographic Record

1. Introduction

Beacon Environmental Limited (Beacon) has been retained by Argo Kennedy Limited to undertake a geomorphic assessment in support of a Comprehensive Environmental Impact Study and Management Plan (CEISMP) for a Local Official Plan Amendment (LOPA) application for three land parcels identified as Parts of Lot 22, Concession 1 and 2 East of Centre Road Chinguacousy in the Town of Caledon, Regional Municipality of Peel (hereto referred as the “subject lands”). The subject lands are located within the Mayfield West Study Area and are bordered by Highway 10 to the west, Old School Road to the north and the Brampton Fairgrounds to the east, within the jurisdiction of the Toronto and Region Conservation Authority (TRCA).

The subject lands consist of three land parcels, as identified on **Figure 1**. The Newhouse and Hicks parcels include portions of tributaries to Etobicoke Creek. A portion of Kilmanagh Creek (a tributary of the West Humber River) traverses the Russell property. Presently, the Russell parcel is non-participating. It is our understanding that the reach of Kilmanagh Creek within the Russell property is classified as Redside Dace (*Clinostomus elongatus*) occupied habitat by the Ministry of Conservation, Environment and Parks (MECP). Under Ontario Regulation 242/08 of the *Endangered Species Act* (ESA 2007), regulated occupied habitat includes the meander belt width, plus vegetated areas or agricultural lands within 30 metres of the meander belt.

The purpose of this geomorphic assessment was to inform the determination of environmental constraint limits in support of the development of a land use plan for the subject lands; specifically, delineation of the meander belt for unconfined reaches of the Etobicoke Creek tributaries and determination of Redside Dace regulated habitat limits (referencing 30 m from the meander belt) for the relevant portion of Kilmanagh Creek. The following tasks were undertaken in support of the study:

- Background review of available materials (topographic mapping, recent and historic aerial photography, watershed reports);
- Desktop assessment to delineate reaches based on underlying geomorphic controls;
- Historic assessment to determine trends in channel planform and land use;
- Field investigation to characterize existing geomorphic conditions and document evidence of active channel processes on a reach basis using standard rapid assessment protocols;
- Following applicable policies and guidelines, delineate the meander belt width on a reach basis referencing recent aerial imagery and historic trends in channel planform (where feasible); and
- In accordance with Ontario Regulation 242/08, delineate the limit of Redside Dace regulated habitat referencing 30 m from the meander belt.

2. Policy Context

2.1 *Endangered Species Act (2007)*

The ESA (2007) came into effect on June 30, 2008, with over 200 species in Ontario identified as extirpated, endangered, threatened, or of special concern. The MECP provides oversight of the ESA for the regulation of Species at Risk (SAR) in Ontario. Under the ESA, native species that are in danger

of becoming extinct or extirpated from the province are identified as being extirpated, endangered, threatened and special concern. These designations are defined as follows:

- Extirpated - a species that no longer exists in the wild in Ontario but still occurs elsewhere;
- Endangered – a species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's *Endangered Species Act*;
- Threatened - a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed; and
- Special Concern (formerly Vulnerable) - a species with characteristics that make it sensitive to human activities or natural events.

Under the ESA, protection is provided to threatened or endangered species and their habitat, as well as providing stewardship and recovery strategies for species. Permitting is required to conduct works within habitat regulated for threatened or endangered species.

2.2 Provincial Policy Statement (2020)



The Provincial Policy Statement (MMAH 2020) issued under the *Planning Act* (1990) outlines areas of provincial interest with respect to natural hazards. In support of the Policy Statement, a Technical Guide - Rivers and Streams: Erosion Hazard Limit document was prepared by MNR (2002) to outline standardized procedures for the delineation and management of riverine erosion hazards in the Province of Ontario. The guide presents erosion hazard protocols based on two generalized landform systems through which watercourses flow: confined and unconfined valley systems. Through this approach, the meander belt width plus an erosion access allowance is defined to determine the erosion hazard limit of an unconfined valley system. For confined valley systems, the erosion hazard limit is governed by geotechnical considerations, including the stable slope allowance and an applicable toe erosion allowance (i.e., channel migration component).

2.3 Regional Municipality of Peel Official Plan (Office Consolidation 2018)

The Region of Peel Official Plan is a document that outlines the policies of the Regional Municipality of Peel to guide economic, environmental and community building decisions which inform the strategic decisions of Peel Region and its lower tier municipalities (Town of Caledon, City of Brampton and City of Mississauga). Section 2.4 of the Official Plan contains policies that apply to natural hazards. Specific sections deal with ravine, valley and stream corridors, and riverine floodplains. These policies commit the Region to work in conjunction with area municipalities and Conservation Authorities towards the following three objectives:

- To ensure that development and site alterations are not permitted in areas where site conditions or location may pose a danger to public safety, public health or result in property damage;
- To encourage a coordinated approach to the use of land and the management of water in areas subject to flooding in order to minimize social disruption; and
- To ensure that methods used to protect existing development at risk from natural hazards do not negatively impact the integrity of the ecosystem.



Site Location		Figure 1
Argo Kennedy Geomorphic Assessment		
		Project: 219527.1 Last Revised: May 2021
Client: Argo Kennedy		Prepared by: DU Checked by: JD
	1:15,000	Inset Map: 1:80,000
Contains information licensed under the Open Government License— Ontario Orthoimagery Baselayer: FBS Peel 2019		

2.4 Town of Caledon Official Plan (Office Consolidation – 2018)

The *Town of Caledon Official Plan* (2018) provides direction as to the land use within the Town.

Schedule A1 - Town of Caledon Town Structure shows the subject lands as part of the Agricultural and Rural Area of the Growth Plan. It also identifies the Etobicoke tributaries and Kilmanagh Creek as being within the Greenbelt Plan Area.

2.5 Toronto and Region Conservation Authority Regulations and Guidelines

2.5.1 *Conservation Authorities Act (Ontario Regulation 166/06)*

The TRCA regulates land use activities in and adjacent to wetlands, watercourses and valleylands under Ontario Regulation 166/06 (*Regulation for Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*) made under the *Conservation Authorities Act*.

Subject to conformity with the municipality's Official Plan, the completion of appropriate studies and application for Conservation Authority permits, TRCA may grant permission for development within these areas if it can be proven that control of flooding, erosion, pollution or the conservation of land will not be affected by the development.

2.5.2 *The Living City Policies (2014)*

The TRCA's Living City Policy (LCP) was approved in November 2014 and replaces the Valley and Stream Corridor Management Program (1994). The LCP document, among other matters, implements current federal, provincial and municipal legislation, policies and agreements affecting conservation authorities; and implements the policies for TRCA's updated section 28 of Ontario Regulation 166/06. For purposes of implementing TRCA's Environmental Management Policies:

- Confined River or Stream Valleys are considered **Valley Corridors**; and
- Unconfined River or Stream Valleys are considered **Stream Corridors**.

According to the LCP, the boundaries of a valley or stream corridor generally require a minimum 10 m setback from the greater of:

- Physical top of the valley feature;
- Long term stable top of slope, where geotechnical concerns exist (which must be confirmed through an appropriate geotechnical analysis);
- Regulatory floodplain;
- Meander belt; and
- Limits of significant vegetation which is contiguous with the valley corridor.

It is the policy of TRCA:

That erosion hazard limits will be determined through site specific field investigations and technical reports where required, in accordance with the text of TRCA's Regulation and Provincial and TRCA standards. Where erosion hazard limits are required and not

available, or where existing erosion hazard information does not meet current Provincial or TRCA standards, TRCA may require the erosion hazard to be determined by a qualified professional, at the expense of the proponent, to the satisfaction of TRCA.

The *Belt Width Delineation Procedures* (TRCA 2004) document outlines standards for delineating the meander belt in TRCA jurisdiction.

3. Geomorphic Assessment Background Review

3.1 Climate

The regional climate, specifically referring to the precipitation patterns, dictate the annual precipitation volumes and the local rainfall duration and interval. As the rainfall interacts with the local physiography, the volume and duration of surface runoff and the release of groundwater storage between rainfall events, are what drive the local geomorphology. Precipitation records from the Canadian Climate Normals (1981 to 2010) recorded at the Georgetown Wastewater Treatment Plant (WWTP), which is located 13.18 km southwest of the subject properties, averaged 70 mm per month in winter (November through February), and 73 mm in summer (March to August; Environment Canada 2020). The increase in summer rainfall is due convective thunderstorms which can be considered by the number days with greater than 10 mm precipitation, which average at 2.3 and 2.4 days per month for winter and summer, respectively (Environment Canada 2020). While the total precipitation and number of large rain events is greater during the summer months, snow melt and rain-on-snow events tend to produce the highest annual flows within the watershed.

3.2 Watershed Conditions

3.2.1 Etobicoke Creek

In 2010, the TRCA issued the *Etobicoke and Mimico Creeks Watersheds Technical Update Report* outlining an adaptive approach to watershed management for decisions affecting these watersheds. The report described the Etobicoke Creek watershed as being made up of four main branches: Main Etobicoke Creek, Little Etobicoke Creek, Etobicoke Creek West Branch and Spring Creek. The Newhouse and Hicks parcels are located within the Etobicoke Creek watershed, which drains an area of 211 km², including parts of Brampton, Mississauga and the City of Toronto, and the Town of Caledon. The upstream drainage area associated with Etobicoke Creek within the subject lands is estimated to be approximately 9 km² (OFAT 2020).

3.2.2 Kilmanagh Creek

In 2008, the TRCA prepared a *State of the Watershed Report* for the Humber River Watershed as a key reference document for land use planning decisions within and adjacent to the Humber River watershed. This report provided the basis for the Watershed Management Plan and provided an overview of existing environmental conditions within the watershed. The Humber River watershed drains a total area of 903 km² and is made up of 5 subwatersheds: Main Humber, East Humber, West Humber, Lower Humber, and Black Creek (TRCA 2008). The Russel parcel is situated within the West

Humber subwatershed. The upstream drainage area associated with Kilmanagh Creek from the parcel is estimated to be approximately 9 km² (OFAT 2020).

3.2.3 Geology

The planimetric form of a watercourse, or the aerial view of the visual orientation, length and organization of a watercourse, is a product of the channel flow regime and the availability of sediments (i.e., surficial geology) within the stream corridor. The 'dynamic equilibrium' of the driving forces (flowing water) and the resisting forces (sediment) are what govern the planimetric form of the channel. The subject properties fall within the South Slope physiographic region (Chapman and Putnam 1984); this area is defined by the southern slope of the Oak Ridges Moraine that gently slopes south, towards Lake Ontario. The South Slope physiographic region consists of a smooth clay till plain that is faintly drumlinized and contains deeply incised stream valleys. Although the topography is relatively flat, infiltration is limited by the high clay content resulting in high runoff characteristics. Surficial geology within the subject lands is dominated by low permeability clay top silt textured till of the Halton Till formation. The eastern extent of the Hick parcel and western extent of the Russel parcel are overlain by a coarse textured glaciolacustrine deposit. Locally, each watercourse reworks a veneer of modern alluvial clay, silt, sand, gravel and organic deposits (TRCA 2010).

3.2.4 Fluvial Geomorphology

3.2.4.1 Etobicoke Creek

A long-term Regional Watershed Monitoring Program for Etobicoke Creek, which included geomorphic monitoring stations, was initiated by the TRCA in 2001. The TRCA (2010) *Etobicoke and Mimico Creeks Watersheds Technical Update* report classified the main tributary to Etobicoke Creek that traverses the Hicks and Newhouse parcels as Reach TE8. The closest geomorphic regional monitoring station (GET-10) established through the program was located on Reach TE8 immediately upstream of Old School Road, west of Kennedy Road. The report noted an average bankfull width and depth of 3.05 m and 0.36 meters, respectively, and an average bankfull gradient of 0.72 % for station GET-10.

3.2.4.2 Kilmanagh Creek

The TRCA (2008) *Humber River State of the Watershed Report* summarized existing fluvial geomorphic conditions throughout the watershed. The report characterized the portion of Kilmanagh Creek relevant to the Russel parcel as a third order stream. In general, the report noted on-going pressures on stream corridors associated with urbanization as a major management challenge throughout the watershed.

3.3 Historical Assessment

The following section presents an overview of historical conditions with respect to land use, land cover and channel conditions in the vicinity of the subject lands. Historical analyses provide insight into the scale of natural and human-induced changes within a watershed, particularly the degree of adjustment to planimetric form of the watercourse and land use changes over time.

In support of the historical assessment, black and white aerial photographs and digital colour imagery were analysed and compared to obtain a simple, qualitative assessment of the degree of land use and channel planform change over time (**Appendix A**). **Table 1** provides a summary of specific observations regarding change in land use based on available historical aerial imagery.

Table 1. Summary of Key Historical Observations

Time Period	Scale, Source	Observations
1964	1:12,000 Northway/Photomap/Remote Sensing Ltd.	Land use surrounding the subject lands was agricultural. Within the subject lands, land use was agricultural with homesteads and outbuildings present. Tree cover was limited to hedgerows and portions of the valley corridor.
		<i>Etobicoke Creek tributaries:</i> Within the subject lands, Etobicoke Creek Tributaries was observed as a well-defined channel. Within both the Hicks and Newhouse parcels, portions of the tributaries appeared to have been channelized. Within remaining sinuous sections of watercourse, evidence of active channel processes included bank erosion and valley wall contact points. Within the Hicks parcel, an offline pond could be observed within the adjacent floodplain on the south side of Old School Road. Within the Newhouse parcel, a backwater condition could be observed upstream of Hurontario Street.
		<i>Kilmanagh Creek:</i> Within the Russel parcel, channelization of Kilmanagh Creek could be observed immediately downstream of the property limit, as well as upstream of the property limit, in the vicinity of Old School Road. Within the Russel parcel, the creek maintained a sinuous planform, with minimal evidence of active erosion observed.
1982	1:12,000 Northway/Photomap/Remote Sensing Ltd.	Land use within and surrounding the subject lands remained consistent. Hurontario Street had been widened to 4 lanes.
		Within the subject lands, no discernible adjustments in channel planform could be observed along the Etobicoke Creek tributaries and Kilmanagh Creek.
2015	1:4,000 First Base Solutions	By 2015, land use south of the subject lands had begun to transition to residential development.
		<i>Etobicoke Creek tributaries:</i> Within the Newhouse parcel, an informal crossing of the main tributary of Etobicoke Creek can be observed south of the farmhouse. Within the Hicks parcel, a backwatered section of could be observed along the tributary.
		<i>Kilmanagh Creek:</i> Minimal adjustments in channel form could be observed within the Russel parcel.
2019	1:4,000 First Base Solutions	Development had expanded south of the subject lands. Within the subject lands, minimal changes in land use or channel form could be observed.

4. Existing Conditions

4.1 Reach Delineation

To facilitate a systematic evaluation of the tributaries of Etobicoke Creek and Kilmanagh Creek, the watercourses were delineated into reaches (**Figure 2**). Reaches are sections of channel with similar characteristics in regard to hydrology, slope, boundary materials, and vegetation, therefore, be expected to behave consistently along their length to changes in the geomorphic function and sediment inputs, as well as to other modifying factors (Montgomery and Buffington 1997; Richards et al. 1997).

For the purposes of this study, the Etobicoke Creek tributaries were delineated into Reaches EC1, EC2, EC3 and TEC1, and Kilmanagh Creek was delineated as a single reach (Reach KC1). The determination of reach extents was based on a desktop assessment of transitions in riparian vegetation, valley form and meander geometry.

4.2 Rapid Assessments

4.2.1 Methods

In order to characterize existing geomorphic conditions, a field assessment was conducted on April 13, 2021. **Figure 2** identifies the extent assessed in support of this study. Field investigations focussed on unconfined reaches (i.e., Reach TEC1) to inform the determination of meander belt limits, but extended upstream to include Reaches EC2 and EC3. As the Russel parcel is nonparticipant, assessment of Reach KC1 was limited to within the Old School Road right-of-way. The following standardized rapid visual assessment methods were applied:

i. Rapid Geomorphic Assessment (RGA – MOE 2003)

The RGA documents observed indicators of channel instability by quantifying observations using an index that identifies channel sensitivity. Sensitivity is based on evidence of aggradation, degradation, channel widening and planimetric form adjustment. The index produces values that indicate whether the channel is stable/in regime (score <0.20), stressed/transitional (score 0.21-0.40) or in adjustment (score >0.41).

ii. Rapid Stream Assessment Technique (RSAT – Galli 1996)

The RSAT uses an index to quantify overall stream health and includes the consideration of biological indicators (Galli 1996). Observations concerning channel stability, channel scouring/sediment deposition, physical in-stream habitat, water quality, and riparian habitat conditions are used to calculate a rating that indicates whether the channel is in poor (<13), fair (13-24), good (25-34), or excellent (35-42) condition.

iii. Downs Classification Method (Downs 1995)

The Downs (1995, outlined in Thorne et al. 1997) classification method infers present and future potential adjustments based on physical observations, which indicate the stage of evolution, and type of adjustments that can be anticipated based on the channel evolution model. The resultant index classifies streams as stable, laterally migrating, enlarging, undercutting, aggrading, or recovering.

4.2.2 Results

Rapid assessment results are summarized in **Table 2** and **Table 3** below. A photographic record of site conditions at the time of assessment is provided in **Appendix B**, with the photo locations identified in **Figure 2**.

4.2.2.1 Etobicoke Creek

Reach EC2

Reach EC2 was characterized as a highly sinuous, well-defined channel situated within a confined valley setting. Riparian vegetation was characterized as continuous, measuring one to five channel widths laterally and consisted predominantly of trees. Bank angles ranged between 30 to 90 degrees with 30 to 60% of banks identified as exhibiting evidence of erosion. Bank materials were comprised of clay, silt, and sand.

Bankfull widths and depths ranged from 3.4 to 5.2 m and 0.3 to 0.9 m, respectively. Riffle and pool substrate consisted of clay, silt, sand, gravel and cobble-sized materials with localized areas of exposed consolidated till. A large beaver dam and associated backwater condition influenced channel morphology within the upstream extent.

RGA results indicated that Reach EC2 was 'in transition', with a score of 0.38. Planimetric form adjustment and widening were identified as the dominant modes of adjustment, as evident through formation of chutes, single thread channel to multiple thread channel development and cut off channels. Evidence of widening included fallen leaning trees occurrence of large woody debris, exposed trees roots and fracture line along the tops of banks.

An RSAT score of 28 indicated a 'good' degree of overall ecological health, with channel stability and sediment deposition as the primary limiting factors. The Downs (1995) model reflected the RGA evaluation of this reach through a classification of U – 'undercutting' based on evidence of erosion on outer banks.

Reach EC3

Reach EC3 was characterized as a moderately sinuous, well-defined channel situated within a confined valley setting. Riparian vegetation was characterized as continuous, measuring one to five channel widths laterally. Vegetation consisted predominantly trees and shrubs, transitioning to shrubs and herbaceous and shrubs in vicinity of Old School Road. Bank angles ranged between 30 to 90 degrees with 5 to 30% of banks identified as exhibiting evidence of erosion. Bank materials were comprised of clay, silt, and sand.



Photo Locations

Figure 2

Argo Kennedy Geomorphic Assessment

Legend

- Subject Property
- Extent Assessed
- Reach Break
- Photo Location
- Watercourse (MNRF 2020)



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1:7,000

0 100 200 m

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Bankfull widths and depths ranged from 2.4 to 4.0 m and 0.4 to 1.1 m, respectively. Riffle and pool substrate consisted of clay, silt, sand, gravel and cobble-sized materials with localized areas of exposed consolidated till. A second beaver dam and associated backwater condition influenced channel morphology within the downstream extent of this reach.

RGA results indicated that Reach EC2 was 'in transition', with a score of 0.28. Widening was identified as the dominant mode of adjustment, as evident through fallen leaning trees, occurrence of large woody debris, exposed tree roots basal scour through riffles and fractures with evidence of slumping banks.

An RSAT score of 26 indicated a 'good' degree of overall ecological health, with riparian habitat conditions and water quality as the primary limiting factors. The Downs (1995) model reflected the RGA evaluation of this reach through a classification of U – 'undercutting' based on evidence of erosion on outer banks.

Reach TEC1

Reach TEC1 was characterized as a relatively straight, intermittently defined channel situated within an unconfined valley setting. Downstream of Old School Road, Reach TEC1 was poorly defined but transitioned to a more defined channel with distance downstream. Riparian vegetation was characterized as continuous, measuring one to five channel widths laterally. Vegetation consisted predominantly grasses and herbaceous plants but transitioned to woody within the downstream valley corridor. Bank angles ranged between 30 to 90 degrees with 5 to 30% of banks identified as exhibiting evidence of erosion. Bank materials were comprised of clay, silt, and sand. Banks also exhibited local evidence of mass failure.

Where defined, bankfull widths and depths ranged from 1.7 to 2.4 m and 0.3 to 0.4 m, respectively. Riffle substrate consisted of gravel and cobble-sized materials with localized areas of exposed underlying consolidated till. Pool substrate consisted of sand, gravel and cobble. Modifications included the Old School Road crossing, which consisted of twin 750 mm plastic corrugated culverts.

RGA results indicated that Reach TEC1 was 'in transition', with a score of 0.21. Widening and degradation were identified as the dominant modes of adjustment and reflect the downstream transition into the main tributary valley corridor. Evidence of widening included the presence of fallen leaning trees, occurrence of large woody debris, exposed tree root and fracture line along the top of the banks. Evidence of degradation included cut face on bar forms head cutting due to knickpoint migration and observations of the channel cutting into the undisturbed overburden.

An RSAT score of 26 indicated a 'good' degree of overall ecological health, with channel stability and riparian habitat conditions identified as the limiting characteristics. The Downs (1995) model reflected the RGA evaluation of this reach through a classification of S – 'stable' with evidence of U – 'undercutting' (erosion on outer banks).

4.2.2.2 Kilmanagh Creek

Reach KC1

Within the extend assessed, Reach KC1 was characterized as a well-defined channel with a high degree of sinuosity situated within an unconfined valley setting. The reach displayed a low gradient and

moderate degree of entrenchment. Riparian vegetation was generally characterized as fragmented, extending 1 to 5 channel widths laterally. Riparian vegetation was comprised of grasses and herbaceous plants with trees and shrubs. Bankfull widths were estimated to range from 2.5 to 3.0 m. Channel substrate consisted of clay, silt, sand and gravel-sized materials.

RGA results indicated that Reach KC1 was 'in transition', with a score of 0.24. Planimetric form adjustment and aggradation were identified as the dominant modes of adjustment. Evidence of planimetric form adjustment included the formation of chutes and single thread to multiple thread channel development. Evidence of aggradation included siltation in pools and deposition in overbank zones.

An RSAT score of 22.5 indicated a 'fair' degree of overall ecological health, with physical instream habitat and riparian habitat conditions as the primary limiting factors. The Downs (1995) model reflected the RGA evaluation of this reach through a classification of M – 'lateral migration'.

Table 2. General Reach Characteristics

Watercourse	Reach	Bankfull Width (m)	Bankfull Depth (m)	Substrate	Riparian Vegetation	Notes
Etobicoke Creek Tributary	EC2	3.4 – 5.2	0.3 – 0.9	clay, silt, sand, gravel, cobble, consolidated till	trees, shrubs	<ul style="list-style-type: none"> • Woody debris in channel and along banks • Beaver dam • Valley wall contacts
	EC3	2.4 – 4.0	0.4 – 1.1	clay, silt, sand, gravel, cobble, consolidated till	trees, shrubs, herbaceous	<ul style="list-style-type: none"> • Undercut and slumping banks • Beaver dam with backwater influence (downstream extent)
	TEC1	1.7 – 2.4	0.3 – 0.4	Sand, gravel, cobble, consolidated till	shrubs, grasses, herbaceous plants	<ul style="list-style-type: none"> • Knickpoint formation • Intermittently defined with vegetation encroachment (upstream extent)
Kilmanagh Creek	KC1	2.5 – 3.0	--	Clay, silt, sand, gravel	grasses, herbaceous plants	<ul style="list-style-type: none"> • Assessed from road right-of-way (nonparticipant lands) • Sinuous planform • Low gradient

Table 3. Rapid Assessment Results

Watercourse	Reach	Rapid Geomorphic Assessment			Rapid Stream Assessment Technique			Downs Classification Method
		Score	Condition	Dominant Mode of Adjustment	Score	Condition	Limiting Feature	
Etobicoke Creek Tributary	EC2	0.38	In Transition	Planimetric form adjustment	28	Good	channel stability and sediment deposition	U – ‘undercutting’
	EC3	0.28	In Transition	Widening	26	Good	riparian habitat, water quality	U – ‘undercutting’
	TEC1	0.21	In Transition	Widening	26	Good	channel stability and riparian habitat conditions	S – ‘stable’ with evidence of U – ‘undercutting’
Kilmanagh Creek	KC1	0.32	In Transition	Planimetric form adjustment	22.5	Fair	physical instream habitat and riparian habitat conditions	M – ‘lateral migration’

5. Analysis

5.1 Meander Belt

The meander belt width is generally defined as the lateral extent that a meandering channel has historically occupied and will likely occupy in the future. Following the TRCA (2004) *Belt Width Delineation Procedures* document, meander belts were delineated for Reaches TEC1 and KC1 were delineated based on the lateral extent of the outermost meander bends along the reach over the available historical record. As Reach TEC1 had been subject to historic channelization, meander belt limits also referenced evidence of frequent floodplain inundation. The resultant 25 m and 54 m dimensions for Reaches TEC1 and KC1, respectively, were then reviewed relative to available topographic mapping and field observations to ensure that it was sufficient to capture the active (bankfull) channel and evidence of lateral occupation of the floodplain at the reach scale. A 20% factor of safety (10% either side) was then applied to this preliminary meander belt in order to account for long-term adjustments in channel form (channel erosion and migration), as well as potential post-development changes in hydrologic regime. The resultant recommended meander belt dimensions for Reaches TEC1 and KC1 of 30 m and 65 m, respectively, are illustrated in **Figure 3**.

5.1.1 Redside Dace Occupied Habitat

For the purposes of determining regulated Redside Dace habitat limits associated with Reach KC1, the 30 m setback was applied to the preliminary meander belt (54m), as this dimension accounts for existing and historic trends in channel planform. **Figure 3** identifies all lands within 30 m of the meander belt for Kilmanagh Creek as they pertain to the Russel Property. Field-based confirmation of the recommended meander belt dimension is recommended.

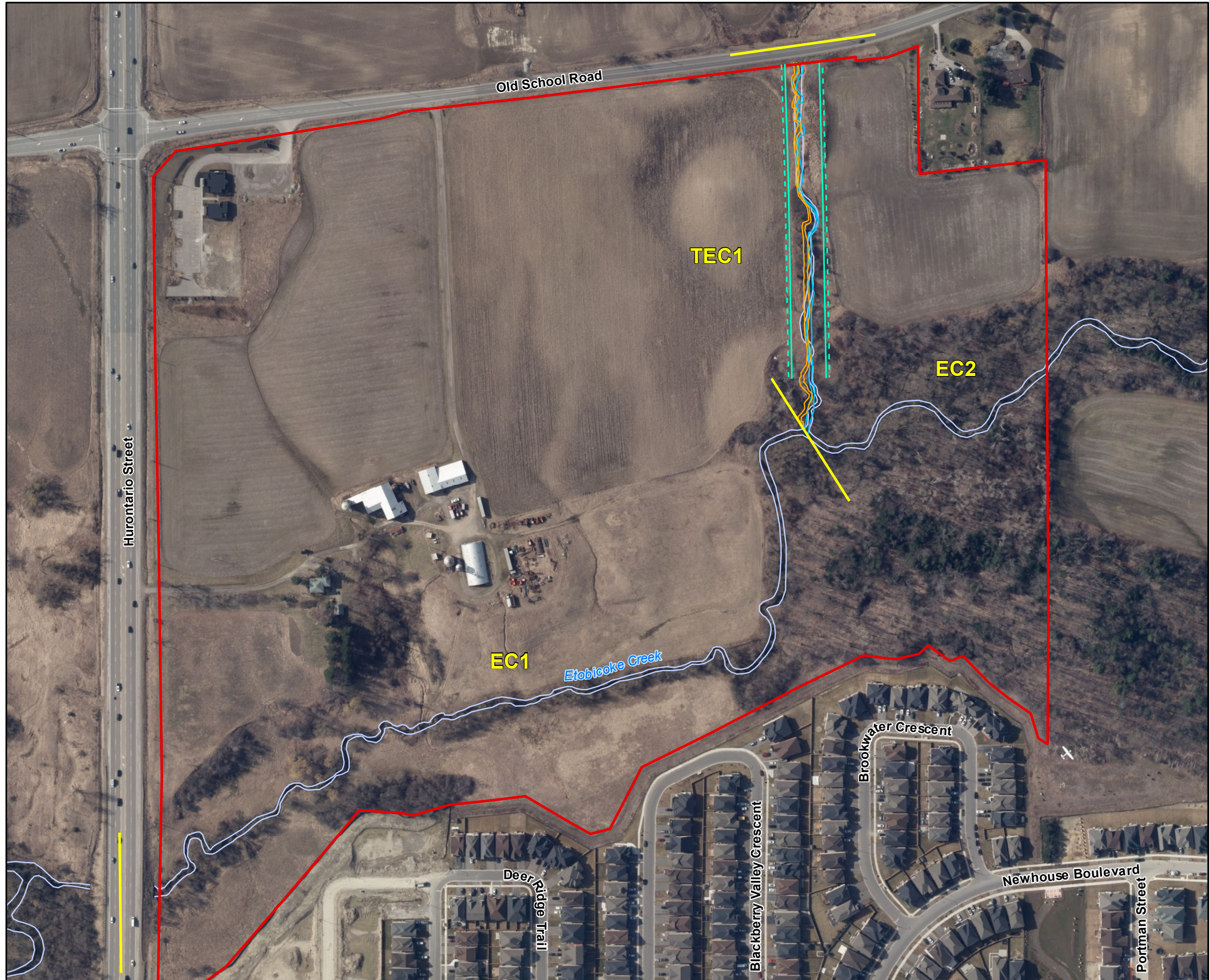
6. Policy Conformance

It is our opinion that the findings of this report are in conformance with the Provincial Policy Statement (2020), Regional Municipality of Peel Official Plan (2020), the Town of Caledon Official Plan (2018), the TRCA Belt Width Delineation Procedures (2004) document and Ontario Regulation 242/08.

7. Conclusions

Beacon was retained by Argo Kennedy Limited to undertake a geomorphic assessment for the subject lands (Newhouse, Hicks and Russell parcels) located within Parts of Lot 22, Concession 1 and 2 East of Centre Road Chinguacousy in the Town of Caledon, Regional Municipality of Peel. The following points summarize the findings of this study:

- Reaches EC3, EC3 and KC1 of were all characterized as well-defined channels, while Reach TEC1 was characterized as intermittently defined;
- Reaches TEC1 and KC1 are situated within an unconfined valley system (stream corridor);
- A review of historical and recent aerial imagery identified that Reaches EC1 and TEC1 of the Etobicoke Creek tributaries were subject to historic channelization;
- Rapid geomorphic assessment results identified all assessed reaches as being in a transitional state, with evidence of widening and planimetric form adjustment observed;
- As Reaches EC1, EC2 and EC3 are situated within a confined valley (valley corridor), meander belt limits were not delineated;
- Recommended meander belt dimensions for unconfined reaches (Reaches TEC1 and KC1) were determined referencing the outermost extent of meander bends based on the current and historical channel planform. As Reach TEC1 had been subject to historic channelization, meander belt limits also referenced evidence of frequent floodplain inundation;
 - A meander belt width of 30 m was recommended for Reach TEC1; and
 - A meander belt width of 65 m was recommended for Reach KC1;
- As Reach KC1 is located within nonparticipant lands, field confirmation of the 65 m meander belt dimension is recommended; and
- In conformity with Ontario Regulation 242/08, lands within 30 m of the preliminary meander belt have been identified for Reach KC1 in relation to the subject lands.



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Meander Belt

Figure 3A

Argo Kennedy Geomorphic Assessment

Legend

- Subject Property
- Reach Break
- Meander Belt (25 m)
- Meander Belt + FOS (30 m)

Watercourse

- 1982
- 2015
- 2019



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Meander Belt

Figure 3B

Argo Kennedy Geomorphic Assessment

Legend

- Subject Property
- Reach Break
- Meander Belt (54 m)
- Meander Belt + 30 m
- Meander Belt + FOS 65 m

Watercourse

- 1964
- 1982
- 2015
- 2019



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Checked by: SG



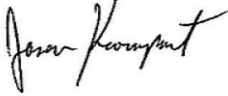
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Should you have any questions or require any additional information please contact the undersigned.

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River Scientist

Report reviewed by:
Beacon Environmental



Shelley Gorenc, M.Sc., P.Geo.
Senior Geomorphologist

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Appendix A

Historical Aerial Imagery



Legend

Subject Property

Historical Aerial Imagery
Newhouse and Hicks

1964

Argo Kennedy Geomorphic Assessment

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<div>Legend</div> <div><div></div> Subject Property</div>	Historical Aerial Imagery Newhouse and Hicks		1982
	Argo Kennedy Geomorphic Assessment		
			Project: 219527.1 Last Revised: May 2021
	Client: Argo		Prepared by: DU Checked by: SG
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<div>Legend</div> <div><div></div> Subject Property</div>	Historical Aerial Imagery Newhouse and Hicks	2015
	Argo Kennedy Geomorphic Assessment	
	<div><div> BEACON ENVIRONMENTAL</div><div>Project: 219527.1 Last Revised: May 2021</div></div>	
	Client: Argo	Prepared by: DU Checked by: SG
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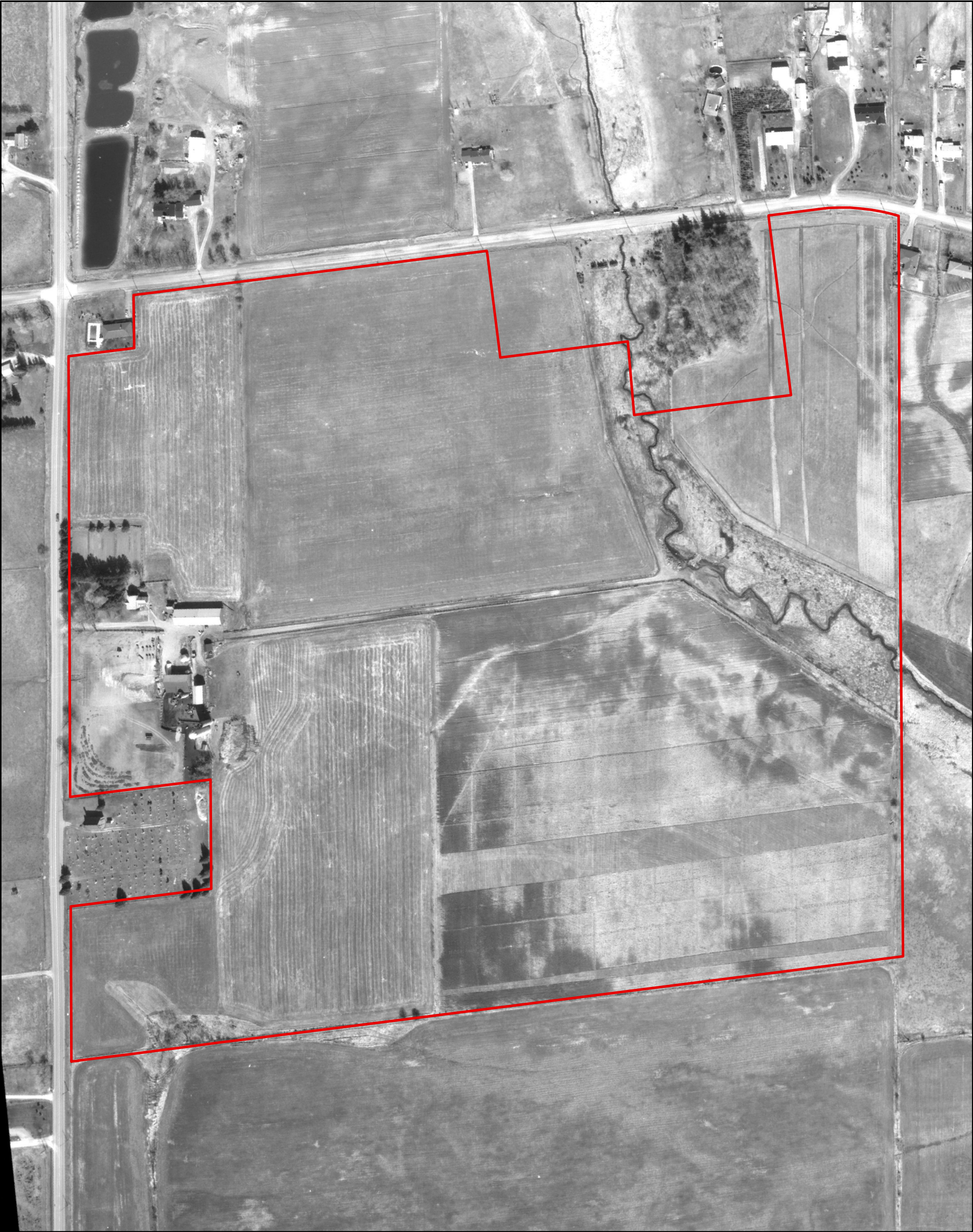
Legend



Subject Property

Historical Aerial Imagery Newhouse and Hicks		2019
Argo Kennedy Geomorphic Assessment		
 BEACON ENVIRONMENTAL		Project: 219527.1 Last Revised: May 2021
Client: Argo		Prepared by: DU Checked by: SG
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Legend <div><div></div> Subject Property</div>	Historical Aerial Imagery Russell Property		1964
	Argo Kennedy Geomorphic Assessment		
	 BEACON ENVIRONMENTAL		Project: 219527.1 Last Revised: May 2021
	Client: Argo		Prepared by: DU Checked by: SG
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<div>Legend</div> <div><div></div> Subject Property</div>	Historical Aerial Imagery		1982
	Argo Kennedy Geomorphic Assessment		
			Project: 219527.1 Last Revised: May 2021
	Client: Argo		Prepared by: DU Checked by: SG
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Legend <div><div></div> Subject Property</div>	Historical Aerial Imagery Russell Property	2015
	Argo Kennedy Geomorphic Assessment	
	 BEACON ENVIRONMENTAL	Project: 219527.1 Last Revised: May 2021
	Client: Argo	Prepared by: DU Checked by: SG
	 1:3,000	<div><div></div><div>050100 m</div></div>
Contains information licensed under the Open Government License— Ontario Orthoimagery Baselayer: FBS Peel 2015		



<div>Legend</div> <div><div></div> Subject Property</div>	Historical Aerial Imagery Russell Property		2019
	Argo Kennedy Geomorphic Assessment		
			Project: 219527.1 Last Revised: May 2021
	Client: Argo		Prepared by: DU Checked by: SG
		1:3,000	<div><div></div><div>050100 m</div></div>
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Appendix B

Photographic Record



Photograph 1. (Location 1)
Reach EC1
Looking downstream at the extent accessed.



Photograph 2. (Location 1)
Reach EC1
Looking downstream at right bank valley wall contact located immediately downstream of the Reach TEC1 confluence.



Photograph 3. (Location 2)
Reach EC2
Looking upstream at a tree root knickpoint with scour pool and flow diversion.



Photograph 4. (Location 3)
Reach EC2
Looking upstream at left bank floodplain oxbow feature.



Photograph 5. (Location 3)
Reach EC2
Looking upstream at confluence of flow split.



Photograph 6. (Location 4)
Reach EC2
Looking downstream at start of flow split.



Photograph 7. (Location 5)
Reach EC2
Looking upstream at Large woody debris jam.



Photograph 8. (Location 6)
Reach EC2
Looking upstream at pool with left bank undercut and right bank point bar.



Photograph 9. (Location 7)

Reach EC2

Looking upstream at left bank valley wall contact



Photograph 10. (Location 7)

Reach EC2

**Looking upstream at confluence of flow split.
Source of flow split is a large beaver dam across
the valley.**



Photograph 11. (Location 8)

Reach EC2

**Looking upstream medial bar and large undercut
along the right bank.**



Photograph 12. (Location 9)

Reach EC2

**Looking upstream at drainage feature on the right
bank.**



Photograph 13. (Location 10)

Reach EC2

**Looking upstream large beaver dam, extending
across the entire valley width.**



Photograph 14. (Location 11)

Reach EC2

**Looking downstream at the backwatered
floodplain due to the beaver dam.**



Photograph 15. (Location 12)

Reach EC2

**Looking upstream at the extent of backwater from
the beaver dam.**



Photograph 16. (Location 13)

Reach EC3

Looking upstream at second beaver dam.



Photograph 17. (Location 14)
Reach EC3
Upstream view of run feature.



Photograph 18. (Location 15)
Reach EC3
Looking downstream at riffle substrate and pool with slumping outside bank.



Photograph 19. (Location 15)
Reach EC3
Looking upstream at left bank slumping with ponding water (photo right).



Photograph 20. (Location 16)
Reach EC3
Looking upstream valley wall contact with undercut.



Photograph 21. (Location 17)

Reach EC3

Looking upstream at Old School Road box culvert crossing.



Photograph 22. (Location 18)

Reach TEC1

Upstream view of confluence into Reach EC1.



Photograph 23. (Location 18)

Reach TEC1

Looking downstream at valley wall contact with leaning and fallen trees.



Photograph 24. (Location 19)

Reach TEC1

Looking upstream pool feature with densely vegetated banks.



Photograph 25. (Location 20)
Reach TEC1
Looking downstream at pool with undercut
outside banks and point bar.



Photograph 26. (Location 21)
Reach TEC1
Downstream view of riffle with left bank undercut.
Floodplain vegetation transitions to



Photograph 27. (Location 22)
Reach TEC1
Looking upstream at head cutting into
consolidates till at the Reach transitions from a
herbaceous swale into a well defined channel with
woody riparian vegetation.



Photograph 28. (Location 23)
Reach TEC1
Looking downstream at general conditions from
Old School Road.



Photograph 29. (Location 23)

Reach TEC1
Looking double plastic corrugated pipes under
Old School Road.



Photograph 30. (Location 24)

Reach TEC1
General reach conditions upstream of Old School
Road.



Photograph 31. (Location 25)

Reach KC1
Looking down stream at general conditions from
Old School Road.



Photograph 32. (Location 26)

Reach KC1
General reach conditions upstream of Old School
Road.

Appendix G

Flora Checklist for Argo Kennedy Limited

Appendix G

Flora Checklist for Argo Kennedy Limited

Scientific Name	Common Name	S Rank ^a	TRCA Rank ^b
<i>Abutilon theophrasti</i>	Velvetleaf	SE5	L+
<i>Acer negundo</i>	Manitoba Maple	S5	L+?
<i>Acer platanoides</i>	Norway Maple	SE5	L+
<i>Acer rubrum</i>	Red Maple	S5	L4
<i>Acer saccharinum</i>	Silver Maple	S5	L4
<i>Acer saccharum</i>	Sugar Maple	S5	L5
<i>Acer x freemanii</i>	(<i>Acer rubrum</i> X <i>Acer saccharinum</i>)	SNA	L4
<i>Achillea millefolium</i>	Common Yarrow	SE5?	L+
<i>Aegopodium podagraria</i>	Goutweed	SE5	L+
<i>Agrostis gigantea</i>	Redtop	SE5	L+
<i>Agrostis stolonifera</i>	Creeping Bentgrass	SE5	L+?
<i>Alliaria petiolata</i>	Garlic Mustard	SE5	L+
<i>Allium tricoccum</i>	Wild Leek	S4	L4
<i>Ambrosia artemisiifolia</i>	Common Ragweed	S5	L5
<i>Amelanchier laevis</i>	Smooth Serviceberry	S5	L5
<i>Anemonastrum canadense</i>	Canada Anemone	S5	L5
<i>Arctium minus</i>	Common Burdock	SE5	L+
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	S5	L5
<i>Asarum canadense</i>	Canada Wild-ginger	S5	L4
<i>Asclepias incarnata</i>	Swamp Milkweed	S5	L4
<i>Asclepias syriaca</i>	Common Milkweed	S5	L5
<i>Asparagus officinalis</i>	Garden Asparagus	SE5	L+
<i>Betula alleghaniensis</i>	Yellow Birch	S5	L4
<i>Betula papyrifera</i>	Paper Birch	S5	L4
<i>Borago officinalis</i>	Common Borage	SEH	L+
<i>Bromus inermis</i>	Smooth Brome	SE5	L+
<i>Calamagrostis canadensis</i>	Bluejoint Reedgrass	S5	L4
<i>Campanula rapunculoides</i>	Creeping Bellflower	SE5	L+
<i>Cardamine concatenata</i>	Cut-leaved Toothwort	S5	L4
<i>Carex bebbii</i>	Bebb's Sedge	S5	L5
<i>Carex blanda</i>	Woodland Sedge	S5	L5
<i>Carex gracillima</i>	Graceful Sedge	S5	L5
<i>Carex granularis</i>	Limestone Meadow Sedge	S5	L5
<i>Carex intumescens</i>	Bladder Sedge	S5	L4
<i>Carex pedunculata</i>	Long-stalked Sedge	S5	L5
<i>Carex pensylvanica</i>	Pennsylvania Sedge	S5	L4
<i>Carex radiata</i>	Eastern Star Sedge	S5	L5
<i>Carex stipata</i>	Awl-fruited Sedge	S5	L5
<i>Carex stricta</i>	Tussock Sedge	S5	L4
<i>Cornus alternifolia</i>	Alternate-leaved Dogwood	S5	L5
<i>Cornus racemosa</i>	Grey Dogwood	S5	L5
<i>Cornus sericea</i>	Red-osier Dogwood	S5	L5
<i>Crataegus macracantha</i>	Large-thorned Hawthorn	S5	L5

Scientific Name	Common Name	S Rank ^a	TRCA Rank ^b
<i>Crataegus monogyna</i>	English Hawthorn	SE4	L+
<i>Dactylis glomerata</i>	Orchard Grass	SE5	L+
<i>Daucus carota</i>	Wild Carrot	SE5	L+
<i>Dryopteris marginalis</i>	Marginal Wood Fern	S5	L4
<i>Echinocystis lobata</i>	Wild Cucumber	S5	L5
<i>Elymus hystrix</i>	Bottlebrush Grass	S5	L4
<i>Elymus repens</i>	Quackgrass	SE5	L+
<i>Epifagus virginiana</i>	Beechdrops	S5	L4
<i>Epilobium ciliatum</i>	Northern Willowherb	S5	L4
<i>Epilobium ciliatum</i> ssp. <i>ciliatum</i>	Northern Willowherb	S5	L5
<i>Equisetum arvense</i>	Field Horsetail	S5	L5
<i>Equisetum variegatum</i>	Variegated Scouring-rush	S5	L4
<i>Erigeron canadensis</i>	Canada Horseweed	S5	L5
<i>Euonymus obovatus</i>	Running Strawberry-bush	S4	L3
<i>Eupatorium perfoliatum</i>	Common Boneset	S5	L5
<i>Eutrochium maculatum</i>	Spotted Joe Pye Weed	S5	L5
<i>Fagus grandifolia</i>	American Beech	S4	L4
<i>Fragaria vesca</i>	Woodland Strawberry	S5	L5
<i>Fraxinus americana</i>	White Ash	S4	L5
<i>Fraxinus pennsylvanica</i>	Red Ash	S4	L5
<i>Galium mollugo</i>	Smooth Bedstraw	SE5	L+
<i>Geranium maculatum</i>	Spotted Geranium	S5	L4
<i>Geranium robertianum</i>	Herb-Robert	S5	L+?
<i>Geum aleppicum</i>	Yellow Avens	S5	L5
<i>Geum laciniatum</i>	Rough Avens	S4	L4
<i>Glyceria striata</i>	Fowl Mannagrass	S5	L5
<i>Hackelia virginiana</i>	Virginia Stickseed	S5	L5
<i>Hemerocallis fulva</i>	Orange Daylily	SE5	L+
<i>Hesperis matronalis</i>	Dame's Rocket	SE5	L+
<i>Hydrophyllum virginianum</i>	Virginia Waterleaf	S5	L5
<i>Hypericum perforatum</i>	Common St. John's-wort	SE5	L+
<i>Impatiens capensis</i>	Spotted Jewelweed	S5	L5
<i>Inula helenium</i>	Elecampane	SE5	L+
<i>Iris versicolor</i>	Harlequin Blue Flag	S5	L3
<i>Juglans nigra</i>	Black Walnut	S4?	L5
<i>Juncus effusus</i>	Soft Rush	S5	L5
<i>Juncus tenuis</i>	Path Rush	S5	L5
<i>Lactuca serriola</i>	Prickly Lettuce	SE5	L+
<i>Leonurus cardiaca</i>	Common Motherwort	SE5	L+
<i>Lepidium campestre</i>	Field Peppergrass	SE5	L+
<i>Ligustrum vulgare</i>	European Privet	SE5	L+
<i>Lilium michiganense</i>	Michigan Lily	S4	L3
<i>Linaria vulgaris</i>	Butter-and-eggs	SE5	L+
<i>Lonicera tatarica</i>	Tatarian Honeysuckle	SE5	L+
<i>Lotus corniculatus</i>	Garden Bird's-foot Trefoil	SE5	L+
<i>Lysimachia ciliata</i>	Fringed Yellow Loosestrife	S5	L5
<i>Lysimachia nummularia</i>	Creeping Yellow Loosestrife	SE5	L+
<i>Lythrum salicaria</i>	Purple Loosestrife	SE5	L+
<i>Maianthemum canadense</i>	Wild Lily-of-the-valley	S5	L4
<i>Maianthemum racemosum</i>	Large False Solomon's Seal	S5	L5

Scientific Name	Common Name	S Rank ^a	TRCA Rank ^b
<i>Malus pumila</i>	Common Apple	SE4	L+
<i>Matteuccia struthiopteris</i>	Ostrich Fern	S5	L5
<i>Matteuccia struthiopteris</i> var. <i>pensylvanica</i>	Ostrich Fern	S5	L5
<i>Medicago lupulina</i>	Black Medick	SE5	L+
<i>Medicago sativa</i>	Alfalfa	SE5	L+
<i>Mellilotus officinalis</i>	Yellow Sweet-clover	SE5	L+
<i>Muhlenbergia mexicana</i>	Mexican Muhly	S5	L5
<i>Myosotis arvensis</i>	Field Forget-me-not	SE4	L+
<i>Nasturtium officinale</i>	Watercress	SE	L+?
<i>Oenothera biennis</i>	Common Evening-primrose	S5	L5
<i>Onoclea sensibilis</i>	Sensitive Fern	S5	L5
<i>Ostrya virginiana</i>	Eastern Hop-hornbeam	S5	L5
<i>Phalaris arundinacea</i>	Reed Canarygrass	S5	L+?
<i>Phleum pratense</i>	Common Timothy	SE5	L+
<i>Phragmites australis</i>	Common Reed	S4?	L+?
<i>Picea abies</i>	Norway Spruce	SE3	L+
<i>Picea glauca</i>	White Spruce	S5	L3
<i>Pinus strobus</i>	Eastern White Pine	S5	L4
<i>Pinus sylvestris</i>	Scots Pine	SE5	L+
<i>Plantago major</i>	Common Plantain	SE5	L+
<i>Poa compressa</i>	Canada Bluegrass	SE5	L+
<i>Poa palustris</i>	Fowl Bluegrass	S5	L5
<i>Poa pratensis</i>	Kentucky Bluegrass	S5	L+
<i>Podophyllum peltatum</i>	May-apple	S5	L5
<i>Polygonatum pubescens</i>	Hairy Solomon's Seal	S5	L4
<i>Polystichum acrostichoides</i>	Christmas Fern	S5	L4
<i>Populus balsamifera</i>	Balsam Poplar	S5	L5
<i>Populus grandidentata</i>	Large-toothed Aspen	S5	L4
<i>Populus tremuloides</i>	Trembling Aspen	S5	L5
<i>Populus x canadensis</i>	(<i>Populus deltoides</i> X <i>Populus nigra</i>)	SNA	L+
<i>Prunella vulgaris</i>	Common Self-heal	S5	L+?
<i>Prunus avium</i>	Sweet Cherry	SE4	L+
<i>Prunus serotina</i>	Black Cherry	S5	L5
<i>Prunus virginiana</i>	Chokecherry	S5	L5
<i>Quercus macrocarpa</i>	Bur Oak	S5	L4
<i>Ranunculus acris</i>	Common Buttercup	SE5	L+
<i>Ranunculus sceleratus</i>	Cursed Buttercup	S5	L5
<i>Rhamnus cathartica</i>	European Buckthorn	SE5	L+
<i>Ribes cynosbati</i>	Eastern Prickly Gooseberry	S5	L5
<i>Rosa multiflora</i>	Multiflora Rose	SE5	L+
<i>Rubus allegheniensis</i>	Allegheny Blackberry	S5	L5
<i>Rubus idaeus</i> ssp. <i>idaeus</i>	European Red Raspberry	SE1	L+
<i>Rumex crispus</i>	Curled Dock	SE5	L+
<i>Salix eriocephala</i>	Cottony Willow	S5	L5
<i>Salix petiolaris</i>	Meadow Willow	S5	L4
<i>Salix x fragilis</i>	(<i>Salix alba</i> X <i>Salix euxina</i>)	SNA	L+
<i>Sium suave</i>	Common Water-parsnip	S5	L5
<i>Solanum dulcamara</i>	Bittersweet Nightshade	SE5	L+
<i>Solidago altissima</i>	Tall Goldenrod	S5	L5
<i>Solidago canadensis</i>	Canada Goldenrod	S5	L5

Scientific Name	Common Name	S Rank ^a	TRCA Rank ^b
<i>Solidago flexicaulis</i>	Zigzag Goldenrod	S5	L5
<i>Solidago juncea</i>	Early Goldenrod	S5	L5
<i>Solidago nemoralis</i>	Grey-stemmed Goldenrod	S5	L5
<i>Sonchus arvensis</i> ssp. <i>arvensis</i>	Glandular Sow-thistle	SE5	L+
<i>Spiraea alba</i>	White Meadowsweet	S5	L4
<i>Symphotrichum ericoides</i> var. <i>ericoides</i>	White Heath Aster	S5	L5
<i>Symphotrichum lanceolatum</i>	Panicled Aster	S5	L5
<i>Symphotrichum lanceolatum</i> ssp. <i>lanceolatum</i>	Eastern Panicled Aster	S5	L5
<i>Symphotrichum lateriflorum</i>	Calico Aster	S5	L5
<i>Symphotrichum novae-angliae</i>	New England Aster	S5	L5
<i>Symphotrichum puniceum</i>	Purple-stemmed Aster	S5	L5
<i>Syringa vulgaris</i>	Common Lilac	SE5	L+
<i>Taraxacum officinale</i>	Common Dandelion	SE5	L+
<i>Thalictrum dioicum</i>	Early Meadow-rue	S5	L5
<i>Thlaspi arvense</i>	Field Pennycress	SE5	L+
<i>Thuja occidentalis</i>	Eastern White Cedar	S5	L5
<i>Tiarella cordifolia</i>	Heart-leaved Foamflower	S5	L4
<i>Tilia americana</i>	Basswood	S5	L5
<i>Trifolium pratense</i>	Red Clover	SE5	L+
<i>Trifolium repens</i>	White Clover	SE5	L+
<i>Trillium grandiflorum</i>	White Trillium	S5	L4
<i>Tsuga canadensis</i>	Eastern Hemlock	S5	L4
<i>Tussilago farfara</i>	Coltsfoot	SE5	L+
<i>Typha angustifolia</i>	Narrow-leaved Cattail	SE5	L+
<i>Typha latifolia</i>	Broad-leaved Cattail	S5	L4
<i>Ulmus americana</i>	White Elm	S5	L5
<i>Urtica dioica</i>	Stinging Nettle	S5	L+
<i>Urtica dioica</i> ssp. <i>dioica</i>	European Stinging Nettle	SE2	L+
<i>Verbascum thapsus</i>	Common Mullein	SE5	L+
<i>Veronica officinalis</i>	Common Speedwell	SE5	L+
<i>Viburnum lentago</i>	Nannyberry	S5	L5
<i>Viburnum opulus</i> ssp. <i>opulus</i>	Cranberry Viburnum	SE3?	L+
<i>Vicia cracca</i>	Tufted Vetch	SE5	L+
<i>Vinca minor</i>	Lesser Periwinkle	SE5	L+
<i>Viola pubescens</i>	Yellow Violet	S5	L5
<i>Viola sororia</i>	Woolly Blue Violet	S5	L5
<i>Vitis riparia</i>	Riverbank Grape	S5	L5
<i>Xanthium spinosum</i>	Spiny Cocklebur	SE2?	L+

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 H

**Breeding Bird 2020 Field Notes for Argo
Kennedy Limited**

Breeding Bird Survey Summary Form

Surveyor Name: Jay V Date (use letters for mos.): 5-Jun-21

Project Name: Argo Kennedy Project #: 219527

Time of Survey (start and finish): 0630 - 0930

Weather (approx. temp., cloud cover, wind, precipitation): 21°C - 24°C

4/8 - 1/8 3-6 no precip

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!

<u>17 Green Frogs noted in</u>	_____
<u>wet area in treeline</u>	_____
<u>on east property (X)</u>	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

48452800

4845800

592900

4845900

593000

4846000

5931000

4846200 593200

Project: 219527 Hicks Property Environmental Due

Diligence

Project Manager: KU

Field Staff: *John*

Date of Site Visit(s): *5-3-2014*

Type of Data Collected:

Data Collected With:

Notes:

YB Davis to Joel.



Old School Road

Kennedy Road



Breeding Bird Survey Summary Form

Surveyor Name: Jay V Date (use letters for mos.): 17-Jun-21

Project Name: Argo Kennedy Project #: 219527

Time of Survey (start and finish): 0630 - 0930

Weather (approx. temp., cloud cover, wind, precipitation): 10°C - 18°C

9/8 04 D-2 no precip.

Additional notes on birds (nests, uncertainties, unusual observations, habitat comments etc.):

2 SAVs nests found

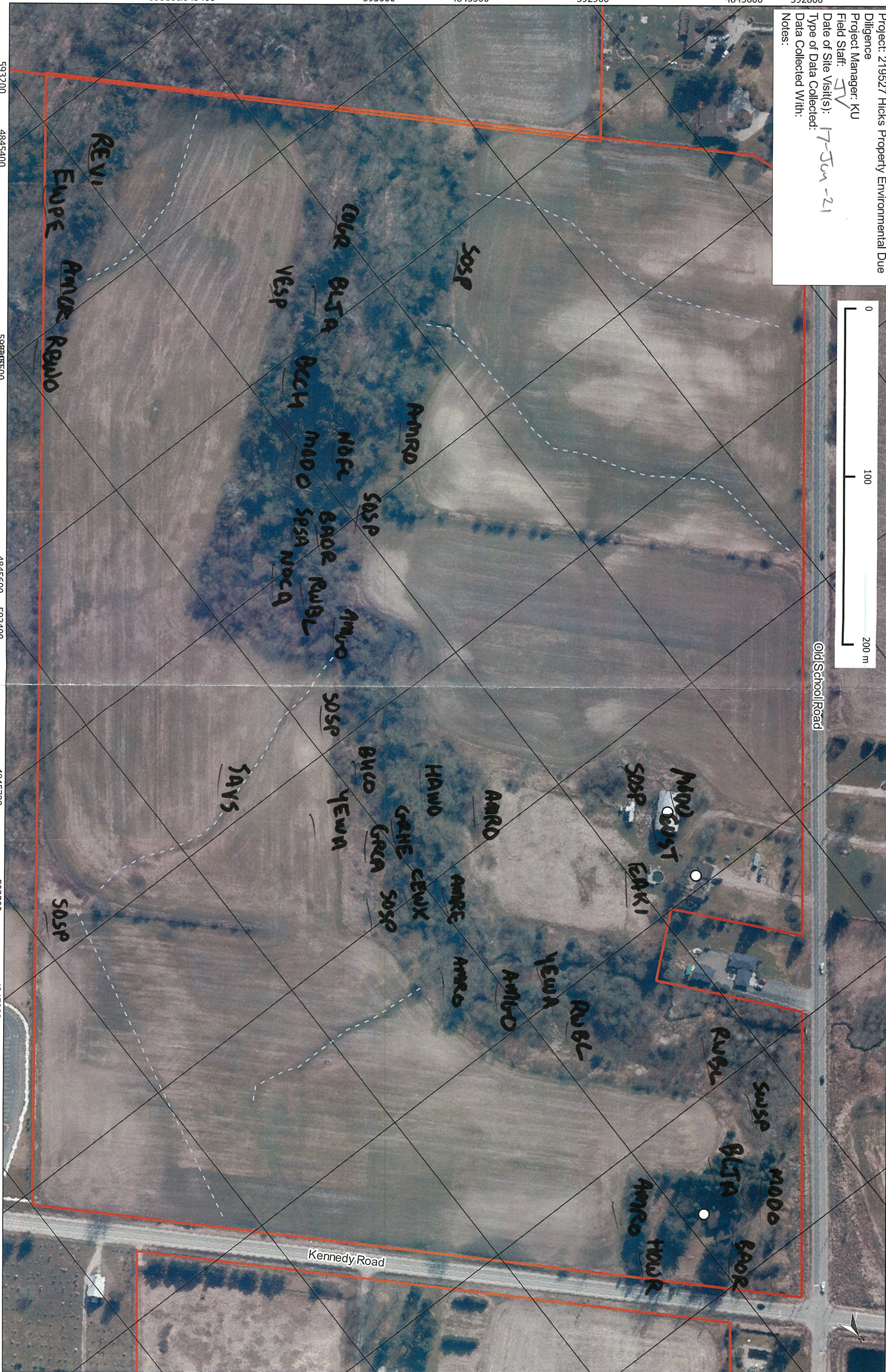
NRWS nesting in truck trailer on ~~the~~ farm on west
side of site.

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!

Old School Road

Kennedy Road



Breeding Bird Survey Summary Form

Surveyor Name: Jay V Date (use letters for mos.): 24-June-21

Project Name: Argo Kennedy Project #: 219527

Time of Survey (start and finish): 0615 - 0715

Weather (approx. temp., cloud cover, wind, precipitation): 16°C - 17°

4/8 - 2/8 1-Wind no precip

Additional notes on birds (nests, uncertainties, unusual observations, habitat comments etc) :

Dedicated EAME/BOBO 3rd survey

1 EAME recorded same area as previous survey

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!

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Project: 219527 Hicks Property Environmental Due Diligence
Project Manager: KU
Field Staff: JV
Date of Site Visit(s): 24-Jun-21
Type of Data Collected:
Data Collected With:
Notes:



Appendix I

Breeding Bird Checklist for Argo Kennedy Limited

Appendix I

Breeding Bird Checklist for Argo Kennedy Lands

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 ^e	Breeding Pairs/ Territories
Green Heron	<i>Butorides virescens</i>			S4	L4		1
Wood Duck	<i>Aix sponsa</i>			S5	L4		1
Mallard	<i>Anas platyrhynchos</i>			S5	L5		X
Turkey Vulture	<i>Cathartes aura</i>			S5	L5		X
Wild Turkey	<i>Meleagris gallopavo</i>			S5	L3		1
Killdeer	<i>Charadrius vociferus</i>			S5	L4		1
Spotted Sandpiper	<i>Actitis macularia</i>			S5	L4		1
Ring-billed Gull	<i>Larus delawarensis</i>			S5	L4		X
Mourning Dove	<i>Zenaida macroura</i>			S5	L5		2
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>			S5	L3		1
Red-bellied Woodpecker	<i>Melanerpes carolinus</i>			S4	L4		1
Downy Woodpecker	<i>Dryobates pubescens</i>			S5	L5		1
Hairy Woodpecker	<i>Dryobates villosus</i>			S5	L4	A	1
Northern Flicker	<i>Colaptes auratus</i>			S4	L4		1
Eastern Wood-Pewee	<i>Contopus virens</i>	SC	SC	S4	L4		1
Eastern Phoebe	<i>Sayornis phoebe</i>			S5	L5		1
Great Crested Flycatcher	<i>Myiarchus crinitus</i>			S4	L4		1
Eastern Kingbird	<i>Tyrannus tyrannus</i>			S4	L4		1
Horned Lark	<i>Eremophila alpestris</i>			S5	L3		X
N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>			S4	L4		1
Barn Swallow	<i>Hirundo rustica</i>	THR	THR	S4	L4		4
Blue Jay	<i>Cyanocitta cristata</i>			S5	L5		2
American Crow	<i>Corvus brachyrhynchos</i>			S5	L5		1
Common Raven	<i>Corvus corax</i>			S5	L4		1
Black-capped Chickadee	<i>Poecile atricapillus</i>			S5	L5		2
House Wren	<i>Troglodytes aedon</i>			S5	L5		3
Wood Thrush	<i>Hylocichla mustelina</i>	THR	SC	S4	L3		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 ^e	Breeding Pairs/ Territories
American Robin	<i>Turdus migratorius</i>			S5	L5		6
Gray Catbird	<i>Dumetella carolinensis</i>			S4	L4		2
Cedar Waxwing	<i>Bombycilla cedrorum</i>			S5	L5		1
European Starling	<i>Sturnus vulgaris</i>			SE	L+		2
Warbling Vireo	<i>Vireo gilvus</i>			S5	L5		2
Red-eyed Vireo	<i>Vireo olivaceus</i>			S5	L4		3
Yellow Warbler	<i>Setophaga petechia</i>			S5	L5		2
American Redstart	<i>Setophaga ruticilla</i>			S5	L4	A	3
Common Yellowthroat	<i>Geothlypis trichas</i>			S5	L4		1
Northern Cardinal	<i>Cardinalis cardinalis</i>			S5	L5		2
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>			S4	L4		1
Chipping Sparrow	<i>Spizella passerina</i>			S5	L5		X
Vesper Sparrow	<i>Pooecetes gramineus</i>			S4	L3		1
Savannah Sparrow	<i>Passerculus sandwichensis</i>			S4	L4	A	3
Song Sparrow	<i>Melospiza melodia</i>			S5	L5		8
Swamp Sparrow	<i>Melospiza georgiana</i>			S5	L4		1
Red-winged Blackbird	<i>Agelaius phoeniceus</i>			S4	L5		4
Eastern Meadowlark	<i>Sturnella magna</i>	THR	THR	S4	L3	A	1
Common Grackle	<i>Quiscalus quiscula</i>			S5	L5		1
Brown-headed Cowbird	<i>Molothrus ater</i>			S4	L5		2
Baltimore Oriole	<i>Icterus galbula</i>			S4	L5		2
American Goldfinch	<i>Spinus tristis</i>			S5	L5		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 J

Significant Wildlife Habitat (SWH) Screening for Argo Kennedy Limited

Appendix J

Significant Wildlife Habitat (SWH) Screening for Argo Kennedy Lands

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands	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 melt water or run-off within these Ecosites.	<i>Suitable Habitat</i> <ul style="list-style-type: none">Fields with sheet water during Spring (mid-March to May) <i>Suggested Criteria</i> 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	<i>Suitable Habitat</i> <ul style="list-style-type: none">Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migrationSewage treatment ponds and storm water ponds do not qualify as SWH, however a reservoir managed as a large wetland or pond/lake does qualifyThese habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water) <i>Suggested Criteria</i> Studies carried out and verified presence of: <ul style="list-style-type: none">Aggregations of 100 or more of listed species for 7 days, results in > 700 waterfowl use daysAreas with annual staging of ruddy ducks, canvasbacks, and redheads are SWHWetland 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.	*	*
3. Shorebird Migratory Stopover Area					
Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover	BBO1 BBO2 BBS1 BBS2 BBT1	<i>Suitable Habitat</i> <ul style="list-style-type: none">Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats	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	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin	BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	<ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i></p> <ul style="list-style-type: none"> 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	<p><u>Hawks/Owls:</u> Combination of ELC Community Series; need to have present one Community Series from each land class;</p> <p><u>Forest:</u> FOD, FOM, FOC.</p> <p><u>Upland:</u> CUM, CUT, CUS, CUW.</p> <p><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).</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i></p> <p>Studies confirm the use of these habitats by:</p> <ul style="list-style-type: none"> 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 <p>The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area</p>	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	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> Hibernacula may be found in caves, mine shafts, underground foundations and Karsts <p><i>Suggested Criteria</i></p> <ul style="list-style-type: none"> 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.	*	*

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands	Candidate SWH On Subject Lands	Candidate SWH Within 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	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i></p> <ul style="list-style-type: none"> Maternity colonies with confirmed use by; <ul style="list-style-type: none"> >10 Big Brown Bats >5 Adult Female Silver-haired Bats <p>The area of the habitat includes the entire woodland or the forest stand ELC ecosite or an ecoelement containing the maternity colonies</p>	Suitable habitat may be present on the Subject Lands or within the Study Area within the forest features.	✓ Forested Communities	✓ Forested Communities
7. Turtle Wintering Areas					
Midland Painted Turtle Northern Map Turtle Snapping Turtle	<p>Snapping and Midland Painted Turtles: ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO.</p> <p>Northern Map Turtles: Open Water areas such as deeper rivers, or streams and lakes with current can also be used as over-wintering habitat.</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i></p> <ul style="list-style-type: none"> 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 <p>If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH</p>	Candidate SWH includes the Etobicoke Creek Headwater PSW Complex and other wetlands or ponds with permanent open water on the Subject Lands. Species targeted surveys completed by Beacon in 2021 confirmed presence of Midland Painted Turtle.	✓ Wetlands with Permanent Open Water	✓ Etobicoke Creek Headwater 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	<p>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.</p> <p>Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator.</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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 	<p>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.</p> <p>To date, DeKay's Brownsnake (<i>Storeria dekayi dekayi</i>), Eastern Gartersnake (<i>Thamnophis sirtalis sirtalis</i>) and Northern Red-bellied Snake (<i>Storeria o. occipitomaculata</i>) have been incidentally recorded on the Subject Lands or within the Study Area. Beacon did not observe an snake during field investigation in 2020-2021.</p>	✓ Natural, Semi-Natural Communities and Areas with Old Anthropogenic Foundations	✓ Natural and Semi-Natural Communities

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
	For Five-lined Skink, ELC Community Series of FOD and FOM and ecosite: FOC1 and FOC3.	<p>outcrop openings with cover rock overlaying granite bedrock with fissures</p> <p><i>Suggested Criteria</i></p> <p>Studies confirming:</p> <ul style="list-style-type: none"> • 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 			
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)	<p>Eroding banks, sandy hills, steep slopes and sand piles. Cliff faces, bridge abutments, silos and barns.</p> <p>Habitat found in the following ecosites:</p> <p>CUM1 CLO1 CUT1 CLS1 CUS1 CLT1 BLO1 BLS1 BLT1</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> • 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 <p><i>Suggested Criteria</i></p> <p>Studies confirming:</p> <ul style="list-style-type: none"> • 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 <p>A colony identified as SWH will include a 50m radius habitat area from the peripheral nests</p>	Although some potential for suitable habitat on Subject Lands or within the Study Area, only evidence of breeding targeted species as observed by Beacon in 2021 was a single Northern Rough-winged Swallow in association with man-made structures.	*	*
10. Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs)					
Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	<p>SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> • 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 <p><i>Suggested Criteria</i></p> <p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of 2 or more active nests of Great Blue Heron or other listed species <p>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</p>	No suitable habitat identified on the Subject Lands or within the Study Area.	*	*
11. Colonially-Nesting Bird Breeding Habitat (Ground)					

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	<p>Any rocky island to peninsula (natural or artificial) with a lake or larger river.</p> <p>Close proximity or watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird).</p> <p>MAM1-6 MAS1-3 CUM CUT CUS</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none">Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areasBrewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands <p><i>Suggested Criteria</i> Studies confirming:</p> <ul style="list-style-type: none">Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian TernAny active nesting colony of one or more Little Gull, and Great Black-backed Gull is significantPresence of 5 or more pairs for Brewer's BlackbirdThe 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	<p>Combination of ELC Community Series; need to have present one Community Series from each land class:</p> <p><u>Field:</u> CUM CUT CUS</p> <p><u>Forest:</u> FOC FOD COM CUP</p> <p>A candidate site will have a history of butterflies being observed.</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none">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 ErieThe habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration southThe habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitatStaging areas usually provide protection from the elements and are often spits of land or areas with the shortest <p><i>Suggested Criteria</i> Studies confirm:</p> <ul style="list-style-type: none">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 <p>MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admirals is to be considered significant</p>	Suitable habitat not identified on the Subject Lands or the Study Area due to its distance from Lake Ontario and Lake Erie.	✖	✖
13. Landbird Migratory Stopover Areas					
All migratory songbirds	All Ecosites associated with the ELC Community Series; FOC FOM FOD SWC SWM SWD	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none">Woodlots >10 ha in size and within 5 km of Lake Ontario and Lake ErieIf multiple woodlands are located along the shoreline those Woodlands <2 km from Lake Erie or Ontario are more significantSites have a variety of habitats; forest, grassland and wetland complexesThe largest sites are more 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	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
		<ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i> Studies confirm:</p> <ul style="list-style-type: none"> 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 <p>This abundance and diversity of migrant bird species is considered above average and significant</p>			
14. Deer Yarding Areas					
White-tailed Deer	<p><i>Note: MNRF to determine this habitat.</i></p> <p>ELC Community Series providing a thermal cover component for a deer yard would include: FOD, FOC, SWM and SWC.</p> <p>Or ELC Ecosites: CUP2, CUP3, FOD3 and CUT</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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% <p><i>Suggested Criteria</i> Studies confirm:</p> <ul style="list-style-type: none"> 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 <p>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</p>	No suitable habitat identified on the Subject Lands or the Study Area by MNRF.	*	*
15. Deer Winter Congregation Areas					
White-tailed Deer	<p>All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD</p> <p>Conifer Plantations much smaller than 50 ha may also be used.</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i></p>	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	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
		<p>Studies confirm:</p> <ul style="list-style-type: none">Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRFUse 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 <p>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</p>			
Rare Vegetation Communities					
16. Cliffs and Talus Slopes					
ELC Communities: TAO, TAS, TAT, CLO, CLS, CLT		<ul style="list-style-type: none">A Cliff is vertical to near vertical bedrock >3m in heightA Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debrisMost 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		<ul style="list-style-type: none">Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosionUsually located within other types of natural habitat such as forest or savannahVegetation can vary from patchy and barren to tree covered but less than 60% <p>Suggested Criteria</p> <ul style="list-style-type: none">A sand barren area >0.5ha in sizeSite 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		<ul style="list-style-type: none">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 soilThe hydrology of alvars is complex, with alternating periods of inundation and droughtVegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plantUndisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal speciesVegetation cover varies from patchy to barren with a less than 60% tree cover <p>Suggested Criteria</p> <ul style="list-style-type: none">An Alvar site > 0.5 ha in sizeFive indicator species specific to alvars within Ecoregion 6E: 1) <i>Carex crawei</i> 2) <i>Panicum philadelphicum</i> 3) <i>Eleocharis compressa</i> 4) <i>Scutellaria parvula</i> 5) <i>Trichostema brachiatum</i>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.	*	*

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities	Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
19. Old Growth Forest				
ELC Communities: FOD FOC FOM SWD SWC SWM	<ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i></p> <ul style="list-style-type: none"> 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) The area of forest ecosites combined or an eco-element within an ecosite that contain the old growth characteristics is the SWH 	Does not occur on the Subject Lands or within the Study Area.	*	*
20. Savannah				
ELC Communities: TPS1 TPS2 TPW1 TPW2 CUS2	<ul style="list-style-type: none"> A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60% <p><i>Suggested Criteria</i></p> <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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) <p><i>Suggested Criteria</i></p> <ul style="list-style-type: none"> 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 (MNR 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				
	<ul style="list-style-type: none"> Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG (MNR 2000) Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps 	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	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
		<ul style="list-style-type: none"> 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 			
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 <ul style="list-style-type: none"> 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: <ul style="list-style-type: none"> 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 Wood Ducks and Hooded Mergansers utilize large diameter trees (>40 cm dbh) in woodlands for cavity nest sites	Although suitable habitat is present on the Subject Lands and within the Study Area in the vicinity of the wetland areas, however surveys determined that not enough of the listed species were noted breeding in 2021 to be considered candidate SWH.	x	x
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 <ul style="list-style-type: none"> 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 <i>Studies confirm the use of these nests by:</i> <ul style="list-style-type: none"> 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.	x	x
25. Woodland Raptor 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	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
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	<i>Suitable Habitat</i> <ul style="list-style-type: none">All natural or conifer plantation woodland/forest stands combined >30ha or with >4 ha of interior habitat; interior habitat determined with a 200 m bufferStick 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 islandIn disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest <i>Suggested Criteria</i> Studies confirm: <ul style="list-style-type: none">Presence of 1 or more active nests from species list is considered significantRed-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)Barred Owl – a 200m radius around the nest is the SWHBroad-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	No suitable habitat identified on the Subject Lands or within the Study Area.	*	*
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	<i>Suitable Habitat</i> <ul style="list-style-type: none">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 animalsFor 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 areasNesting areas on the sides of municipal or provincial road embankments and shoulders are not SWHSand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used <i>Suggested Criteria</i> Studies confirm: <ul style="list-style-type: none">Presence of 5 or more nesting Midland Painted TurtlesOne or more Northern Map Turtle or Snapping Turtle nestingThe 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 SWHTravel routes from wetland to nesting area are to be considered within the SWH	Although suitable habitat is identified on the Subject Lands and within the Study Area, species targeted surveys to be completed by Beacon in 2021 confirmed that not enough turtles were present to suggest candidate SWH. Additionally, evidence of turtle nests were noted on the subject property.	*	*
27. Seeps and Springs					

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities		Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
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.	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i> Studies confirm:</p> <ul style="list-style-type: none"> 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 Beacon Environmental (2021) seepage has been observed in two areas within the subject lands. However, none of these seepage areas are associated with a forest.	*	*
28. Amphibian Breeding Habitat (Woodland)					
Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	<p>All Ecosites associated within these ELC Community Series: FOC, FOM, FOD, SWC, SWM, SWD</p> <p>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.</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i> 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</p>	Potentially suitable habitat identified on the Subject Lands and within the Study Area. Species targeted surveys completed by Beacon in 2021 to confirmed that a call code of 3 of Spring Peeper and Wood Frog were heard from amphibian call stations 8 and 9, which are associated with ELC Unit 10.6 and 9.3.	✓ ELC units 10.6 and 9.3	✓ Wetlands within or Adjacent to a Woodland
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	<p>Classes SW, MA, FE, BO, OA and SA.</p> <p>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.</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> Wetlands >500 m² (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 <p><i>Suggested Criteria</i> Studies confirm:</p> <ul style="list-style-type: none"> Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog or toad 	No suitable habitat 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	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
		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			
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	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i> Studies confirm:</p> <ul style="list-style-type: none"> Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. <p>Any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH</p>	No suitable habitat identified on the Subject Lands or within the Study Area.	*	*
Habitat for Species of Conservation Concern					
31. Marsh Bird Breeding Habitat					
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	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i> Studies confirm:</p> <ul style="list-style-type: none"> 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 	Potentially suitable habitat identified on the Subject Lands and within the Study Area. Species targeted surveys completed by Beacon in 2021 to confirmed that not enough of the listed species were present to suggest candidate SWH.	*	*
32. Open Country Bird Breeding Habitat					
Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow Short-eared Owl	CUM1 CUM2	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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) 	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	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
		<ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i> Field Studies confirm:</p> <ul style="list-style-type: none"> 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. <p>The area of SWH is the contiguous ELC ecosite field areas</p>			
33. Shrub/Early Successional Bird Breeding Habitat					
<p><u>Indicator Species:</u> Brown Thrasher Clay-coloured Sparrow</p> <p><u>Common Species:</u> Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher</p> <p><u>Special Concern:</u> Yellow-breasted Chat Golden-winged Warbler</p>	<p>CUT1 CUT2 CUS1 CUS2 CUW1 CUW2</p> <p>Patches of shrub ecosites can be complexed into a larger habitat for some bird species.</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i> Field Studies confirm:</p> <ul style="list-style-type: none"> 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 <p>The area of the SWH is the contiguous ELC ecosite field/thicket area</p>	No suitable habitat is present on the Subject Lands or within the Study Area.	*	*
34. Terrestrial Crayfish					
<p>Chimney or Digger Crayfish (<i>Fallicambarus fodiens</i>) Devil Crawfish or Meadow Crayfish (<i>Cambarus Diogenes</i>)</p>	<p>MAM1, MAM2, MAM3, MAM4, MAM5, MAM6 MAS1, MAS2, MAS3 SWD, SWT, SWM</p> <p>CUM1 within inclusions of above meadow marsh or swamp ecosites can be used by terrestrial crayfish.</p>	<p><i>Suitable Habitat</i></p> <ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i> Studies Confirm:</p> <ul style="list-style-type: none"> Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites <p>Area of ELC Ecosite polygon is the SWH</p>	No evidence of Terrestrial Crayfish was documented during field studies.	*	*

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities	Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
35. Special Concern and Rare Wildlife Species				
	<ul style="list-style-type: none"> 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 <p><i>Suggested Criteria</i> Studies confirm:</p> <ul style="list-style-type: none"> 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) 	<p>Suitable habitat occurs on the Subject Lands and within the Study Area for two Special Concern and Provincially Rare (S1-S3, SH) Two species were confirmed to breeding during breeding bird surveys in 2021 conducted by Beacon:</p> <ul style="list-style-type: none"> A single Eastern Wood-Pewee (<i>Contopus virens</i>) within forest habitat; and A single Wood Thrush (<i>Hylocichla mustelina</i>) within forest habitat. 	<p>✓ Forests (ELC Units 10.6 and 10.8)</p>	<p>✓ Forests</p>
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	<ul style="list-style-type: none"> 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 	<p>Amphibian breeding habitat (woodland) may be present on the subject lands and study area and within the study area. Species targeted surveys to be completed by Beacon in 2021 to confirm.</p>	<p>✓ Wetlands within or Adjacent to a Woodland</p>	<p>✓ Wetlands within or Adjacent to a Woodland</p>
37. Deer Movement Corridors				
White-tailed Deer	<ul style="list-style-type: none"> 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) 	<p>No deer movement corridors meeting the SWH criteria have been identified by MNRF to date on the Subject Lands or within the Study Area.</p>	<p>✖</p>	<p>✖</p>

Wildlife Habitat Category and Associated Species and Ecological Land Classification (ELC) Communities	Provincial Guidance for SWH in Ecoregion 6E*	Application to the Subject Lands	Candidate SWH On Subject Lands	Candidate SWH Within Study Area
	<ul style="list-style-type: none">Field Studies must be conducted at the time of year when species are expected to be migrating or moving to and from winter concentration areasCorridors that lead deer to wintering habitat should be unbroken by roads or residential areasCorridors 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			

* 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.