LOCAL SUBWATERSHED STUDY REPORT

MOUNT HOPE WEST
RESIDENTIAL SUBDIVISION
UNITED HOLDINGS INC.

TOWN OF CALEDON

PROJECT 2024-5476 **FEBRUARY 2026**

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Revision	Description	Prepared		Approved	
		By	Date	By	Date
1.0	LSS Draft	Schaeffers	June 2025	Team	June 2025
2.0	LSS Final	Schaeffers	June 2025	K. Shahbikian	June 2025
3.0	Submission 2	Schaeffers	Feb 2026	K. Shahbikian	Feb 2026

Executive Summary

Authors

The Local Subwatershed Study was prepared with input from SGL Inc (planning), GEI Consultants Canada Ltd. (natural heritage), GEO Morphix (fluvial geomorphology), Soil Engineers Ltd. (hydrogeology and geotechnical), Pratus (climate), and Schaeffers & Associates Ltd. (engineering, water resources).

Background

United Holdings Inc. has retained Schaeffers & Associates Ltd. to lead the Mount Hope West Local Subwatershed Study. The study serves to create a sustainable development plan for the Subject Lands in Caledon by protecting and enhancing the natural and human environments by implementing the direction, targets, criteria and guidance of the Region of Peel's Scoped Subwatershed Study. The Local Subwatershed Study components are organized into three phases. The results of each phase are outlined in this document.

The Mount Hope West Area is approximately 31.98 ha in size. The eastern portion of the Subject Lands falls within the Mount Hope West Secondary Plan Area and is the focus of this LSS. The Mount Hope West Area is dominated by agricultural lands. The proposed development includes mixed residential units and commercial lands.

Natural Heritage

GEI Consultants Canada Ltd. (GEI) completed a multi-phase natural heritage review for the Mount Hope West lands in Caledon, Ontario, on behalf of United Holdings Inc., to support the Local Subwatershed Study (LSS) process.

As part of Phase 1, GEI delineated the Existing Natural Heritage System (NHS) through desktop review and ecological field studies conducted between 2022 and 2024. The NHS delineation was based on the presence and extent of natural heritage features such as woodlands, wetlands, watercourses, and other supporting features, natural hazards, and ecological setbacks. The Existing

NHS was compared to the Preliminary NHS identified in the SABE Scoped Subwatershed Study (Wood et al. 2022), which outlined high- and medium-constraint features and established enhancement and linkage goals to support a connected, resilient system. Information collected during Phase 1 formed the basis for identifying key natural heritage features and their ecological features potentially impacted by future development and provided a baseline for the subsequent phases of the study.

In Phase 2, GEI assessed the potential direct, indirect, and induced impacts to the Existing NHS associated with the proposed development. The development will result in the direct removal of four wetland areas in the southern portion of the Subject Lands, totaling approximately 0.69 ha. In addition, a reach of the existing watercourse in the southwestern portion of the site will be realigned to accommodate development. Indirect and induced effects, such as changes to hydrology, construction-related disturbances, and increased anthropogenic activity resulting from future occupancy, were also considered. Mitigation measures have been proposed to avoid, minimize, or manage these potential impacts, including erosion and sediment control (ESC), stormwater management (SWM) measures designed to maintain hydrological balance, construction best practices, installation of rear-lot fencing (without gates) along residential interfaces with the NHS, and the distribution of educational brochures to homeowners. These measures aim to minimize disturbance to retained features and reduce long-term degradation following occupancy.

To address the removal of wetland features and the realignment of the watercourse, a conceptual restoration and enhancement plan was developed to support long-term ecological function and improve the performance of the Proposed NHS. Wetland compensation is proposed at a minimum 1:1 ratio, with approximately 0.69 ha of wetland restoration to be implemented. This includes wetland replication along the realigned channel and the creation of new tableland wetlands within the Greenbelt Lands, forming a more contiguous NHS by connecting existing wetland features. The corridor between the NHS and the proposed development footprint will be seeded with native

groundcover mix to provide a vegetated buffer and enhance natural habitat availability and diversity.

The realigned channel reach has been designed by GEO Morphix using fluvial geomorphic principles, with the goal of restoring natural channel processes, improving aquatic habitat conditions, and integrating wetland and riparian features into a cohesive ecological corridor. It will replace the existing degraded and undefined reach with a longer, meandering channel that mimics natural systems through a shallow–deep undulating form. Additional habitat enhancements—such as pools, woody debris, native plantings, raptor poles, and rock piles—will increase biodiversity and ecological value, while the channel's dimensions and meander belt width are designed to support long-term stability and function.

Following approval of the conceptual restoration and enhancement plan by the relevant reviewing authorities, a detailed design brief will be prepared by a Certified Ecological Restoration Practitioner (CERP) and a Landscape Architect (LA) to guide implementation. This brief will include specific design drawings, species lists, and implementation sequencing. It will also outline a comprehensive monitoring program to evaluate restoration success and an adaptive management strategy to address unexpected outcomes. The monitoring and adaptive management plan—outlined conceptually in Phase 3—will include site-specific performance targets, clear triggers for action, and responsive management measures. Consideration will be given to long-term ecological resilience under changing environmental conditions, including invasive species control, vegetation survivorship, channel stability, and potential human encroachment.

Together, the proposed mitigation measures, restoration design, and monitoring and adaptive management framework support a development approach that balances planning objectives with environmental considerations. This integrated strategy aims to protect the Mount Hope West NHS and its ecological functions over the long term, with the goal of achieving a net ecological gain and contributing to the Town of Caledon's broader goals for sustainable growth and community development.

Fluvial Geomorphology

GEO Morphix completed a fluvial geomorphology assessment along all watercourses within the subject lands and two watercourse reaches east of Mount Hope Road in support of the Local Subwatershed Study (LSS). The desktop component of the assessment included a review of available background reports, mapping and aerial imagery. Previously established reach breaks were also reviewed and subsequently refined based on site-specific field observations.

Geomorphological field observations confirmed that the central tributary has been substantially influenced by existing and historical land uses, including agricultural practices and modification of drainage within the relatively small woodland in the subject lands. The rapid assessment results indicated that the portions of central tributary upstream and downstream of the woodlot were in regime (i.e., generally stable), while the portion of channel within the woodlot was in transition due to evidence of aggradation and widening. The tributary east of Mount Hope Road was reviewed in detail as it is proposed to receive stormwater discharge as part of the development. Overall, the extent of the eastern tributary assessed in the field showed evidence of active erosion and adjustment, with channel widening being the dominant systematic indicator.

The extent of the potential erosion hazard can be used to define, in part, the limit of development. All watercourse reaches within the subject lands were evaluated to have unconfined floodplains and as such, the potential erosion hazard was defined by the meander belt width for each reach. Meander belt widths previously delineated by others for the central tributary were reviewed in the context of field observations collected by GEO Morphix in 2025 and 2026. For the portion of the central tributary proposed for realignment, a meander belt width of 18 m was delineated for existing conditions.

Two stormwater management ponds (SWMPs) are proposed to service the development. One SWMP will be located adjacent to the realigned, naturalized corridor in the southern portion of the subject lands and will outlet to the realigned channel corridor and flow south under Columbia Way. The other SWMP is proposed to discharge to the tributary east of Mount Hope Road. As

the SWMP that outlets to the realigned corridor ultimately discharges to a recently constructed online SWMP south of Columbia Way, no further review of the central tributary was completed. Instead, the erosion mitigation assessment focused on the receiving tributary east of Mount Hope Road and included erosion threshold calculations and erosion exceedance analyses through a comparison of post- and pre-development event-based hydrology modelling provided by Schaeffers Consulting Engineers. Results of the erosion exceedance modelling indicate that the proposed SWM plan effectively reduces erosion potential along the receiving watercourse. In addition, the predicted decreases in erosion potential may help increase channel stability by reducing active degradation and widening within the watercourse east of Mount Hope Road.

The tributary east of Mount Hope Road is proposed to receive discharge from the Mount Hope West Secondary Plan Area and the Bolton North Hill Secondary Plan Area. Surface water quantity monitoring for the tributary east of Mount Hope Road was collected in 2024 and 2025 by others in support of the Bolton North Hill Secondary Plan Area. Surface water data collection will continue in 2026 to ensure sufficient data is collected for calibration. This data will also be used to calibrate the continuous model for the current study. In advance of the calibrated modeling being available, The project team will undertake an interim sensitivity analysis with the currently available model, which will be submitted under separate cover. This approach has been accepted by the Town of Caledon and TRCA for a separate Local Subwatershed Study.

An updated erosion exceedance analysis will be completed using the calibrated continuous hydrology provided by Schaeffers Consulting Engineers, when available. Similar to the event-based analysis completed to date and outlined below, the interim sensitivity analysis and the updated erosion exceedance analysis will use an in-house model to evaluate the potential for changes in key erosion indices within the receiving tributary east of Mount Hope Road. The erosion mitigation analyses will be completed following TRCA (2012) guidelines.

The proposed natural corridor design provides an opportunity to replace the historically impacted and morphologically limited feature with a naturalized corridor containing a meandering channel with shallow and deep undulating typology and an enhanced floodplain. The proposed bankfull

channel was sized to convey the 1.25-year return period event to promote regular inundation of the floodplain. The proposed channel sinuosity results in an increase in channel length when existing (253 m) and proposed (321 m) conditions are compared. Removal of the existing knickpoints near the downstream extent of the reach will also improve fish passage upstream. The naturalized corridor and development plan also accommodates the removal of approximately 0.35 of existing riparian wetland through the creation of approximately 0.26 ha of wetland within the proposed corridor. The balance of the wetland proposed for removal is to be replicated elsewhere in the subject lands. Overall, the proposed design will enhance aquatic and terrestrial habitats and provide a more diverse floodplain. The formalized corridor will also improve the linkage between the natural heritage system south of Columbia Way with the woodlot in the subject lands.

A three year and largely season-based (i.e., spring and fall site visits) post-construction monitoring plan is recommended to ensure that the natural corridor design is implemented and functioning as intended. Annual reporting is to be prepared, which will document construction activities and post-construction monitoring results. In addition to the natural corridor, three years of post-construction monitoring along the tributary east of Mount Hope Road is recommended to review conditions along the receiving watercourse. Reporting is to be completed on an annual basis.

Hydrogeology

United Holdings Inc. retained Soil Engineers Ltd. (SEL) to conduct a hydrogeological assessment for the subject Lands. The current investigation revealed that The Subject Lands lies within the physiographic region of southern Ontario known as the South Slope and the landform is identified as Till Plain (Drumlinized). As well, the Subject Lands are located within an area mapped as Clay to silt-textured till (derived from glaciolacustrine deposits or shale).

The subsoil investigation has revealed that beneath the topsoil veneer, and the Earth fill at the western portion of the site mainly comprises silty clay and silty clay till with interbedded layers of silty fine sand within the northwestern portion of the Subject Site. The Subject Site is identified within a Significant Groundwater Recharge Area (SGRA) according to the regional-scale Source

Water Protection mapping (Source Water Protection Information Atlas). Findings from the current site-specific investigation indicate that the Subject Site is primarily composed of silty clay and silty clay till—soil types known for their low permeability. This is further supported by hydraulic conductivity test results from in-situ hydraulic conductivity tests, which also demonstrated low permeability. Given the site's soil composition and the results of the current investigation, the Subject Site does not exhibit the characteristics of a Significant Groundwater Recharge Area.

Hydrology and Floodplains

The Subject Lands are located within the Main Humber River subwatershed, falling under the jurisdiction of the Toronto and Region Conservation Authority (TRCA). Directly downstream of the site are the Cold Creek West Tributary B and Main Humber Tributary A. The development proposes residential, commercial, and parkland land uses, including a channel realignment near Columbia Way.

Hydrologic modelling was conducted using the TRCA's Visual OTTHYMO (VO) model for future uncontrolled conditions. The TRCA model was updated to reflect the proposed land use changes and refined drainage patterns within the study area. The model scenarios included an assessment of the post development condition of the Subject Site, and a model that includes a proposed development from the Bolton North Hill Landowners Group (BNHG) as well. To support the hydraulic assessment, a HEC-RAS model was developed by joining three existing TRCA models. The 6-hour 100-year storm and regional storm peak flows were used as flow inputs. Proposed floodplain figures were generated based on the model scenario which considers both the post development condition of the Subject Site and the proposed BNHG developments. The Regional Storm was found to be the regulatory storm.

A comparison of results between the model scenarios was completed to assess the impact of development. The results confirmed a lack of significant downstream impacts as a result of the Mount Hope West lands in the post development scenario. Regional controls are not required for the West SWM pond of the Subject Site as impacts to the flows are well contained within the

downstream channel corridors. However, attenuation will be provided for the regional storm event for the West Pond, to the greatest extent possible. Impacts to peak flows at the tributary downstream of the East SWM pond are minimal. Regional controls were required for the East Pond based on consultation with the TRCA. Results for the BNHG Post development model revealed that BNHG will significantly increase flows along the downstream tributary, Main Humber Tributary A, once developed. The increased flows are contained within valley corridors of the Main Humber Tributary. Regional controls are not recommended, however, the requirement for regional controls is subject to review of the TRCA.

Servicing and Stormwater Management

The proposed development is set to include 100 detached houses, 328 semi-detached units, 170 townhouse units, and a 2.65 ha commercial block with a total estimate population of 2555. In phase 1 of the development, it is proposed to include 84 detached houses, 160 semi-detached units, 56 townhouse units, and the 2.65 ha commercial block, with a total estimate population of 1349. The proposed development is expected to be serviced by Pressure Zone 7, ensuring adequate water supply and pressure. Connectivity to the existing municipal system will be established through future infrastructure. Water supply infrastructure around the subject site is expected to commence in 2027 and be completed by 2029. The design demonstrates that the system at the time of construction will be capable of addressing average, peak hour, maximum day, and fire flow demands. A combined maximum demand plus fire flow of 284.14 L/s is required for the subject site. Prior to the construction of the future Region water supply infrastructure, a limited number of units can be developed, mentioned earlier as part of phase 1. A temporary Booster Pumping Station (BPS) is required, as the existing system cannot maintain adequate pressures during the Peak Hour Demand (PHD). For phase 1, a combined maximum demand plus fire flow of 276.10 L/s is required for the subject site.

Sanitary flows from the development will be managed through internal sewers along the proposed road network. The ultimate servicing strategy for these flows will involve utilizing the new proposed trunk sewer on Humber Station Road. The sanitary servicing plan has designed in

conformance with the Region of Peel's design criteria, projecting an estimate total peak flow of 38.02 L/s. The construction of sanitary sewers connecting the subject lands to the proposed system on Emil Kolb Parkway is anticipated to begin in 2027 and conclude in 2029. Prior to the construction of the future Region Sanitary infrastructure, a limited number of units can be developed, as part of phase 1. Modeling for 300 units conducted by the Region of Peel has identified capacity constraints at the Bolton SPS and within the downstream sanitary collection system. It was observed that the equivalent flow rate of 19.09 L/s causes the existing system to surcharge in multiple areas and suggests attenuating the flow on-site by adding equalization volumes at the SPS site. Hence, it seems reasonable to attenuate the phase 1 Peak Wet Weather Flow (PWWF) minus 15 L/s (suggested by the region) at the SPS site to prevent basement flooding.

Stormwater will be managed through a dual-drainage system, where minor flows are conveyed via sewers and major flows are handled by overland routes. Two SWM ponds, the West Pond and East Pond, will be implemented to provide water quality, erosion, quantity, and volume control through filtration. Specifically, these ponds will ensure enhanced water quality treatment (80% TSS removal), erosion control via the detention of the 25 mm rainfall event for 48 hours. Quantity control will be provided for the 2-year to 100-year storm events for the West Pond and the East Pond. In addition, the East Pond will provide quantity control for the regional storm event. While, the West Pond will provide attenuation for the regional storm event to the greatest extent possible. The development also meets the 27 mm volume control target through a combination of filtration beds and other measures. A water balance analysis indicates that the development aims to meet pre-development water balance conditions, with the infiltration deficient being addressed by LID measures such as Infiltration trenches in rear yards and site plan retention. A feature-based water balance analysis also confirms a low risk to impacted wetlands, with any hydrologic changes deemed to be within a reasonable range.

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1.0 Introduction

The Mount Hope West subject area, referred to as the "Subject Lands", is a proposed New Community Area in Caledon located west of Mount Hope Road and north of Columbia Way, acting as an extension to the existing Bolton community. A Secondary Plan and Draft Plan of Subdivision are being completed concurrently. The Subject Lands is registered as part of Lot 5, Concession 4, W.H.S., Town of Caledon (the "Town") within the Regional Municipality of Peel. A location map is shown as **Figure 1.1**.

In correspondence with the Town of Caledon and the Toronto and Region Conservation Authority (TRCA), it was agreed to conduct a Local Subwatershed Study (LSS) for the Subject Lands alone, pertinent to the Secondary Plan and Draft Plan of subdivision. The purpose of the LSS is to create a sustainable development plan for the Subject Lands in Caledon by protecting and enhancing the natural and human environments by implementing the direction, targets, criteria and guidance of the Region of Peel's Scoped Subwatershed Study (SSS) (Wood et al. 2022). The LSS confirms, refines and implements a Natural Heritage System (NHS) and the water resources management approach to protect, rehabilitate, and enhance the natural and water-based environments within the subject site area.

The proposed scope of work for the LSS is outlined in the Local Subwatershed Study Terms of Reference – Mount Hope West document (TOR), submitted to the Town and TRCA in February 2025.

The study components are organized into three phases, per the Town's (2024) *Terms of Reference: Local Subwatershed Studies* (LSS TOR). The results of each phase are outlined in this document and are as follows:

- Phase 1 – Characterization of Existing Conditions and Baseline Inventory
- Phase 2 – Analysis, Impact Assessment, Mitigation and Recommendations
- Phase 3 – Implementation, Monitoring and Adaptive Management

The TRCA's Environmental Impact Statement Guidelines (October 2014) and the TRCA's Master Environmental Servicing Plan Guideline (March 2015) are applied to this LSS. The LSS also follows the requirements of the Region of Peel Official Plan, Town of Caledon Official Plan, (both the in-effect Official Plan and the Future Caledon Official Plan), and the TRCA.

1.1 Background Studies and Guidelines

The Mount Hope West Area is approximately 31.71 ha in size (**Figure 1.1**). The eastern portion of the Subject Lands falls within the Town's Urban Boundary, which is being planned through the Mount Hope West Secondary Plan and Draft Plan of Subdivision, and is the focus of this LSS. The western portion of the Subject Lands falls within the Greenbelt Plan Area (MMA 2017) and is hereafter referred to as the "Greenbelt Lands" (**Figure 1, Appendix A.1.1**).

There are several study components for which their study areas extend beyond the boundaries of the Secondary Plan Area. The disciplines that have Study Areas that differ from the Secondary Plan Area are as described in the following sections.

1.1.1 Natural Heritage Study Area

The Natural Heritage Study Area (NH Study Area) consists of the Secondary Plan Area and the 120 m adjacent lands, as shown in **Figure 1 (Appendix A.1.1)**.

The 120 m adjacent lands allow for the assessment of potential negative impacts on significant natural heritage features and functions in areas where development or site alteration is most likely to have an effect. Where property access to non-participating lands was not available, their characterization is based on air photos, background secondary sources, and surveys from publicly accessible areas.

1.1.2 Fluvial Geomorphic Study Area

The fluvial geomorphology assessment is undertaken for watercourses within the Mount Hope West area, as well as reaches that are proposed to receive stormwater discharge downstream (i.e., east of Mount Hope Road). The assessment for the downstream reaches focuses on a review of

tributary inputs and erosion sensitivity in support of the proposed stormwater management strategy. Watercourse reaches south of Columbia Way were not assessed for erosion sensitivity as a recently constructed online stormwater management pond is present immediately south of the roadway.

1.1.3 Hydrologic Study Area

The Mount Hope West area is located within the middle reaches of the Main Humber subwatershed. The Hydrologic Study Area (HSA) will encompass the Mount Hope West area, in addition to external drainage from lands upstream that flow through the Mount Hope West area. The HSA will also include key flow nodes downstream of the Mount Hope West area up to the confluence with the Main Humber River near King Road and Albion Vaughan Road. These flow nodes will be utilized to compare post-development flows to pre-development flows to assess potential impacts and develop mitigation plans specific to the Mount Hope West area.

1.2 Existing Land Use and Ownership

The Mount Hope West Area is dominated by agricultural lands, with two mapped watercourses, several wetland pockets, and hedgerows. The Humber River and its associated valley occur west of the Study Area. Protected Countryside and the Greenbelt Area lie to the west and north of the site area, making up the headwater lands.

Residential homes front onto portions of the roads surrounding the Mount Hope West area. The developable portion of the Subject Lands is owned by United Holdings Inc.

1.3 Background Studies and Guidelines

There are numerous studies, plans, guidelines, etc. that will provide input and guidance to the preparation of the LSS. The following outlines these studies:

- Provincial Planning Statement (PPS) (MMAH, 2024)
- Region of Peel Official Plan (2022);

- Region of Peel Settlement Area Boundary Expansion Study (SABE), (2022);
- Region of Peel Water and Wastewater Master Plan (2020);
- Region of Peel Environmental Assessment - Bolton Water and Wastewater Capacity Improvements (ongoing);
- Town of Caledon: Development Standards Manual (2019);
- In-effect Town of Caledon Official Plan (Office Consolidation 2024);
- Future Caledon Official Plan (Adopted May 2024, Awaiting Provincial Approval);
- Town of Caledon Growth Management Phasing Plan and Financial Impact Assessment Presentation (2024);
- Municipal Consolidated Linear Infrastructure Environmental Compliance Approvals, Ministry of Environment, Conservation and Parks (MECP), (June 2023);
- Development Charges Background Study – Consolidation Report, The Regional Municipality of Peel (Watson & Associates Economists Ltd., 2020)
- Species at Risk in Ontario (SARO) List, regulation to the Endangered Species Act, 2007 (ESA);
- Ministry of Natural Resources: Natural Heritage Reference Manual: Second Edition (OMNR 2010);
- Humber River Watershed Plan (TRCA, 2008) and any on-going updates including the Humber River Watershed Characterization Report (TRCA, 2023);
- Humber River Watershed Plan Implementation Guide (TRCA, 2008);
- Humber River State of the Watershed Reports (TRCA, 2008);

- Final Report Humber River Hydrology Update (TRCA, 2018);
- Listen to Your River: A Report Card on the Health of the Humber River Watershed (TRCA, 2007);
- Humber River Fisheries Management Plan (MNR and TRCA, 2005);
- TRCA Master Environmental and Servicing Plan Guideline (TRCA, 2015);
- Evaluation, Classification, and Management of Headwater Drainage Features Guidelines (CVC & TRCA, 2014);
- TRCA Guidelines for Review of SWM Pond Location with Respect to Groundwater Conditions;
- TRCA Stormwater Management Criteria Document (TRCA, 2012);
- Erosion and Sediment Control Guide for Urban Construction (TRCA, 2019);
- Crossings Guideline for Valley and Stream Corridors (TRCA, 2015);
- Channel Modification Design and Submission Requirements (TRCA, 2007);
- Technical Guidelines for Flood Hazard Mapping (TRCA and other Conservation Authorities, 2017);
- TRCA/CVC Low Impact Development Stormwater Management Planning and Design Guide (February 2024);
- Geotechnical Engineering Design and Submission Requirements (TRCA November 2017);
- Hydrogeological Assessment Submissions- Conservation Authority Guidelines to Support Development Applications (Conservation Ontario 2013);

- Technical Guide for River & Stream Systems: Erosion Hazard Limit (MNRF, 2002);
- Ministry of the Environment Water Well Records;
- Approved CTC Source Protection Plan (CTC Source Protection Committee, 2022); and,
- Approved Assessment Report: Toronto and Region Source Protection Area (CTC Source Protection Committee, 2022)

Figure 1.1: Location Plan

Phase 1 – Subwatershed Characterization and Baseline Inventory

Phase 1 includes the characterization of existing conditions and development of a baseline inventory. This analysis records, characterizes, and assesses natural hazards and natural heritage features and functions within the Study Area. The analysis provides recommendations for the protection, conservation, and management of natural hazards and natural heritage features within the Secondary Plan Area. Phase 1 characterizes the resources associated with each discipline and across disciplines to accomplish the following, as per the Town's LSS TOR.

2.0 Natural Heritage (Terrestrial and Aquatic Systems)

2.1 Scope Overview

GEI Consultants Canada Ltd. (GEI) conducted a natural heritage review for the Mount Hope West Secondary Plan Area development application. The lands owned by United Holdings Inc. are located north of Columbia Way and west of Mount Hope Road (hereafter referred to as the "Land Holdings"), as shown in **Figure 1 (Appendix A.1.1)**. The eastern portion of the Land Holdings is located within the Mount Hope West Secondary Plan Area, and the western portion is located within the Greenbelt Plan (MMA, 2017).

The natural heritage review was undertaken for the entire NH Study Area, which consists of the Mount Hope West Secondary Plan Area and the 120 m adjacent lands, as illustrated in **Figure 1 (Appendix A.1.1)**. The purpose of this Phase 1 natural heritage study is to support the LSS process by identifying and characterizing the natural heritage features within the NH Study Area and assessing their significance and ecological function.

Through detailed ecological investigations, including feature staking exercises, this study defines the Existing Natural Heritage System (NHS), delineating it based on the greatest extent of natural features and hazards, along with their associated setbacks. The Existing NHS mapping establishes the natural heritage constraints and opportunities for development within the Secondary Plan Area. Additionally, this study compares the Existing NHS with the Preliminary NHS from the SABE Scoped SWS (Wood et al., 2022) and includes a review and refinement of its enhancement and

linkage opportunities.

This study also provides information on the natural heritage planning context and policies relevant to the future proposed development of the Secondary Plan Area, including the Provincial Planning Statement (PPS; MMAH, 2024) and associated provincial guidance in the *Natural Heritage Reference Manual* (NHRM; MNR, 2010), the Peel Regional Official Plan (2022), the Future Caledon Official Plan (2025), and Ontario Regulation (O. Reg.) 41/24, administered by the Toronto and Region Conservation Authority (TRCA).

Key components of this study include:

- Desktop review of natural heritage background information, legislation, regulations, and policies relevant to the NH Study Area;
- Ecological field investigations, including targeted species surveys, to identify and delineate natural heritage features and assess species presence in the NH Study Area;
- Biophysical characterization of the NH Study Area;
- Evaluation of the significance of the identified natural heritage features; and
- Mapping of the Existing NHS.

2.2 Natural Heritage Planning Context and Legislative Framework

The NH Study Area is subject to the policies and provisions of the following legislative, regulatory, and planning documents, along with any related guidance materials that support their implementation:

- PPS (MMAH, 2024) under the *Planning Act*, 1990;
- Greenbelt Plan (MMA, 2017) under the *Greenbelt Act*, 2005;
- Peel Regional Official Plan (2022);
- Future Caledon Official Plan (2025);
- O. Reg. 41/24 under the *Conservation Authorities Act*, 1990, administered by the TRCA;
- Provincial *Endangered Species Act, 2007* and Bill 5;

- Provincial *Fish and Wildlife Conservation Act*, 1997;
- Federal *Fisheries Act*, 1985;
- Federal *Migratory Birds Convention Act, 1994*.

2.2.1 Provincial Planning Statement

The PPS provides policy direction on matters of provincial interest related to land use planning and development. It "supports a comprehensive, integrated and long-term approach to planning." The PPS is to be read in its entirety and land use planners and decision-makers need to consider all relevant policies and how they work together.

This report addresses those policies that are specific to Natural Heritage (Section 4.1). Eight types of natural heritage features and areas are defined in the PPS, as follows:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat (SWH);
- Fish habitat;
- Habitat of endangered and threatened species; and
- Significant Areas of Natural and Scientific Interest (ANSIs).

The PPS states that development and site alteration shall not be permitted in significant wetlands within Ecoregions 5E, 6E, and 7E, or in significant coastal wetlands. Development and site alteration are also not permitted in fish habitat or in the habitat of endangered and threatened species, except in accordance with provincial and federal requirements.

Development and site alteration shall not be permitted in significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E, and 7E; non-significant coastal wetlands in Ecoregions 5E, 6E, and 7E; significant woodlands in Ecoregions 6E and 7E; significant valleylands in Ecoregions 6E

and 7E; SWH; significant ANSIs, or on adjacent lands to any of the previously noted natural heritage features and areas (except for the habitat of endangered and threatened species), unless it is demonstrated that there will be no negative impacts on the natural features or their ecological functions.

Of note, adjacent lands are defined in the PPS as "those lands contiguous to a specific natural heritage feature or area where it is likely that development or site alteration would have a negative impact on the feature or area. The extent of the adjacent lands may be recommended by the Province or based on municipal approaches which achieve the same objectives."

2.2.2 Greenbelt Plan

The Greenbelt Plan (MMA, 2017) was created to provide permanent protections for the agricultural land base and the ecological and hydrological features, areas, and functions within the Greater Golden Horseshoe. The Greenbelt Plan, together with other provincial plans, builds on the PPS to establish a land use planning framework for the Greater Golden Horseshoe that supports a thriving economy, a clean and healthy environment, and social equity.

As described within Section 2 of the Greenbelt Plan, the Greenbelt Area includes lands within the Oak Ridges Moraine Area, the Niagara Escarpment Plan Area, the Parkway Belt West Plan Area, and lands designated as Protected Countryside and as Urban River Valley.

According to *Schedule 1: Greenbelt Area* and as shown in **Figure 2 (Appendix A.1.1)**, the western portion of the Land Holdings is designated as Protected Countryside. Per *Schedule 4: Greenbelt Natural Heritage System*, these lands are also located within the Greenbelt Plan NHS. The Greenbelt Plan NHS is not a land use designation; rather, it is an overlay on top of the Protected Countryside designation.

The Greenbelt Plan sets out policies to protect key natural heritage features (KNHFs), key hydrologic features (KHFs), and key hydrologic areas (KHAs).

KNHFs include the following:

- Habitat of Endangered and Threatened species;
- Fish habitat;
- Wetlands;
- Life Science ANSIs;
- Significant valleylands;
- Significant woodlands;
- SWH (including habitat of Special Concern species);
- Sand barrens, savannahs, and tallgrass prairies; and
- Alvars.

KHFs include the following:

- Permanent and intermittent streams;
- Lakes (and their littoral zones);
- Seepage areas and springs; and
- Wetlands.

KHAs include the following:

- Significant groundwater recharge areas;
- Highly Vulnerable Aquifers; and
- Significant surface water contribution areas.

Per Section 3.2.5 of the Greenbelt Plan, development and site alteration are prohibited within KNHFs, KHFs, and their associated Vegetation Protection Zones (VPZs), except for uses such as infrastructure, conservation, or flood control projects that meet the criteria set out in the plan. For proposals within 120 m of KNHFs or KHFs, a Natural Heritage Evaluation or Hydrological Evaluation must demonstrate that there will be no negative impacts on their ecological or hydrological functions and must also identify VPZs that are sufficient to protect the features and are maintained as natural, self-sustaining vegetation.

Several sections of the Greenbelt Plan address infrastructure encroachment into the Greenbelt NHS. Section 3.2.2.3 provides the overarching policy requirements associated with development and site alteration in the Greenbelt NHS:

> "*New development or site alteration in the Natural Heritage System (as permitted by the policies of this plan) shall demonstrate that:*
>
> a) *There will be no negative impacts on key natural heritage features or key hydrologic features or their functions;*
> b) *Connectivity along the system and between key natural heritage features and key hydrologic features located within 240 m of each other will be maintained or, where possible, enhanced for the movement of native plants and animals across the lands.*"

Section 3.2.5.1 of the Greenbelt Plan identifies the types of development and site alteration that are permitted in the Greenbelt NHS (subject to other policies, where relevant):

> "*Development or site alteration is not permitted in key hydrologic features and key natural heritage features within the Natural Heritage System, including any associated vegetation protection zone, with the exception of:*
>
> *a) Forest, fish and wildlife management;*
> *b) Conservation and flood and erosion control projects, but only if they have been demonstrated to be necessary in the public interest and after all alternatives have been considered; or*
> *c) Infrastructure, aggregate, recreational, shoreline and existing uses, as described by and subject to the policies of section 4*."

Section 4.2.1.1 of the Greenbelt Plan provides the following general infrastructure policy:

> "*All existing, expanded or new infrastructure subject to and approved under the Canadian Environmental Assessment act, the Environmental Assessment Act, the Planning Act, the Aggregate Resources Act or the Telecommunications Act or by*

the National or Ontario Energy Boards, or which receives a similar environmental approval, is permitted within the Protected Countryside, subject to the policies of this section and provided it meets one of the following to objectives:

a) It supports agriculture, recreation and tourist, Towns/Villages and Hamlets, resource use or the rural economic activity that existing and is permitted within the Greenbelt; or

b) *It serves the significant growth and economic development expected in southern Ontario beyond the Greenbelt by providing for the appropriate infrastructure connections among urban centres and between these centres and Ontario's borders*."

Section 4.2.1.2 of the Greenbelt Plan provides additional policy criteria for permitted infrastructure.

2.2.3 Settlement Area Boundary Expansion Studies

The SABE study conducted by the Region of Peel was used to inform the implementation of the Peel Regional Official Plan (2022). The SABE study identified locations for new community and employment lands in the Town of Caledon to accommodate growth through 2051. The study also delineated the "Natural Environment System within New Community Areas," integrating it into the Peel Regional Official Plan policies and mapping for the "2051 New Urban Area."

To support the SABE study and Peel Regional Official Plan and to better understand environmental conditions, impacts, and management opportunities, two technical documents were prepared by Wood Environment & Infrastructure Solutions Canada Ltd. (Wood): An Environmental Screening Report (Wood, 2020) and a Scoped SWS (Wood et al., 2022; prepared in collaboration with consultants specializing in ecology, fisheries, hydrogeology, and stream morphology).

The SABE Scoped SWS technical document has three parts:

- Part A – Characterization
- Part B – Impact Assessment
- Part C – Implementation Plan

The NH Study Area for this LSS falls within the SABE boundary, and as such, desktop data from these reports were used to inform this LSS.

2.2.3.1 Environmental Screening Report (Wood, 2020)

The SABE Environmental Screening Report (Wood, 2020) initial study area analyzed all lands in the Region of Peel outside of existing settlement areas and the Greenbelt Plan (MMA, 2017). Natural features were categorized into three preliminary constraint levels:

- **High Constraint:** Mapped natural environment features and areas with existing designations or significance that afford them protection under current provincial or municipal plans/policies. These areas prohibit development.
- **Medium Constraint:** Mapped natural environment features and areas that may, through further assessment, represent constraints to development or indicate potentially significant functions. This category also includes portions of non-provincial NHS outside of High Constraint features—typically corridors and linkages that may constrain development but require refinement through further study. Medium Constraint areas may be upgraded to High Constraint or determined to have little or no constraint as additional information becomes available.
- **Low Constraint:** Mapped natural environment areas that, based on current knowledge, do not preclude development but may influence land use planning (e.g., densities, development types). These areas may require additional studies, enhanced management, or other considerations that could increase development complexity or management needs.

2.2.3.2 Scoped Subwatershed Study (Wood et. al., 2022)

The preliminary high and medium constraint features identified in the SABE Environmental

Screening Report were used to refine the focus study area for the SABE Scoped SWS (Wood et al., 2022):

- **Preliminary High Constraint Features:**
  - Provincially Significant Wetlands (PSWs)
  - Provincial NHSs, including the Greenbelt NHS within the Study Area
  - Significant woodlands (Core Woodlands, Region of Peel OP, 2022)
  - ANSIs
  - Environmentally Sensitive Areas (Region of Peel OP, 2022)
  - Significant valleylands
  - Other valleylands
  - Permanent and intermittent watercourses
- **Preliminary Medium Constraint Features:**
  - Other wetlands
  - Other woodlands
  - Other drainage features (e.g., headwater drainage features [HDFs])
  - Seepage areas and springs
  - Municipal NHSs

The SABE Scoped SWS primarily relied on desktop data, and as such significance of natural heritage features was not always determined. This LSS aims to obtain site-specific field data to better assess high- and medium-constraint features.

2.2.3.2.1 Preliminary Natural Heritage System

The following NHS feature types were identified and integrated into the overall Preliminary NHS for the SABE Scoped SWS (Figure DA2-11b, Appendix D of Part C):

- **Key Features** – Features recommended for protection within a connected NHS:
  - Woodlands, wetlands, valleylands;
  - Environmentally Sensitive/Significant Areas;

  - SWH;
  - Fish habitat;
  - Provincially and regionally significant ANSIs;
  - Habitat for Endangered and Threatened Species;
  - HDFs classified as Protection or Conservation;
  - KNHFs & KHFs (Greenbelt Plan); and
  - Sand Barrens, Savannahs, and Grasslands (per provincial plans or ELC classifications).
- **Supporting Features** – Features requiring further assessment to determine if they meet Key Feature criteria or contribute to the NHS:
  - Woodlands, wetlands, valleylands;
  - Regionally significant Earth Science ANSIs;
  - HDFs identified as Mitigation;
  - Successional habitats; and
  - Open aquatic habitats.
- **Other Features** – Features requiring additional study to determine status within the NHS:
  - Woodlands;
  - Wetlands;
  - Successional habitats;
  - Open aquatic habitats; and
  - NHS Targets & Enhancement Goals.

Section 2.1.3 of Part C of the SABE Scoped SWS (Wood et al., 2022) technical document states:

> *"Due to the scoped nature of the Scoped SWS, it is acknowledged that the areas mapped through this study* ***may be refined or confirmed through more detailed local levels of study****. This may* ***include features confirmation (category – Key, Supporting, Other), refined boundary delineation,*** *and detailed implementation of the linkages, enhancement and mitigation measures (e.g., buffers) as informed by site-specific study (i.e., field work) subject to the recommendations of this*

> *study. This report sets out the **framework and targets** for implementation for the NHS and **provides guidance** to support subsequent phases of work. System targets have a strong focus on enhancement through robust linkages and enhancement areas; **these targets are to be implemented through detailed studies and through policy**."* **[emphasis added]**

The framework, targets, and guidance of the SABE Scoped SWS technical document are implemented through the policies of the Peel Regional Official Plan and the Future Caledon Official Plan, discussed in **Sections 2.2.4 and 2.2.5**.

As recommended by the SABE Scoped SWS technical document, this LSS presents the results of site-specific field data collection and significance analysis for the natural heritage features of the Land Holdings, based on which the SABE Scoped SWS's Preliminary NHS will be updated. This update will include confirmation of feature categories (i.e., Key, Supporting, Other) and a review and refinement of enhancement and linkage opportunities.

2.2.3.2.2 Natural Heritage System Targets and Enhancement Goals

The SABE Scoped SWS outlines recommended targets for the NHS within the SABE area:

- **Natural cover:** no net loss;
- **Wetlands:** no net loss of wetland cover; increase total wetland cover through NHS enhancements;
- **Valley and stream corridors:** no net loss of ecological and hydrological functions; increase natural cover within these corridors through enhancements;
- **Successional and open habitats:** Maintain important existing successional/open habitats contiguous to other features and areas of the NHS; increase representation and quality of open country habitats across the landscape through NHS enhancement opportunities; strive to create at least one habitat area with a minimum size threshold of 5 ha;
- **Aquatic:** achieve 75% naturally vegetated watercourse length through protection, enhancement or restoration;

- **Sand barrens, savannahs, grasslands:** protect these where they occur; and
- **NHS enhancements:** identify and distribute enhancement opportunities across the NHS to support a robust and sustainable system; increase natural cover by 30%.

2.2.4 Peel Regional Official Plan

The Peel Regional Official Plan (2022) was adopted by the Region of Peel Council on April 28, 2022, and approved by the Minister of Municipal Affairs and Housing (MMAH) on November 4, 2022. The Peel Regional Official Plan is intended to guide future planning activities within the Region and provide direction to those initiatives that aim to improve the existing physical environment. This Plan also provides direction and support to local municipalities in the development of their Official Plans and future planning activities. As per Ontario Bill 23 (*More Homes Built Faster Act*, 2022) and Bill 185 (*Cutting Red Tape to Build More Homes Act*, 2024), the Peel Regional Official Plan has been, as of July 1, 2024, deemed to constitute an Official Plan of Peel's lower-tier municipalities: Caledon, Brampton, and Mississauga.

The eastern portion of the Land Holdings is designated as "Urban System" and "2051 New Urban Area" in *Schedule E1: Regional Structure*. The Peel Regional Official Plan directs urban development and redevelopment to Urban System areas. The western portion of the Land Holdings, located in the Greenbelt Plan (MMA, 2017), is also included within the regional "Greenlands System" overlay designation per *Schedule C1: Greenlands System*, with some "Core Areas" mapped in *Schedule C2: Core Areas of the Greenlands System in Peel*.

Schedule A-1: Water Resource System Features & Areas identifies several watercourses within the NH Study Area. According to Section 2.6.6 of the Official Plan, the Region of Peel directs local municipalities to further interpret, refine, identify, or designate "Water Resource System" features and areas within their Official Plans, as appropriate. The Land Holdings are also largely mapped within a "Significant Groundwater Recharge Area" in *Schedule A3: Significant Groundwater Recharge Areas*.

2.2.4.1 Greenlands System

The Greenlands System is governed through detailed land use policies in Section 2.14 of the Peel Regional Official Plan. The Official Plan natural heritage feature designations of the Greenlands System are "Core Areas", "Natural Areas and Corridors", and "Potential Natural Areas and Corridors," with definitions, interpretation guidance, and policy direction for these designations outlined in Sections 2.14.5 through 2.14.42 of the Official Plan. These policies include a requirement for proponents of development or site alteration within natural heritage features and areas identified as Greenlands System Core Areas, or on lands adjacent to these features and areas, to conduct an environmental impact study.

Section 2.14.5 defines the **Greenlands System** as being made up of the following components:

> *"a) Core Areas, which are designated and shown generally on Schedule C-2, which are protected, restored and enhanced in this Plan and in the local municipal official plans;*
> *b) Natural Areas and Corridors, which will be interpreted, protected, restored, and enhanced and shown, as appropriate, in the local municipal official plans;*
> *c) Potential Natural Areas and Corridors, which will be interpreted, protected, restored, and enhanced and shown, as appropriate, in the local municipal official plans. Potential Natural Areas and Corridors will be analyzed to determine their functional role in supporting and enhancing the ecological integrity of the Greenlands System;*
> *d) The Natural Heritage System overlay of the Growth Plan and the key natural heritage features and key hydrologic features, which will be protected in accordance with the Plan;*
> *e) The Natural Heritage System overlay of the Greenbelt Plan and the key natural heritage features and key hydrologic features, which will be protected in accordance with the Plan;*
> *f) Urban River Valleys of the Greenbelt Plan, which will be protected and, where appropriate, restored, in accordance with the policies of this Plan;*

g) The Natural Core Areas and Natural Linkage Areas land use designations of the Oak Ridges Moraine Conservation Plan and the key natural heritage features and key hydrologic features, which will be protected in accordance with the Plan; and
h) The Escarpment Natural Area and Escarpment Protection Area land use designations of the Niagara Escarpment Plan and the key natural heritage features and key hydrologic features, which will be protected in accordance with the Plan."

2.2.4.1.1 Core Areas

Section 2.14.5 identifies the **Core Areas** of the Greenlands System as being made up of the following components:

"a) significant wetlands;
b) significant coastal wetlands;
c) woodlands meeting one or more of the criteria for Core Area woodland in Table 1;
d) Environmentally Sensitive or Significant Areas;
e) Provincial Life Science Areas of Natural and Scientific Interest;
f) Escarpment Natural Areas of the Niagara Escarpment Plan; and
g) valley and stream corridors meeting one or more of the criteria for Core Area valley and stream corridors in Table 2 and as shown on Schedule C-2."

2.2.4.1.2 Natural Areas and Corridors

Section 2.14.18 identifies the **Natural Areas and Corridors** of the Greenlands System as being made up of the following components:

"a) evaluated non-provincially significant wetlands and coastal wetlands;
b) woodlands meeting one or more of the criteria for NAC woodland in Table 1;
c) significant wildlife habitat meeting one or more of the criteria in the Ministry of Northern Development, Mines, Natural Resources and Forestry's Significant Wildlife Habitat Technical Guide and associated Criteria Schedules for Ecoregions 6E and 7E;

d) fish habitat;

e) habitat of aquatic species at risk;

f) habitat of endangered and threatened species defined in accordance with the Endangered Species Act;

g) regionally significant life science Areas of Natural and Scientific Interest;

h) provincially significant earth science Areas of Natural and Scientific Interest;

i) Escarpment Protection Areas of the Niagara Escarpment Plan;

j) the Lake Ontario shoreline and littoral zone and other natural lakes and their shorelines;

k) any other valley and stream corridors that have not been defined as part of the Core Areas;

l) sensitive headwater areas and sensitive ground water discharge areas; and

m) any other natural features and functional areas interpreted as part of the Greenlands System Natural Areas and Corridors by the local municipalities, in consultation with the conservation authorities and the Ministry of Northern Development, Mines, Natural Resources and Forestry, including, as appropriate, elements of the Potential Natural Areas and Corridors."

2.2.4.1.3 Potential Natural Areas and Corridors

Section 2.14.19 identifies the **Potential Natural Areas and Corridors** of the Greenlands System as being made up of the following components:

"a) unevaluated wetlands and coastal wetlands;

b) cultural woodlands and cultural savannahs within the Urban System meeting one or more of the criteria for PNAC woodland in Table 1. The evaluation of cultural woodlands and cultural savannahs is also subject to Policy 2.14.29;

c) any other woodlands greater than 0.5 hectares;

d) regionally significant earth science Areas of Natural and Scientific Interest;

e) sensitive ground water recharge areas;

f) portions of Historic shorelines;

g) open space portions of the Parkway Belt West Plan Area;

h) enhancement areas, buffers and linkages; and

i) any other natural features and functional areas interpreted as part of the Greenlands System Potential Natural Areas and Corridors, by the individual local municipalities in consultation with the conservation authorities."

2.2.5 Future Caledon Official Plan

The Future Caledon Official Plan (2025) was adopted by the Town Council on March 26th, 2024, and approved by the MMAH on October 22, 2025. The Town of Caledon completed a Growth Management & Phasing Plan in 2024 to implement the Future Caledon Official Plan. The Mount Hope West Lands are included in Phase 1 of the Growth Management Plan, prioritizing their development in alignment with the Town's long-term growth objectives.

The eastern portion of the Land Holdings is delineated as "Urban Area" in *Schedule B1: Town Structure*. The Urban Area includes the undeveloped new urban land that was approved through the Peel Regional Official Plan (2022) and is expected to accommodate most of the Town's population and employment growth over the next 30 years and beyond. These lands are further classified as "New Urban Area 2051" in *Schedule B2: Growth Management* and designated as "New Community Area" in *Schedule B4: Land Use Designations*.

Schedule D1: Natural Environment System and *D2b: New Urban Area Preliminary Natural Environment System* identify "Natural Features and Areas" within the Greenbelt Plan (MMA, 2017) and "Permanent and Intermittent Streams" and "Supporting Features and Areas" within both the Greenbelt Plan Area and the Secondary Plan Area. Additionally, the Secondary Plan Area is also mapped as a "Significant Groundwater Recharge Area" per *Schedule D4b: Significant Groundwater Recharge Areas*.

2.2.5.1 Natural Environment System

The Natural Environment System is governed through detailed land use policies in Section 13 of the Future Caledon Official Plan. The Official Plan natural heritage feature designations and

overlay designations are "Natural Features and Areas" and "Supporting Features and Areas," respectively, with definitions, interpretation guidance, and land use policies for these designations outlined in Sections 13.3 and 13.4.

Section 13.2.1 defines the Town's **Natural Environment System** as being made up of the following components:

> *"a) Core Areas of the Greenlands System as identified and protected in the Region of Peel Official Plan, and which are designated Natural Features and Areas (NFA) by this Plan;*
> *b) Natural Areas and Corridors and Potential Natural Areas and Corridors of the Greenlands System as identified and protected in the Region of Peel Official Plan, and which are designated Supporting Features and Areas (SFA) by this Plan;*
> *c) the Greenbelt Plan Natural Heritage System;*
> *d) the Greenbelt Plan Urban River Valleys;*
> *e) the Natural Heritage System for the Growth Plan;*
> *f) the Natural Core Area and Natural Linkage Area designations within the Oak Ridges Moraine Conservation Plan;*
> *g) the Escarpment Natural Area and Escarpment Protection Area designations within the Niagara Escarpment Plan;*
> *h) Provincially significant Earth Science Areas of Natural and Scientific Interest within the Niagara Escarpment Plan Area;*
> *i) regionally significant Earth Science Areas of Natural and Scientific Interest within the Niagara Escarpment Plan Area; and*
> *j) The water resource system which includes permanent and intermittent streams, wetlands, seepage areas and springs, kettle lakes, highly vulnerable aquifers and significant groundwater recharge areas and Areas of High and Low Aquifer Vulnerability within the Oak Ridges Moraine Conservation Plan area."*

Section 13.10 sets out the policies for the Natural Environment System in New Community Areas, which were identified through the Peel Region's 2022 SABE Scoped SWS (Wood et al.,

2022). The Official Plan requires an LSS, or equivalent study, prepared to the satisfaction of the Town in order to inform the identification and refinement of the Natural Environment System within each Secondary Plan area and to support new development in the New Community Areas. Section 13.10.1 a) iv) states that the LSS must "*review, confirm and refine the Preliminary Natural Environment System shown on Schedules D2a and D2b, New Urban Area Preliminary Natural Environment System*."

2.2.5.1.1 Greenbelt Natural Heritage System

The Future Caledon Official Plan indicates that the Greenbelt NHS is a component of the Town's Natural Environment System. Section 13.2.2 states that "*the Natural Features and Areas designation and Supporting Features and Areas overlay designation apply through the Town of Caledon and may be more restrictive than provincial plans* […]"

Section 13.5 outlines policies for the Greenbelt NHS and KHFs. Section 13.5.1 identifies activities permitted within KHFs and KNHFs (including their VPZs) within the Greenbelt NHS, including, but not limited to:

> "a) *Forest, fish and wildlife management;*
> *b) Conservation and flood and erosion control projects, but only if they have been demonstrated to be necessary in the public interest and after all alternatives have been considered* […]"

Section 13.5.2 provides criteria for with development and site alteration within the Greenbelt NHS, which include the following:

> "a) *There are no negative impacts on key natural features or key hydrologic features or their functions, to the satisfaction of the Town;*
> *b) Connectivity along the system and between key natural heritage features and key hydrologic features located within 240 m of each other will be maintained or, where possible, enhanced for the movement of native plants and animals across the landscape;*

c) the removal of other natural features not identified as key natural heritage features and key hydrologic features is avoided, where possible. Such features should be incorporated into the planning and design of the proposed use wherever possible […]"

2.2.5.1.2 Natural Features and Areas

Section 13.3.1 states that the **Natural Features and Areas** designation corresponds to the Core Areas of the Greenlands System as identified in the Peel Regional Official Plan (2022). The Natural Features and Areas designation includes the following:

"a) Provincially Significant Wetlands;
b) Woodlands meeting one or more of the criteria for Core Area woodland on Table 1 of the Region of Peel Official Plan;
c) Significant valleylands
d) Environmentally Sensitive or Significant Areas;
e) Provincial Life Science Areas of Natural and Scientific Interest;
f) The Escarpment Natural Area designation of the Niagara Escarpment Plan; and
g) Valley and stream corridors meeting one or more of the criteria for Core Area valley and stream corridors in Table 2 of the Region of Peel Official Plan."

Section 13.3.3 identifies activities that are permitted within the Natural Features and Areas designation. These include, but are not limited to, "*forest, fish and wildlife management*" and "*conservation and flood and erosion control projects, but only if they have been demonstrated to be necessary in the public interest and after all reasonable alternatives have been considered*."

Section 13.3.4 indicates that, for activities permitted within the Natural Features and Areas designation:

"D*evelopment and site alteration will only be permitted if it has been demonstrated to the satisfaction of the Town, that there will be no negative impacts on the natural feature or their ecological function, and that*

a) There is no reasonable alternative location outside of the Natural Features and Areas designation and use, development or site alteration is directed away from the Natural Features and Areas designation to the greatest extent possible

b) If avoidance is not possible, the impact to the feature is minimized;

c) Any impact to the feature or its function is mitigated through restoration enhancement to the greatest extent possible; and

d) Where ecosystem compensation is determined to be appropriate and feasible, including for essential infrastructure, it may be considered in accordance with Town ecosystem compensation guidelines and applicable Conservation Authority requirements."

2.2.5.1.3 Supporting Features and Areas

Section 13.4.1 states that the **Supporting Features and Areas** overlay designation corresponds to the Natural Areas and Corridors and Potential Natural Areas and Corridors of the Greenlands System as identified in the Peel Regional Official Plan. The Supporting Features and Areas overlay designation includes the following:

"a) Evaluated non-provincially significant wetlands;

b) Un-evaluated wetlands;

c) Woodlands meeting one or more of the criteria for a Natural Areas and Corridors woodland in Table 1 of the Region of Peel Official Plan;

d) Cultural woodlands and cultural savannas within the Urban System meeting one or more of the criteria for a Potential Natural Area and Corridor woodland in Table 1 of the Region of Peel Official Plan;

e) Any other woodland greater than 0.5 hectares that does not meet the criteria for a Natural Areas and Corridors woodland in Table 1 of the Region of Peel Official Plan;

f) Significant wildlife habitat meeting one or more of the criteria in the Ministry of Northern Development, Mines, Natural Resources and Forestry significant wildlife

habitat technical guide, but located outside of an applicable Provincial plan area;

g) Fish habitat;

h) Habitat of aquatic species at risk;

i) Habitat of endangered species and threatened species;

j) Regionally significant Life Science Areas of Natural and Scientific Interest;

k) Provincially significant Earth Science Areas of Natural and Scientific Interest outside of the Niagara Escarpment Plan Area;

l) The Escarpment Protection Area designation of the Niagara Escarpment Plan;

m) Any other valley and stream corridor that have not been defined as meeting one or more of the criteria for Core Area valley and stream corridors in Table 2 of the Region of Peel Official Plan;

n) Sensitive head water areas and sensitive groundwater discharge areas;

o) Regionally significant Earth Science Areas of Natural and Scientific Interest outside of the Niagara Escarpment Plan Area;

p) Sensitive groundwater recharge areas;

q) Enhancement areas;

r) Linkages; and

s) Vegetation protection zones identified in Provincial plans and buffers outside of Provincial plan areas."

Permitted uses within the Supporting Features and Areas overlay designation are those permitted in the Greenbelt NHS (as outlined in **Section 2.2.2**). The Town's criteria for development and site alteration within the Natural Features and Areas designation outlined in **Section 2.2.5.1.1** also apply to development within the Supporting Features and Areas overlay designation.

2.2.6 Toronto and Region Conservation Authority

The NH Study Area is located within the jurisdiction of the TRCA. O. Reg. 41/24 allows Conservation Authorities to implement Section 28 of the *Conservation Authorities Act, 1990* (amended 2024), which states under Section 28(1) that:

> 28 (1) *No person shall carry on the following activities, or permit another person to carry on the following activities, in the area of jurisdiction of an authority:*
>
> *1. Activities to straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream or watercourse or to change or interfere in any way with a wetland.*
>
> *2. Development activities in areas that are within the authority's area of jurisdiction and are,*
>
> *i. hazardous lands,*
>
> *ii. wetlands,*
>
> *iii. river or stream valleys the limits of which shall be determined in accordance with the regulations,*
>
> *iv. areas that are adjacent or close to the shoreline of the Great Lakes-St. Lawrence River System or to an inland lake and that may be affected by flooding, erosion or dynamic beach hazards, such areas to be further determined or specified in accordance with the regulations, or*
>
> *v. other areas in which development should be prohibited or regulated, as may be determined by the regulations. 2017, c. 23, Sched. 4, s. 25.*

Pursuant to O. Reg. 41/24, any interference with or development in or on areas stated in the *Conservation Authorities Act* (e.g., hazardous lands, wetlands, river or stream valleys) requires permission from the Conservation Authority. The Conservation Authority may issue permits under Section 28.1 and may attach conditions on the permits per Section 9(1) of the Regulation.

The TRCA Regulation Mapping (2024) tool identifies several regulated areas within the NH Study Area, including areas in the northern and southern portion mapped as watercourses with a meander belt and flood hazards (engineered) as well as four PSWs and their areas of interference.

The TRCA's *The Living City* (2014) outlines the principles, goals, objectives, and policies

approved by the TRCA to guide their planning and development approvals process. This document includes policies for determining the Natural System and provides recommendations for buffer widths to protect natural heritage features such as woodlands, wetlands, and valley and stream corridors.

2.2.7 Endagered Species Act, 2007 and Bill 5

The Ministry of the Environment, Conservation and Parks (MECP) administers the provincial *Endangered Species Act, 2007* (amended 2021), which was developed to:

- Identify species at risk (SAR), based upon best available science;
- Protect SAR and their habitats and to promote the recovery of SAR; and
- Promote stewardship activities that would support those protection and recovery efforts.

The *Endangered Species Act* protects all Threatened, Endangered, and Extirpated species listed on the *Species at Risk in Ontario List* (SARO; O. Reg. 230/08). These species are legally protected from harm or harassment, and their habitats are legally protected from damage or destruction, as defined under the *Endangered Species Act*.

On April 17, 2025, the Government of Ontario introduced Bill 5, the *Protect Ontario by Unleashing our Economy Act, 2025*. On June 5, 2025, Bill 5 received Royal Assent, and it will modify and eventually replace the *Endangered Species Act* on a date to be determined. Upon its enactment, the *Endangered Species Act* and its associated regulations will be repealed.

The *Species Conservation Act, 2025* provides many of the same protections to SAR, with notable changes including the following:

- Revised definition of “habitat”;
- Removal of “harass” from the list of prohibited activities;
- Introduction of an online project registration system; and
- Expansion of eligibility for registration.

2.2.8 Fish and Wildlife Conservation Act, 1997

The Ministry of Natural Resources (MNR) administers the *Fish and Wildlife Conservation Act*, 1997, which governs the protection, management, and sustainable use of Ontario's fish and wildlife resources. The *Fish and Wildlife Conservation Act* establishes rules for activities such as hunting, fishing, and trapping, and provides measures to support the conservation of wildlife populations and their habitats.

Under the *Fish and Wildlife Conservation Act*, specific features used by wildlife receive legal protection. Examples include beaver dams and the dens of Black Bear and furbearing mammals, which are protected from damage or destruction, except in circumstances exempted for licensed trappers or for certain species (e.g., fox and skunk). The *Fish and Wildlife Conservation Act* also protects the nests and eggs of bird species that are not protected under the *Migratory Birds Convention Act* and are not otherwise excluded under the *Fish and Wildlife Conservation Act*.

2.2.9 Fisheries Act, 1985

Fisheries and Oceans Canada (DFO) administers the federal *Fisheries Act, 1985* (amended 2019), which defines fish habitat as "spawning grounds and 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". The *Fisheries Act* prohibits the death of fish by means other than fishing and the harmful alteration, disruption, or destruction of fish habitat (HADD). A HADD is defined as "any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat's capacity to support one or more life processes" (DFO, 2019a).

Some projects may be eligible for exemption from the DFO review process, as specified under Step 3 of the DFO Fish and Fish Habitat Protection Program review process (DFO, 2019b). All other projects or activities that have the potential to impact fish or fish habitat should be submitted to DFO through the "Request for Review" process. DFO will review the proposed project to determine whether there is potential to:

i. Impact an aquatic SAR;

ii. Cause the death of fish; or

iii. Result in HADD of fish habitat.

The death of fish by means other than fishing or a HADD of fish habitat can be authorized by DFO under paragraphs 34.4(2)(b) or 35(2)(b) of the *Fisheries Act*. Authorizations require the preparation and submission of an application package identifying the impacts on fish and fish habitat; the avoidance, mitigation, and offsetting measures that will be implemented; and any monitoring that is proposed.

2.2.10 Migratory Birds Convention Act, 1994

Environment and Climate Change Canada (ECCC) administers the *Migratory Birds Convention Act, 1994* (amended 2017), which protects the nests of migratory bird species from destruction, including incidental take (i.e., the unintentional destruction of a nest), as well as from disturbance. The *Migratory Birds Convention Act* does not provide a set date when activities, such as tree removal, can be completed without the risk of incidental harm to the nests of birds. The requirement to ensure that there are no active bird nests present within the work area rests with the proponent of the activity.

2.3 Gap Analysis and Data Collection Approach and Methods

The existing natural heritage planning and legislative framework, the SABE Scoped SWS (Wood et al., 2022), and other relevant background reports were reviewed to inform baseline monitoring and ecological field investigations for the LSS. A comprehensive ecological field program was developed to characterize natural heritage features and functions, identify setbacks, refine the Preliminary NHS from the SABE Scoped SWS, and assess natural heritage constraints to development. This program is further detailed below.

GEI used two levels of investigation to obtain detailed information on natural heritage features and functions within the NH Study Area: a background review of existing information sources and detailed field surveys and assessments to gather site-specific ecological data. The following sections describe each level of investigation in further detail.

2.3.1 Background Review

GEI reviewed the following background materials to identify existing natural heritage information and assess potential species presence for the NH Study Area:

- *The Physiography of Southern Ontario*, 3rd Edition (Chapman & Putnam, 1984);
- Aerial imagery (e.g., First Base Solutions, Google);
- MNR Geospatial Ontario datasets through the *Ontario GeoHub* platform and the related *Make a Map: Natural Heritage Areas* (2024) mapping tool;
- MNR Natural Heritage Information Centre (NHIC) database accessed via the *Make a Map: Natural Heritage Areas* (2024) mapping tool;
- MECP guidance on bat SAR (2022);
- Birds Canada's *Ontario Breeding Bird Atlas* (OBBA; Cadman et al., 2007);
- Ontario Nature's *Ontario Reptile and Amphibian Atlas* (2024);
- Toronto Entomologists' Association's *Ontario Butterfly and Moth Atlases* (2024a, 2024b);
- DFO's *Canadian Aquatic Species at Risk* distribution mapping (2024); and
- Citizen science databases (i.e., *iNaturalist* [2024] and *eBird* [2024]).

The results of the background review can be found in **Sections 2.4.1 to 2.4.4**.

2.3.2 Ecological Field Surveys

GEI conducted an ecological field survey program between 2022 and 2025 to gather data necessary for assessing the significance of natural heritage features within the NH Study Area, identifying potential ecological constraints to development, and exploring opportunities for restoration and enhancement. Based on GEI's review of aerial imagery and background information, the following ecological field surveys were undertaken to identify and delineate natural heritage features and assess species presence:

- Ecological Land Classification (ELC);
- Two-season botanical inventory (summer and fall);
- Wetland and woodland boundary delineation;

- Breeding bird surveys (two rounds);
- Calling amphibian surveys (three rounds);
- Turtle basking surveys (three rounds);
- Incidental snake surveys (three rounds);
- Terrestrial crayfish survey (one round);
- Bat habitat assessment (one round);
- Aquatic habitat assessment (AHA; one round); and
- Headwater Drainage Feature Assessment (HDFA; three rounds).

The following subsections describe the methods of these ecological field surveys. A summary of the survey types and dates is provided in **Table 1 (Appendix A.1.2)**. The results of the ecological field surveys can be found in **Sections 2.4.5 to 2.4.7**.

2.3.2.1 Vegetation and Landscape Survey Methods

2.3.2.1.1 Ecological Land Classification

GEI conducted ELC to characterize the vegetation communities within the NH Study Area. In addition, ELC was also completed for the remainder of the Land Holdings outside of the NH Study Area. The classification followed the sampling protocol outlined in *Ecological Land Classification for Southwestern Ontario: First Approximation and its Application* (Lee et al., 1998).

Vegetation communities on the Land Holdings were initially identified using aerial imagery and subsequently ground-truthed and revised as necessary during field visits on July 14 and September 28, 2022. For areas outside the Land Holdings, vegetation communities were delineated and characterized through air photo interpretation. This analysis used spring 2023 imagery obtained from First Base Solutions. Generally, vegetation communities of at least 0.5 ha in size were mapped; however, smaller distinct communities were also mapped where appropriate.

ELC classification was completed to the finest level of resolution (vegetation type) whenever feasible. When the observed species assemblage did not align with existing vegetation codes, the

community was classified to the ecosite level. The provincial status of all vegetation communities was determined based on the NHIC plant communities list (2021).

2.3.2.1.2 Botanical Inventory

GEI conducted a two-season botanical inventory to identify vascular plant species within the NH Study Area in 2022, with surveys completed during the summer (July 14) and fall (September 28). Species nomenclature generally follows the Database of Vascular Plants of Canada (Brouillet et al., 2010+).

The provincial status of all plant species observed was determined based on NHIC rankings (2024). Local status was assessed based on data for Peel Region, per the *Distribution and Status of the Vascular Plants of the Greater Toronto Area* (Varga et al., 2005).

2.3.2.1.3 Wetland and Woodland Boundary Delineation

GEI, Town of Caledon, and TRCA staff staked the wetland and woodland limits within the NH Study Area on August 15, 2024. The staked wetland and woodland boundaries were surveyed by R-PE Surveying Ltd., a licensed Ontario Land Surveyor, the same day.

2.3.2.2 Wildlife Survey Methods

The following subsections outline the methods used by GEI to conduct targeted wildlife surveys within the NH Study Area.

2.3.2.2.1 Breeding Bird Surveys

GEI conducted breeding bird surveys within the NH Study Area following the protocols of the *Atlas of the Breeding Birds of Ontario 2001–2005* (Cadman et al., 2007) and the *Ontario Forest Bird Monitoring Program* (Cadman et al., 1998). These protocols generally follow the *Bird and Bird Habitats: Guidelines for Wind Power Projects* (MNRF, 2020) recommended under the *SWH Criteria Schedules for Ecoregion 6E* (MNRF, 2015a) but have been adjusted, based on professional experience, to implement a more comprehensive approach that combines area search

and point count techniques.

GEI conducted two survey rounds during the peak breeding season, on June 3 and 23, 2022, between dawn and five hours after dawn. These survey dates were chosen to ensure suitable weather conditions, without thick fog or precipitation and with wind speeds generally below 19 km/h. Five point-count stations (PC1 to PC5) in different habitat types were surveyed within the Land Holdings **(Figure 3, Appendix A.1.1)** and combined with area searches to help determine the presence, variety, and abundance of bird species. Each point-count station was surveyed for 10 minutes for birds within 100 m and beyond 100 m. All species recorded at a point-count station were mapped to provide spatial information and were observed for signs of breeding behaviour.

GEI verified the suitability of available habitat within the NH Study Area for grassland breeding bird SAR. It was determined that the Land Holdings did not provide suitable breeding habitat for grassland bird SAR, and therefore a third round of breeding bird surveys was not required.

2.3.2.2.2 Amphibian Call Count Surveys

GEI conducted amphibian call count surveys on the NH Study Area following the Marsh Monitoring Program (MMP) methodology (Bird Studies Canada, 2009). In addition, amphibian call count surveys were completed for the remainder of the Land Holdings outside of the NH Study Area. Eight survey stations (AMC1 to AMC8) were selected based on aerial photography and a site reconnaissance, which identified potential breeding habitat at various ponds and wetlands within the NH Study Area **(Figure 3, Appendix A.1.1)**.

Nocturnal call count surveys were conducted during the peak breeding season on April 28, May 25, and June 19, 2023, on warm nights with little wind and no heavy rain. The three survey rounds were conducted when minimum nighttime air temperatures were 5°C, 10°C, and 17°C, respectively, and surveys were conducted at least 15 days apart. Surveys began half an hour before dusk and ended before midnight.

The survey stations were surveyed for three minutes and the MMP call level codes system was

used to identify frog activity:

- Level 1 when calls are not simultaneous and calling individuals can be counted;
- Level 2 when some calls are simultaneous but individual calls are distinguishable, and the number of individuals can be estimated; and
- Level 3 when calls are continuous and overlapping in a full chorus.

If loud noise such as from plane, train, or road traffic was present, the three-minute monitoring period was delayed until a quieter period. Information recorded included the date and time of each call count survey, species observed, air temperature, wind speed, degree of cloud cover, and level of precipitation.

In addition to conducting amphibian call count surveys, GEI searched all features located within the Land Holdings (i.e., all except AMC1 and AMC6) for amphibian egg masses during all three rounds of the turtle basking surveys.

2.3.2.2.3 Turtle Basking Surveys

GEI conducted turtle basking surveys within the NH Study Area based on protocols set forth by the MNR (MNRF, 2015b). In addition, turtle basking surveys were completed for the remainder of the Land Holdings outside of the NH Study Area. Four survey stations (BS1 to BS4) were selected based on aerial photography and a site reconnaissance, which identified potential overwintering habitat at various ponds and open wetlands within the Land Holdings **(Figure 3, Appendix A.1.1)**. During the 2023 spring surveys, the southernmost pond (at the location of amphibian call count survey station AMC8) was determined to be too shallow and disturbed to support turtle overwintering habitat and was therefore not surveyed.

GEI conducted three survey rounds during the peak basking season, on April 26, 27, and May 5, 2023. Surveys were conducted between 8:00 and 17:00 under sunny conditions with air temperatures between 5°C and 25°C, or alternatively under overcast conditions with air temperatures between 15°C and 30°C.

Binoculars were used to scan, from a distance, the edges and surface of each water body for basking turtles for 30 minutes per station. If possible, the perimeter of the feature was walked and surveyed, using polarized sunglasses, after scanning with binoculars. Information recorded during these surveys included the date and time of each basking survey, species observed, locations of observations (UTM coordinates), air temperature, and weather conditions.

2.3.2.2.4 Incidental Snake Surveys

The site reconnaissance survey determined that the NH Study Area within the Land Holdings lacked access below the frostline or suitable soils to support snake hibernacula. As a result, targeted snake visual encounter surveys were not conducted. Instead, GEI performed three rounds of incidental snake surveys on April 26, April 27, and May 5, 2023, during the spring emergence period (late-April to mid-May), when the probability of detecting snakes is highest. Snake visual encounter surveys were conducted on mild spring mornings (minimum 8°C, and no greater than 25°C) with sunny or overcast conditions, between the hours of 8:00 and 14:00.

Incidental surveys included lifting debris on site to check for snake presence and general visual sweeps for snakes while traversing the site. Information recorded during these surveys included the date and time of each visual encounter calling survey, species observed, locations of observations (UTM coordinates), air temperature, and weather conditions.

2.3.2.2.5 Terrestrial Crayfish Survey

In accordance with the Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF, 2015a), Terrestrial Crayfish surveys were required to be conducted from April to August in all suitable ecosites with permanent or temporary water. Ideally, these surveys were performed before emergent vegetation restricted visibility of the bare ground.

Within the NH Study Area within the Land Holdings, Terrestrial Crayfish surveys were conducted in June 2022, in conjunction with other survey types, across all suitable ecosites. Due to the difficulty of visually observing crayfish individuals, their presence was confirmed by identifying

burrows, also referred to as chimneys. If identified, the locations of clusters, which signified a colony, or individual chimneys were recorded using a hand-held GPS device. Additional information, such as the surrounding vegetation within a 1 m radius, distance to water, and the number of chimneys observed, was also documented.

2.3.2.2.6 Bat Habitat Assessment

GEI conducted the bat habitat assessment within the southeastern corner of the Greenbelt Plan Area woodland on December 3, 2025, targeting snag/cavity trees (≥10 cm diameter at breast height) with features such as peeling bark, early decay, cavities, and crevices from cracks, knot holes, or woodpecker activity.

2.3.2.3 Aquatic Survey Methods

The following subsections outline the methods used by GEI to conduct aquatic surveys within the NH Study Area. Aquatic surveys included an AHA of the watercourse within the Land Holdings and HDFA surveys for other drainage features within the NH Study Area.

Based on GEI's observations of the watercourses and HDFs, no fish community sampling was deemed necessary, as all identified drainage features were determined to be incapable of providing direct fish habitat.

2.3.2.3.1 Aquatic Habitat Assessment

An AHA was conducted on April 30, 2023, within the watercourse that flows through the southwestern portion of the Secondary Plan Area. This watercourse (referred to as watercourse TCC1) is a tributary of Cold Creek, which in turn is a tributary of the Humber River. The AHA consisted of a visual survey of instream and riparian habitat conditions along and adjacent to the watercourse. The following features were documented during the survey:

- Hydrology (e.g., flowing or standing water);
- General watercourse morphology (e.g., riffle, run, pool);

- Wetted width and depth (at time of survey);
- Bed and bank substrate;
- Instream habitat (e.g., woody debris, aquatic vegetation, undercut banks);
- Presence of obstructions to fish movement (e.g., culverts, debris dams);
- Evidence of groundwater inputs (e.g., springs, seeps, iron flocculation/staining); and
- Riparian habitat.

2.3.2.3.2 Headwater Drainage Feature Assessment

GEI completed an HDFA in the NH Study Area in accordance with the protocols outlined in the *Evaluation, Classification, and Management of Headwater Drainage Features Guidelines* (CVC & TRCA, 2014; hereafter referred to as the "HDFA Guidelines"). The HDFA Guidelines provide a standardized approach to identifying and evaluating HDFs, assessing their ecological and biophysical functions, and providing long-term management recommendations to protect or maintain the important ecological or biophysical functions in a developing landscape.

Prior to conducting the first round HDFA survey in April 2023, GEI reviewed existing background mapping of the NH Study Area (i.e., Geospatial Ontario's *Make a Map: Natural Heritage Areas* mapping tool, TRCA Regulation Mapping, and the SABE Scoped SWS) as well as historical satellite imagery from October 2022 and prior.

Due to the timing of project initiation, the first round HDFA survey was completed later than the typical first-round window per the HDFA Guidelines (i.e., mid-March to Mid-April). To address this, the survey was conducted immediately following a precipitation event, on April 30, 2023, to approximate earlier spring hydrological conditions. As flowing water conditions were observed in HDFs during the survey, it appeared representative of early spring hydrology. Furthermore, no annual agricultural activities (e.g., spring field ploughing and planting) had been completed yet prior to the survey, and therefore the observed flow paths were also considered consistent with spring conditions.

During the first round HDFA survey, all portions of the NH Study Area within the Land Holdings

were walked to identify existing HDFs. Existing background mapping and historical satellite imagery were referenced during the survey; however, only those HDFs present on the landscape during the field investigation were documented and assessed. Each identified HDF was divided into reaches following the delineation guidance in the HDFA Guidelines. Data collection for each reach was completed in accordance with the *Ontario Stream Assessment Protocol* (OSAP) Section 4: Module 11 protocol for Unconstrained Headwater Sampling (Stanfield ed., 2017). A second round HDFA survey was completed on May 25, 2023, to assess late spring conditions. During this survey, all identified HDFs in the Secondary Plan Area were dry, with the exception of the wetland pond reach H1-S1. Consequently, no third round (i.e., summer) HDFA survey was required or completed.

A photographic record of each feature was taken during each survey event; this record is provided in **Appendix A.1.3**. Where property access was not available for HDFs upstream or downstream from the Land Holdings, observations were made from the property boundary.

Upon completing the surveys, the collected data was analyzed to classify the HDFs and determine appropriate management recommendations based on the hierarchical framework outlined in the HDFA Guidelines.

2.4 Biophysical Characterization

This section provides an overview of the physical and ecological characteristics of the NH Study Area. It describes the physiographic context, regional landscape ecology, and natural heritage features, including vegetation communities, wildlife, and aquatic habitats. Background reviews and results of targeted surveys are presented to identify and assess species presence, habitat conditions, and ecological functions within the NH Study Area.

2.4.1 Physiography

The NH Study Area is located in the South Slope physiographic region, which forms the southern slope of the Oak Ridges Moraine and extends from the Niagara Escarpment to the Trent River. This sloping plain covers approximately 2,432 km² and rises to the line of contact with the moraine

at elevations of 240 to 305 m above sea level. This represents an increase of up to 120 m over a distance of approximately 11 km. The region is underlain by limestones, grey shales, and reddish shales, which influence its soil composition and hydrology.

Soils on the South Slope are diverse and have supported agriculture for over a century. Key soil series include the sandy Dundonald series in the east and the clay loams of the Chinguacousy and Oneida series in the west. The landscape is characterized by drumlinized terrain, fluted till plains, and steep valleys carved by fast-flowing streams. Intermittent drainage patterns have contributed to gully erosion, particularly in areas with steep slopes, where agricultural lands face challenges from soil loss.

Prominent natural features in this physiographic region include the steep valleys of tributaries to the Rouge, Don, and Humber river systems, which contribute to the region's ecological and hydrological functions. Historically, the South Slope was dominated by oak, hickory, and white pine forests, much of which has been converted to agriculture and urban development (Chapman & Putnam, 1984).

2.4.2 Landscape Ecology

The NH Study Area occurs within the Lake Simcoe-Rideau Ecoregion 6E, which extends from Lake Huron to the Ottawa River and includes most of the northern Lake Ontario shoreline and the St. Lawrence River Valley. Ecoregion 6E falls within the Great Lakes–St. Lawrence forest region, an area of moderate climate where natural succession leads to forests dominated by shade-tolerant hardwood species, such as Sugar Maple (*Acer saccharum*) and American Beech (*Fagus grandifolia*), and hardwood species with intermediate shade tolerance, such as Red Oak (*Quercus rubra*) and Yellow Birch (*Betula alleghaniensis*). These forests also often include associations of White Pine (*Pinus strobus*) and Red Pine (*Pinus resinosa*).

Consideration of the larger ecological matrix or landscape provides insight into potential interactions between abiotic and biotic flows. The primary ecological linkage in the local landscape is formed by the forested and wetland communities associated with the Greenbelt Plan

Area, which offer the greatest opportunity for the movement of organisms, matter, and energy across the surrounding landscape. The naturally vegetated communities associated with the HDF and wetland in the northern portion of the NH Study Area also contribute to wildlife movement opportunities. The agricultural lands that dominate the Land Holdings and surrounding areas to the north and west offer more limited opportunities for wildlife movement due to agricultural land management practices. Movement opportunities to the south and east are further constrained by major roads and urban development.

2.4.3 Natural Heritage Areas Mapping

The MNR Geospatial Ontario's *Make a Map: Natural Heritage Areas* (2024) mapping tool identifies the following natural heritage features within the NH Study Area **(Figure 2, Appendix A.1.1)**:

- Three units of the Castlederg PSW Complex and three unevaluated wetland units are mapped within the portion of the NH Study Area that falls within the Greenbelt Plan Area.
- One unevaluated wetland is mapped within the southern portion of the NH Study Area.
- Woodlands are present within the NH Study Area, within the Greenbelt Plan Area.
- Three hedgerows are mapped within the NH Study Area.
- Two tributaries of Cold Creek are mapped within the NH Study Area, one in the northern portion and one in the southern portion.

No additional natural heritage features were identified within the NH Study Area through this mapping tool. Data from the NHIC database, while accessed via *Make a Map: Natural Heritage Areas*, are presented separately in **Section 2.4.4.1.**

2.4.4 Species Occurrence Records

The following subsections summarize species occurrence records for the NH Study Area, compiled from the background review.

2.4.4.1 Natural Heritage Information Centre

The MNR NHIC database was accessed via the *Make a Map: Natural Heritage Areas* (2024) mapping tool, and searched for records of provincially significant plants, vegetation communities, and wildlife within the Land Holdings and the surrounding areas. The database provides occurrence data in 1 km x 1 km (1 km^2) area squares, with four squares overlapping the Land Holdings (17PJ0061, 17PJ0062, 17PJ0161, and 17NJ9961). All species identified within the NHIC squares may not be found within the Land Holdings. Habitat type, availability, and size are all contributing factors in species presence and use.

A total of nine species of interest were recorded in the squares that overlap with the Land Holdings:

- Species listed as Threatened or Endangered on the SARO list:
  - Black Ash (*Fraxinus nigra*) – Endangered;
  - Redside Dace (*Clinostomus elongatus*) – Endangered;
  - Bobolink (*Dolichonyx oryzivorus*) – Threatened; and
  - Eastern Meadowlark (*Sturnella magna*) – Threatened.
- Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1–S3 species):
  - Eastern Wood-pewee (*Contopus virens*) – Special Concern;
  - Wood Thrush (*Hylocichla mustelina*) – Special Concern;
  - Snapping Turtle (*Chelydra serpentina*) – Special Concern;
  - Scarlet Beebalm (*Monarda didyma*) – S3; and
  - American Brook Lamprey (*Lethenteron appendix*).

The Redside Dace observation is associated with the Humber River upstream of Queen Street North in the Town of Caledon. The watercourses on and adjacent to the Land Holdings ultimately discharge into the Humber River downstream of confirmed Redside Dace habitat; therefore, this observation does not have implications for the future development of the NH Study Area.

In addition to these species, all four NHIC area squares were identified to contain a mixed wader

nesting colony wildlife concentration area.

2.4.4.2 Bat Species at Risk

Seven out of Ontario's eight bat species are listed on the SARO List as Endangered:

- Eastern Red Bat (*Lasiurus borealis*);
- Eastern Small-footed Myotis (*Myotis leibii*);
- Hoary Bat (*Lasiurus cinereus*);
- Little Brown Myotis (*Myotis lucifugus*);
- Northern Myotis (*Myotis septentrionalis*);
- Silver-haired Bat (*Lasionycteris noctivagans*); and
- Tri-colored Bat (*Perimyotis subflavus*).

These SAR bat species are known to form maternity roosts within wooded areas, individual trees, as well as anthropogenic structures such as barns, houses, garages, and sheds. The MECP generally considers SAR bats to be ubiquitous within forest and swamp communities, and therefore these species are potentially present within the NH Study Area.

2.4.4.3 Ontario Breeding Bird Atlas

The *OBBA Data Summary: 2001–2005* (Cadman et al., 2007) contains detailed information on the population and distribution status of birds in Ontario. The database provides occurrence data in 10 km x 10 km (100 km^2) area squares, with two squares overlapping the Land Holdings (17NJ96 and 17PJ06). The Land Holdings are a small component of the overall atlas square, and therefore it is unlikely that all the listed bird species are found within the Land Holdings. Habitat type, availability, and size are all contributing factors to bird species presence and use.

A total of 122 species were recorded in the atlas squares that overlap with the Land Holdings, with the following species of interest noted:

- Species listed as Threatened or Endangered on the SARO list:

- Acadian Flycatcher (*Empidonax virescens*) – Endangered;
- Red-Headed Woodpecker (*Melanerpes erythrocephalus*) – Endangered;
- Bank Swallow (*Riparia riparia*) – Threatened;
- Bobolink – Threatened;
- Eastern Meadowlark – Threatened; and
- Least Bittern (*Ixobrychus exilis*) – Threatened.

- Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1–S3 species; B=breeding population, N=non-breeding population, M=migrant population):
  - Barn Swallow (*Hirundo rustica*) – Special Concern;
  - Eastern Wood-pewee – Special Concern;
  - Grasshopper Sparrow (*Ammodramus savannarum*) – Special Concern;
  - Wood Thrush – Special Concern; and
  - Common Gallinule (*Gallinula galeata*) – S3B.

2.4.4.4 Ontario Reptile and Amphibian Atlas

The *Ontario Reptile and Amphibian Atlas* (Ontario Nature, 2024) contains detailed information on the population and distribution status of herpetofauna in Ontario. The database provides occurrence data in 10 km x 10 km (100 km^2) area squares, with two squares overlapping the Land Holdings (17NJ96 and 17PJ06). The Land Holdings are a small component of the overall atlas square, and therefore it is unlikely that all the listed herpetofauna species are found within the Land Holdings. Habitat type, availability, and size are all contributing factors to herpetofauna species presence and use.

A total of 21 species were recorded in the atlas squares that overlap with the Land Holdings, of which 10 are frog and toad species, four are salamander species, three are turtle species, and four are snake species. The following species of interest were noted:

- Species listed as Threatened or Endangered on the SARO list:
  - Blanding's Turtle (*Emydoidea blandingii*) – Threatened.

- Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1–S3 species):
    - Snapping Turtle – Special Concern.

2.4.4.5 Ontario Butterfly and Moth Atlas Results

The *Ontario Butterfly and Moth Atlases* (Toronto Entomologists' Association, 2024a; 2024b) contain detailed information on the population and distribution status of butterflies and moths in Ontario. The database provides occurrence data in 10 km x 10 km (100 km^2) area squares, with two squares overlapping the Land Holdings (17NJ96 and 17PJ06). The Land Holdings are a small component of the overall atlas square, and therefore it is unlikely that all the listed butterfly and moth species are found within the Land Holdings. Habitat type, availability, and size are all contributing factors to butterfly and moth species presence and use.

A total of 78 species was recorded in the atlas squares that overlap with the Land Holdings, of which 59 are butterfly species and 19 are moth species. The following species of interest were noted:

- Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1–S3 species):
    - Monarch (*Danaus plexippus*) – Special Concern; and
    - Carolina Sphinx (*Manduca sexta*) – S2.

2.4.4.6 Aquatic Species at Risk Distribution Mapping

The DFO *Canadian Aquatic Species at Risk* (2024) distribution mapping tool was used to identify any known occurrences of aquatic SAR, including fish and mussels, within the watercourses and HDFs on the Land Holdings, as well as upstream and downstream reaches.

No aquatic SAR or critical habitat were identified within the Cold Creek sub-watershed, which encompasses the Land Holdings. Redside Dace was identified in the Humber River upstream of the Cold Creek mouth, and Silver Lamprey (*Ichthyomyzon unicuspis*), a species of Special Concern

in Canada and Ontario, was identified in the Humber River approximately 4.5 km southeast of the Land Holdings.

2.4.4.7 Citizen Science Databases (iNaturalist and eBird)

The *iNaturalist* (2024) database is a large citizen science-based project that aims to collect, archive, and share sightings of flora and fauna species. Users can submit observations to be reviewed and identified by naturalists and scientists to help provide accurate species observations. As the observations can be submitted by anyone, and the records are not officially vetted, the data obtained from this tool should not be used as a clear indicator of species presence. It should be noted that only "research grade" observations will be referenced.

This online database was examined to identify observations made on and within 120 m of the Land Holdings that were research grade; two species of interest were identified:

- Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1–S3 species):
  - Great Egret (*Ardea alba*) – S2B, S3M; and
  - Chestnut Schizura Moth (*Schizura badia*) – S3.

The *eBird* (2024) database is a large citizen science-based project that aims to gather bird diversity information in the form of checklists of birds, archive it, and share it to power new data-driven approaches to science, conservation, and education. As the observations can be submitted by anyone, and the records are not officially vetted, the data obtained from this tool should not be used as a clear indicator of species presence, and species may be filtered out based on habitat and target survey efforts.

The nearest "hotspot" (as identified by eBird), is Bolton-Columbia Way Stormwater Pond, located within 120 m of the Land Holdings, in the residential subdivision south of Columbia Way. The listed sightings for this hotspot include the following significant species:

- Species of Conservation Concern (i.e., listed as Special Concern on the SARO list, or identified as an S1–S3 species):
    - Great Egret – S2.

2.4.5 Vegetation and Landscape Survey Results

The following subsections present the results of the vegetation and landscape surveys conducted by GEI within the Land Holdings. A copy of the field data sheets is provided in **Appendix A.1.3**.

2.4.5.1 Vegetation Communities

ELC mapping of the NH Study Area and the remainder of the Land Holdings is shown in **Figure 4 (Appendix A.1.1)**. A description of each ELC community within the Secondary Plan Area is provided in **Table 2 (Appendix A.1.2)**.

The Secondary Plan Area primarily consists of active agricultural (AG) lands planted with row crops. The non-participating lands along Mount Hope Road, north of the Land Holdings, comprise residential properties. The non-participating lands along Mount Hope Road, east of the central portion of the Land Holdings, include a residence, several agricultural buildings, and an old field cultural meadow (CUM1-1) community.

Within the Land Holdings, the northern portion of the Secondary Plan Area includes a former residential area, where the residence has since been removed along with two adjacent hedgerows. Surrounding the former residential area is a coniferous cultural plantation (CUP3), a Reed-canarygrass meadow marsh (MAM2-2), and an off-line open aquatic community (OAO) of anthropogenic origin.

The southern portion of the Secondary Plan Area also contains three small marsh communities. These include a small shallow aquatic (SA) community surrounded by a ring of Cattail-dominated shallow marsh (MAS2-1) and a forb-dominated marsh (MAM2). This outermost marsh community experiences regular disturbance from agricultural practices; however, it retains wetland characteristics, and crops do not successfully establish there. Another small

Cattail-dominated shallow marsh (MAS2-1) is located south of this wetland and similarly experiences agriculture-related disturbance. Lastly, a forb-dominated meadow marsh (MAM2) is associated with the southern watercourse and is also regularly ploughed through as part of normal agricultural practices on the property and has very sparse vegetation.

Historically, the southwest portion of the Secondary Plan Area on the Land Holdings consisted of an uncultivated meadow. However, the area has since been converted to agricultural land use.

To the west of the Secondary Plan Area, the Greenbelt Plan Area also primarily consists of row-crop agricultural (AG) land uses, but it also includes a large woodland community in the southern portion. This Sugar Maple-Beech-dominated deciduous forest (FOD5-2) community contains several wetland areas (MAM2-2, MAM2-10, MAS2-1) within and along its edges, as well as more open cultural meadow (CUM1-1) areas. Three wetland communities (MAS2-1, SA/MAS2-1/MAM2-2, and MAS2-1/MAM2-2) are located north of this woodland within 120 m of the Secondary Plan Area.

No provincially rare vegetation communities were identified, based on rarity designations from the NHIC (2021).

2.4.5.2 Wetland Boundary Delineation

The results of the wetland staking conducted with the TRCA within the NH Study Area on August 15, 2024, are presented in **Figure 4 (Appendix A.1.1)** and were used to refine ELC mapping for the Land Holdings and determine the limits of the NHS.

2.4.5.3 Woodland Boundary Delineation

The results of the woodland staking conducted with the Town of Caledon within the NH Study Area on August 15, 2024, are presented in **Figure 4 (Appendix A.1.1)** and were used to refine ELC mapping for the Land Holdings and determine the limits of the NHS.

2.4.5.4 Vascular Plants

GEI identified 84 vascular plant species (inclusive of subspecies, varieties, and hybrids) within the NH Study Area during the two-season botanical inventory. Of these, 56 species (67%) are native, while 28 species (32%) are exotic. Among the native species, 53 (95%) are ranked S5 (secure in Ontario), and three (5%) are ranked S4 (apparently secure in Ontario). A complete list of vascular plant species is provided in **Table 3 (Appendix A.1.2)**.

2.4.5.5 Plant Species of Conservation Interest

No vascular plant species identified within the NH Study Area during the botanical inventories were classified as SAR or provincially rare (S1–butterS3). However, two locally rare species were observed based on Peel Region rarity rankings (Varga et al., 2005):

- White Spruce (*Picea glauc*a) – R3; and
- Peach-leaved Willow (*Salix amygdaloides*) – R6.

The White Spruce observations were located within the coniferous cultural plantation (CUP3) in the northern portion of the Secondary Plan Area and were determined to be planted rather than part of a naturally occurring population. The Peach-leaved Willow was observed within a wetland in the southern portion of the Secondary Plan Area but was later noted to be absent during subsequent site visits due to agricultural land management practices.

2.4.5.6 Potentially Sensitive Plant Species

The sensitivity of plant species was identified using their assigned Coefficient of Conservatism value (Oldham et al., 1995), which range from 0 (low) to 10 (high) based on a species' tolerance of disturbance and habitat fidelity. Species with a low Coefficient of Conservatism value tend to have little or no fidelity to pristine or unique natural ecosystems and can be found in a variety of natural or anthropogenic habitats. Species with a Coefficient of Conservatism value of 7 to 10 are potentially sensitive (with 9 and 10 being the most sensitive) as they tend to have a consistent fidelity to high quality, undisturbed, or unique ecosystems. No species with a Coefficient of

Conservatism value of 7 to 10 were identified within the NH Study Area.

2.4.5.7 Invasive Plant Species

Invasive plant species can pose significant ecological threats by reproducing and spreading aggressively, outcompeting native plants, reducing biodiversity, and impairing the ecological function of natural areas. The severity of their impact depends on site conditions; however, under favourable conditions, these species can dominate and outcompete all others.

Urban Forest Associates (2002) developed a categorical ranking system to classify invasive plants in southern Ontario based on their ecological threat. Category 1 plants are considered the most invasive, capable of dominating a site indefinitely due to their highly efficient reproduction and dispersal mechanisms.

Of the 28 exotic plant species identified within the NH Study Area, six are classified as Category 1 by Urban Forest Associates:

- Canada Thistle (*Cirsium arvense*);
- European Buckthorn (*Rhamnus cathartica*);
- Garlic Mustard (*Alliaria petiolata*);
- Manitoba Maple (*Acer negundo*);
- Multiflora Rose (*Rosa multiflora*); and
- Purple Loosestrife (*Lythrum salicaria*).

2.4.6 Wildlife Survey Results

The following subsections present the results of the targeted wildlife surveys conducted by GEI within the NH Study Area. A copy of the field data sheets is provided in **Appendix A.1.3**.

2.4.6.1 Birds

A total of 29 bird species was observed within the NH Study Area. Of these, two species were confirmed breeders, 14 were probable breeders, and 10 were possible breeders. The remaining

three species were classified as non-breeders, flyovers, or migrants. Additionally, 11 species were observed only on adjacent lands within 120 m.

All 26 confirmed, probable, or possible breeders are provincially ranked as S5 (common and secure), S4 (apparently common and secure), or SNA (species not native to Ontario). No bird species observed within the NH Study Area are provincially rare (S1–S3; NHIC, 2024). A complete list of observed bird species is provided in **Table 4 (Appendix A.1.2)**.

The forested community (FOD5-2) within the Greenbelt Plan Area had two Special Concern species: Eastern Wood-pewee (*Contopus virens*) and Wood Thrush (*Hylocichla mustelina*). However, these species were not observed within the Secondary Plan Area, and no suitable habitat exists within the Secondary Plan Area. No SAR were observed within the Secondary Plan Area.

One locally rare species, Vesper Sparrow (*Pooecetes gramineus*), ranked L3 (rare to uncommon locally) per TRCA rarity rankings (2017a), was observed at PC1, PC3, and PC4 within the Secondary Plan Area.

Historically, the southwest portion of the Secondary Plan Area on the Land Holdings consisted of an uncultivated meadow. However, the area has since been converted to agricultural use. As such, bird species observations from PC4 may no longer reflect current conditions.

2.4.6.2 Amphibians

Much of the NH Study Area consists of active agricultural fields, with several wetland features regularly disturbed by agricultural land management practices. Despite this, these areas were surveyed for calling amphibians, although they often consisted of pooled water with limited emergent vegetation or other potential egg mass attachment sites.

A total of five amphibian species were heard calling within the Land Holdings during the three rounds of call count surveys:

- American Toad (*Anaxyrus americanus*);

- Gray Treefrog (*Hyla versicolor*);
- Green Frog (*Lithobates clamitans*);
- Northern Leopard Frog (*Lithobates pipiens*); and
- Spring Peeper (*Pseudacris crucifer*).

In addition, American Toads were heard calling within 120 m of the Land Holdings. All observed species are provincially ranked S5 (common and secure) or S4 (apparently common and secure).

Full survey results are provided in **Table 5 (Appendix A.1.2)**. A description of each station and a summary of the recorded calling amphibians are provided below:

- **AMC1:** This station is directed toward an off-site ponded feature to the west of the Land Holdings, outside the NH Study Area. As the feature is off-site, water depths could not be confirmed; however, water was observed to be present during all three surveys. Four species were heard calling from this feature (Spring Peeper, American Toad, Gray Treefrog, and Green Frog). A maximum of five individuals (Spring Peeper) of any species was recorded. This feature was not searched for amphibian egg masses.
- **AMC2:** This station is located within the MAS2-1/MAM2-2 community located to the north of the woodland and is partially within the NH Study Area but outside the Secondary Plan Area. Water was present during all three surveys. One species was heard calling (Gray Treefrog), with a maximum of 10 individuals recorded. There were no amphibian egg masses observed in this feature.
- **AMC3:** This station is located within an SA/MAS2-1/MAM2-2 community within the NH Study Area but outside the Secondary Plan Area. Water was present during all three surveys. Three species were heard calling from this feature (American Toad, Gray Treefrog, and Northern Leopard Frog). A maximum of four individuals (Gray Treefrog) of any species was recorded. There were no amphibian egg masses observed in this feature.
- **AMC4:** This station is located near a series of wet depressions outside the NH Study Area. Water was present during all three surveys. No amphibians were heard calling, and there were no amphibian egg masses observed in this feature.

- **AMC5:** This station is associated with a MAS2-1/MAM2-2 community along the northern Land Holdings boundary and is partially within the NH Study Area but outside the Secondary Plan Area. Water was present during all three surveys. No amphibians were heard calling, and there were no amphibian egg masses observed in this feature.
- **AMC6:** This station is directed toward an off-site ponded feature to the north, within the NH Study Area. As the feature is off-site, water depths could not be confirmed; however, water was observed to be present during all three surveys. Four species were heard calling from this feature (Spring Peeper, Gray Treefrog, Northern Leopard Frog, and Green Frog). A maximum of five individuals (Spring Peeper and Gray Treefrog) of any species was recorded. This feature was not searched for amphibian egg masses.
- **AMC7:** This station is located within the anthropogenic pond (OAO) in the northern portion of the Secondary Plan Area. Water was present during all three surveys. Three species were heard calling from this feature (Spring Peeper, Gray Treefrog, and Green Frog). A maximum of eight individuals (Gray Treefrog) of any species was recorded. There were no amphibian egg masses observed in this feature.
- **AMC8:** This station is located within the shallow aquatic (SA) community in the southern portion of the Secondary Plan Area. Water was present during all three surveys. One species was heard calling from this feature (Gray Treefrog), with just one individual recorded. There were no amphibian egg masses observed in this feature.

2.4.6.3 Turtles

No turtles were observed at the four stations surveyed. Survey results are provided in **Table 6 (Appendix A.1.2)**. Two notes should be considered:

- **BS1** could only be surveyed from a limited vantage point as it was located off-site, meaning turtles may have been present but not visible.
- **BS2** was also off-site and had to be scanned through a dense hedgerow, which may have obscured turtles along this feature.

2.4.6.4 Snakes

No snakes were observed on the Land Holdings despite incidental survey efforts.

2.4.6.5 Terrestrial Crayfish

Terrestrial Crayfish chimneys were observed within the southern portion of the Secondary Plan Area within the following two wetland communities:

- MAS2-1/MAM2 community: 64 chimneys; and
- MAM2 community: 6 chimneys.

Terrestrial Crayfish chimneys were also observed within the Greenbelt Plan Area within the following two wetland communities located north of the large woodland:

- SA/MAS2-1/MAM2-2 community: 45 chimneys; and
- MAS2-1/MAM2-2 community: 1 chimney.

Furthermore, several Terrestrial Crayfish chimneys were observed throughout the agricultural field within the southern portion of the Secondary Plan Area, outside of the existing wetland communities. This area is regularly disturbed due to agricultural land management practices.

Terrestrial Crayfish chimney observations within wetlands are shown in **Figure 8 (Appendix A.1.1)**. While the species of chimney-building crayfish was not determined, and therefore its conservation ranking is unknown, these observations were considered as part of the SWH assessment in **Section 2.5.1.5**.

2.4.6.6 Bats

The assessment identified suitable SAR bat roosting habitat in four trees located within the southeastern portion of the woodland in the Greenbelt Plan Area. Prior to the removal of any trees identified as suitable SAR bat roosting habitat, the Proponent will be required to address all applicable requirements under SAR legislation in effect at the time of project implementation.

At the time of this report, bat acoustic monitoring using passive recording devices for a minimum duration of ten consecutive evenings in June is recommended within this area to confirm the presence or absence of SAR bats, as a due diligence measure consistent with regulatory expectations under the *Endangered Species Act*. This recommendation may be updated based on future guidance from the MECP.

2.4.6.7 Incidental Observations

Incidental wildlife observations were recorded during surveys conducted by GEI in 2022 and 2023. Evidence such as direct sightings, calls, tracks, scat, and runways was used to identify wildlife present within the NH Study Area. These observations contributed to documenting wildlife and wildlife habitat, as well as characterizing the nature, extent, and significance of animal activity in the area.

Species documented incidentally within the NH Study Area during the 2022 to 2023 ecological field surveys are listed below, excluding those already reported in other sections as part of targeted wildlife surveys:

- Mammals:
  - Coyote (*Canis latrans*) – S5;
  - Northern Raccoon (*Procyon lotor*) – S5; and
  - White-tailed Deer (*Odocoileus virginianus*) – S5.
- Insects:
  - Cabbage White (*Pieris rapae*) – SNA;
  - Clouded Sulphur (*Colias philodice*) – S5;
  - Common Ringlet (*Coenonympha tullia*) – S5;
  - Silvery Blue (*Glaucopsyche lygdar*) – S5; and
  - Common Whitetail (*Plathemis lydia*) – S5.

Table 7 (Appendix A.1.2) provides a master list of all wildlife observed within the NH Study Area during on-site surveys.

2.4.7 Aquatic Survey Results

The following subsections provide an overview of the background information review and field assessment results for the HDFs and watercourses within the NH Study Area. For ease of reference in this section, the ponded area (SA) of the larger tableland wetland within the southern portion of the Secondary Plan Area (SA/MAS2-1/MAM2) is referred to as "the wetland pond." Furthermore, the HDFs and watercourses within the Secondary Plan Area have been assigned identifier numbers:

- TCC1 – The watercourse Tributary of Cold Creek originating in the Greenbelt Plan Area west of the Secondary Plan Area and flowing south towards Columbia Way;
- TCC2 – The watercourse depicted in background mapping as originating from the wetland pond and flowing west into TCC1;
- TCC3 – The watercourse Tributary of Cold Creek on adjacent lands to the east across Mount Hope Road, flowing east beginning at Mount Hope Road; and
- HDF H1 – The HDF originating from the wetland pond and flowing east towards Mount Hope Road in the headwaters of TCC3.

A copy of the field data sheets is provided in **Appendix A.1.3**.

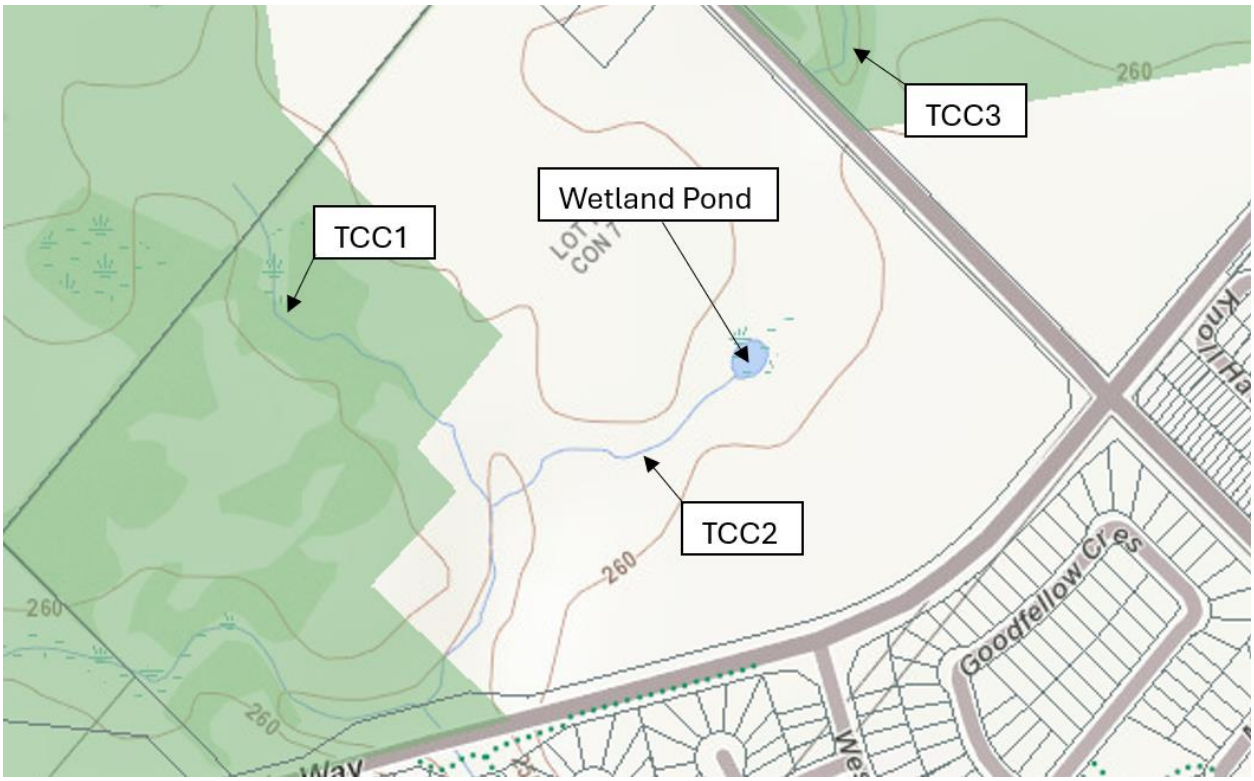
2.4.7.1 Background Information Review

2.4.7.1.1 Natural Heritage Areas Mapping

The MNR Geospatial Ontario's *Make a Map: Natural Heritage Areas* (2025) mapping tool identifies several "watercourses" within the southern portion of the Secondary Plan Area. However, as this mapping is based on remote sensing, some features mapped as "watercourses" within this database are more appropriately identified as an HDFs following field assessment.

Geospatial Ontario's mapping tool identifies TCC1, TCC2, and TCC3, but does identify HDF H1. A screenshot of Geospatial Ontario's mapping, taken on December 2, 2025, is provided in **Figure 2-A**, with labels added for reference.

Figure 2-A. Geospatial Ontario's Natural Heritage Areas Mapping (2025)



Source: Ontario GeoHub (MNR, 2025)

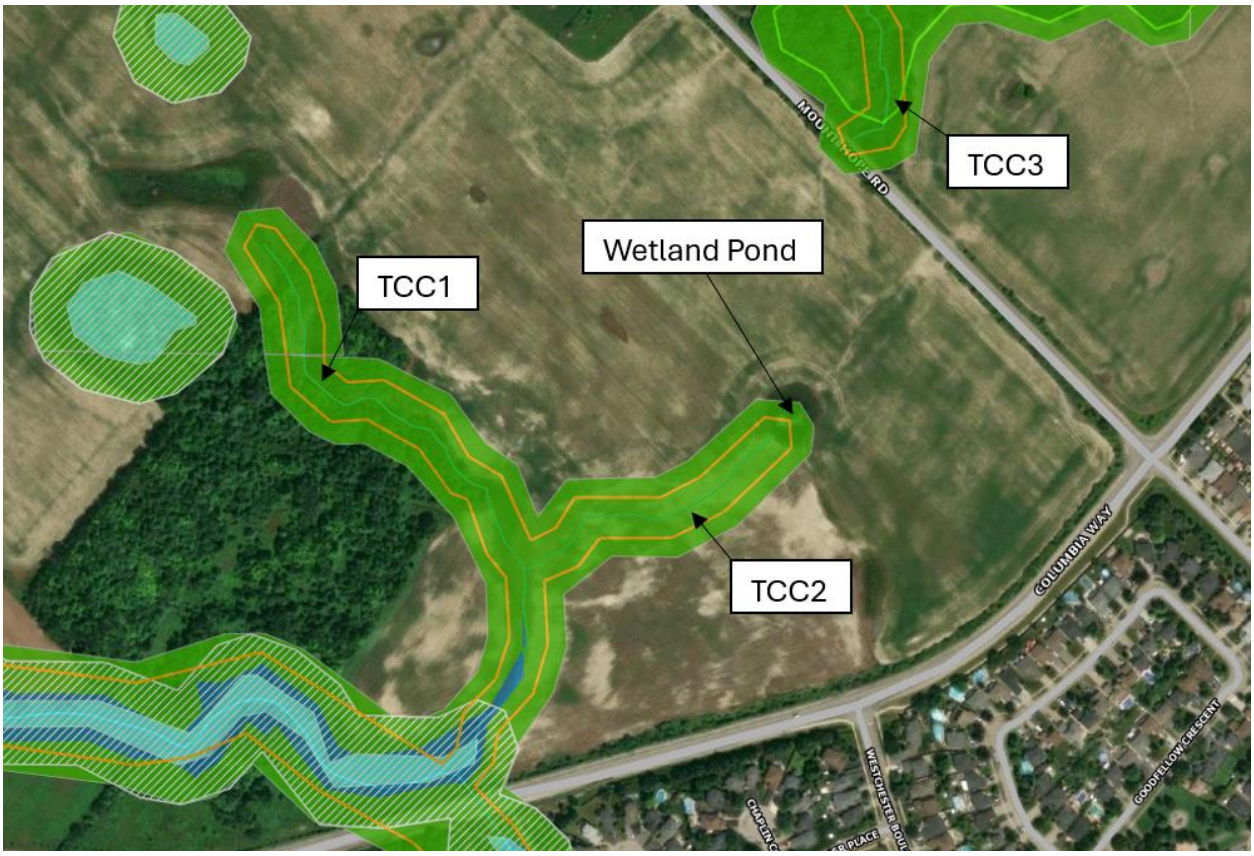
2.4.7.1.2 Toronto and Region Conservation Authority Regulation Mapping

The TRCA Regulation Mapping (2024) tool identifies TRCA-regulated features including watercourses, wetlands, flood hazards, and erosion hazards (including crest of slope and meander belt). However, as this mapping is based on remote sensing, some features mapped as "watercourses" within this database are more appropriately identified as an HDFs following field assessment.

TRCA's mapping tool identifies TCC1, TCC2, and TCC3, but does not identify HDF H1. TCC1, TCC2, and TCC3 are identified in the mapping as having a meander belt. The downstream portion of TCC1 is identified as having a floodplain, but TCC2 and TCC3 are not depicted as having a floodplain. TCC3 is mapped as having a crest of slope beginning a short distance downstream from Mount Hope Road. A screenshot of TRCA's mapping, taken on December 2,

2025, is provided in **Figure 2-B**, with labels added for reference.

Figure 2-B. TRCA Regulation Mapping (2024)



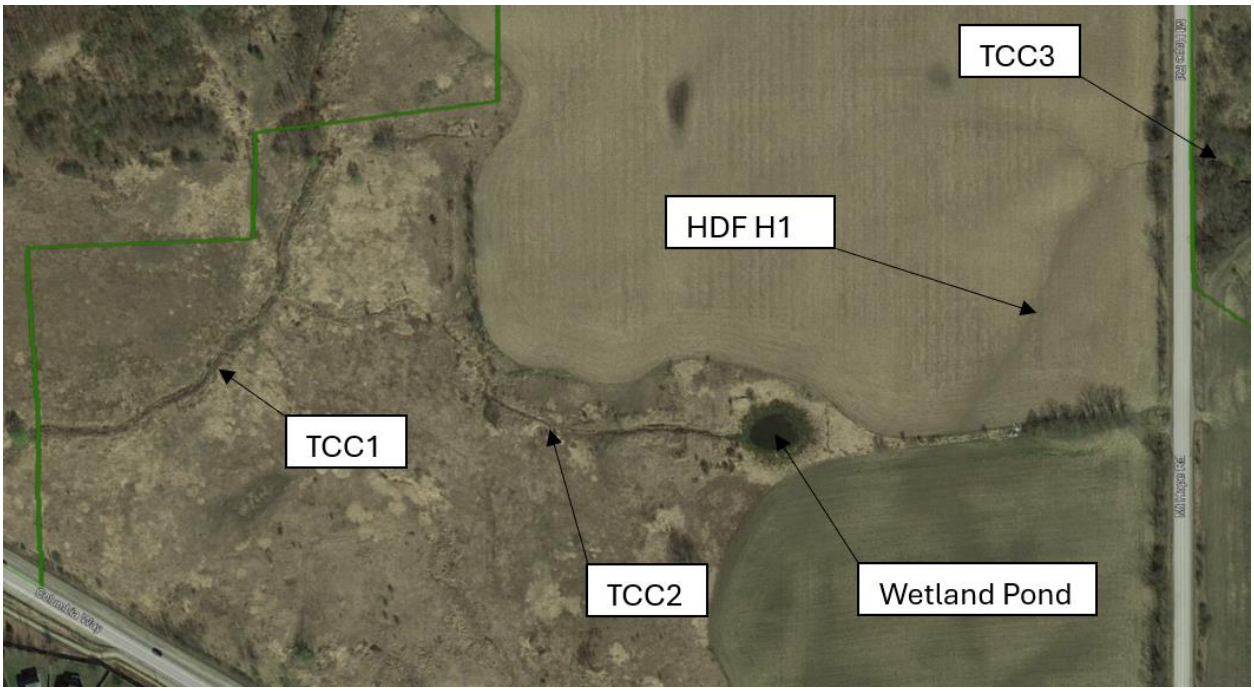
Source: TRCA Regulation Mapping (2024)

2.4.7.1.3 Historical Satellite Imagery Review

The southwestern portion of the Secondary Plan Area historically consisted of an uncultivated meadow. The meadow appears present in historical Google Earth satellite imagery until October 2022. However, the southwestern area was ploughed between October 2022 and February 2023 to increase the amount of available agricultural land.

Prior to October 2022, TCC2 is visible in historical imagery from May 2018 (**Figure 2-C**), originating from the wetland pond and flowing west into TCC1. HDF H1 is also visible in this imagery, originating from the wetland pond and flowing east through an agricultural field, beneath Mount Hope Road, and into TCC3 east of Mount Hope Road.

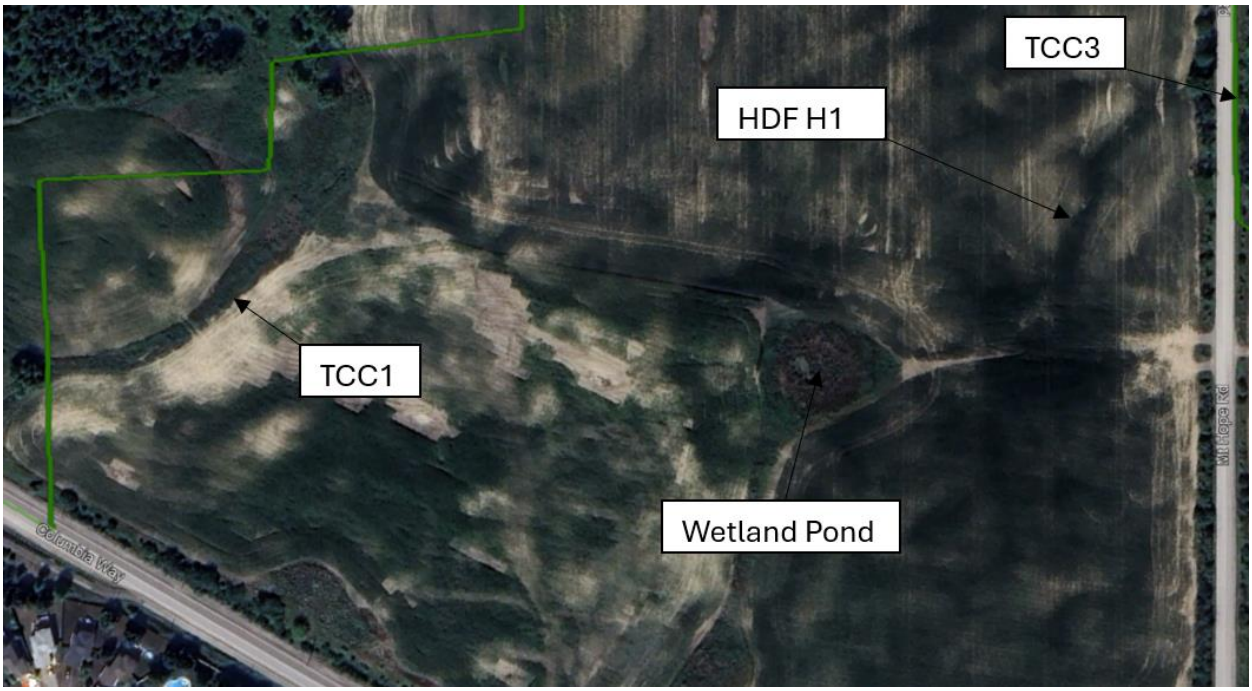
Figure 2-C. Historical Satellite Imagery (May 2018)



Source: Google Earth Pro (2025)

Recent imagery from August 2025 (**Figure 2-D**) is from the period following the conversion of the former meadow area to agricultural land. The wetland pond, TCC1, TCC3, and HDF H1 are still visible in this imagery, but TCC2 is no longer evident.

Figure 2-D. Current Satellite Imagery (August 2025)

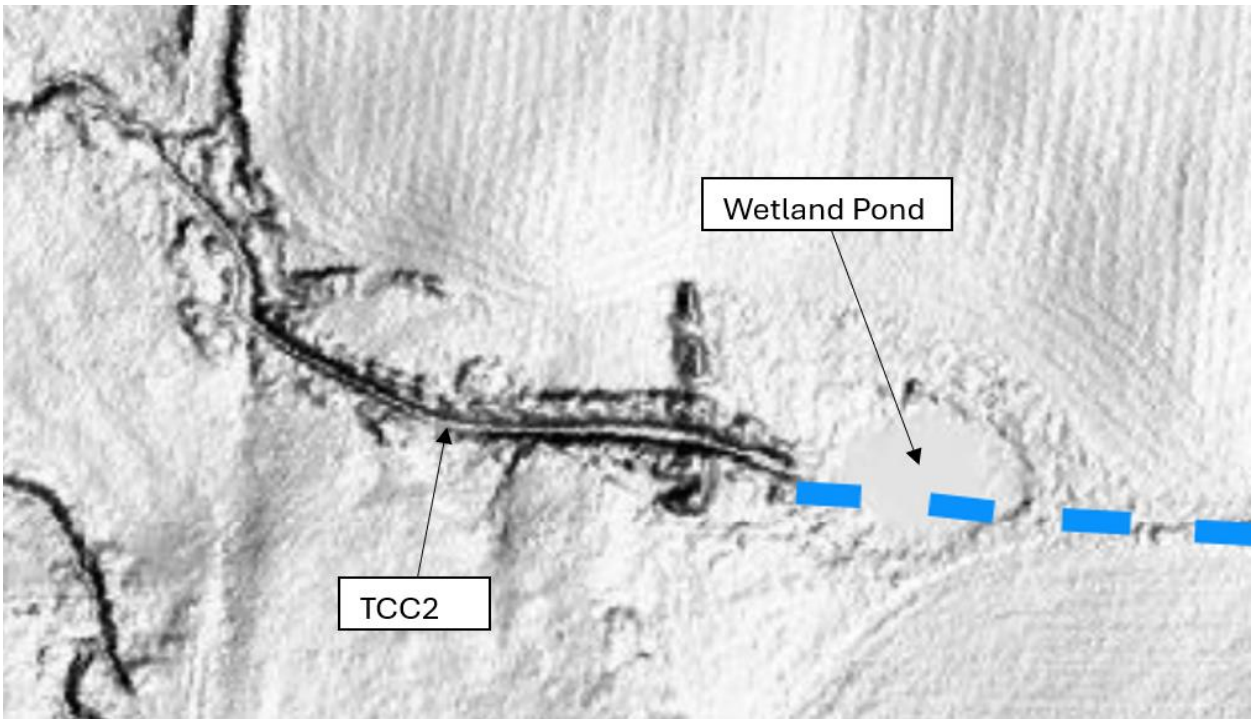


Source: Google Earth Pro (2025)

2.4.7.1.4 Historical LiDAR Data Review

The wetland pond and TCC2 are both visible in historical LiDAR Digital Elevation Model (DEM) mapping (**Figure 2-E**), captured prior to the expansion of agricultural activities in this area. Based on this imagery, it appears that the upper end of the TCC2 channel had been excavated, based on the apparent soil piles adjacent to the channel.

Figure 2-E. Historical LiDAR Imagery



Source: Unknown (provided by GEO Morphix Ltd.)

2.4.7.1.5 Settlement Area Boundary Expansion Scoped Subwatershed Study Mapping

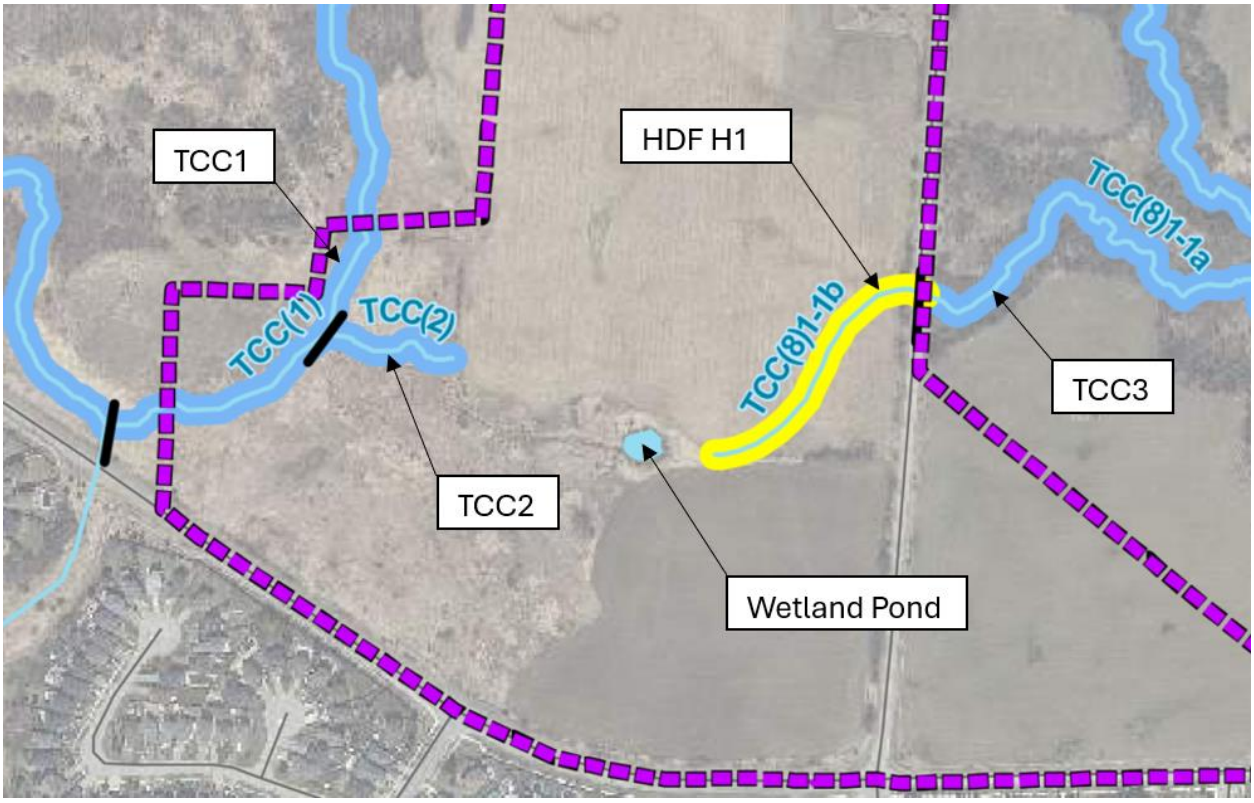
The SABE Scoped SWS (Wood et al., 2022) Part A report identified the following drainage features in the southern part of the Secondary Plan Area.

- Watercourse TCC(1) – The watercourse originating in the Greenbelt Plan Area west of the Secondary Plan Area and flowing south towards Columbia Way, referred to as TCC1 in this memorandum.
- Watercourse TCC(2) – An approximately 63-m long watercourse at the downstream end of the historical drainage feature referred to as TCC2 in this memorandum, flowing west into TCC1. The upstream portion of TCC2 originating from the wetland pond is not shown.

- HDF TCC(8)1-1b – The HDF originating from the wetland pond and flowing east towards Mount Hope Road in the headwaters of TCC(8)1-1a (TCC3 in this memorandum), referred to as HDF H1 in this memorandum.

A screenshot of this mapping is provided in **Figure 2-F**.

Figure 2-F. Drainage Features Mapping from the SABE Scoped SWS Part A Report



Source: SABE Scoped SWS (Wood et al., 2022)

2.4.7.2 Watercourses

The Land Holdings are located within the Humber River watershed, within the TRCA's jurisdiction. This watershed encompasses 900 km² of land, including portions of the municipalities of Caledon, King, Brampton, Mississauga, and Toronto (TRCA, 2023a). The Land Holdings are situated in the Cold Creek subwatershed.

2.4.7.2.1 TCC1

An unnamed tributary of Cold Creek (TCC1) flows from north to south through the southwestern corner of the Secondary Plan Area; this watercourse has an upstream drainage area of 0.41 km² (OWIT, 2023). The tributary discharges into Cold Creek, which ultimately flows into the main branch of the Humber River approximately 5 km downstream before discharging into Lake Ontario (TRCA, 2023a). The fluvial geomorphological assessment determined that this watercourse consists of three reaches: THRE-1-1, THRE-1-2, and THRE-1-3.

THRE-1-3 represents the furthest upstream reach within the Land Holdings and is located within the Greenbelt Plan Area. This reach originates within a topographical low point in the agricultural field north of the woodland. The low point accumulates and ponds water during precipitation events and appears to be fed by tile drainage outlets and overland flow. Water is conveyed through the ponded area into the woodland, where the reach contains a narrow riparian corridor with mature trees encroaching on the channel before transitioning to wetland grasses. Riparian vegetation is constrained by adjacent agricultural practices. Channel form is poorly defined, with no evident riffle-pool morphology, and substrates are dominated by clay and silt; however, wetland vegetation persists within and adjacent to the channel where conditions allow.

THRE-1-2 is located within the Greenbelt Plan Area and flows along the margin of and within the large woodland. Channel morphology within this reach is generally limited to runs, with no defined riffle or pool features. Riparian vegetation is relatively well developed and consists of grasses and trees, providing bank stabilization, organic matter inputs, and shading to the watercourse. The channel widens upstream, and portions of the woodland were inundated with water at the time of the assessment. Historical air photography indicates that the current channel form may be due, at least in part, to historical modifications, including dug ponds and tree clearing. Bed and bank substrates are composed primarily of clay and silt and are moderately sorted.

THRE-1-1 represents the furthest downstream reach within the Land Holdings and is located within the Secondary Plan Area. This reach has been historically altered through artificial straightening and cultivation, resulting in poor bed and bank definition and limited riparian

vegetation. Bed and bank substrates consist primarily of clay and silt. A knickpoint of approximately 0.8 m is present near the downstream extent of the reach, downstream of which the channel becomes more defined prior to joining the receiving system. The downstream portion of THRE-1-1 conveys flows toward a confluence with another unnamed watercourse just upstream of Columbia Way. The combined watercourse then flows through a culvert beneath Columbia Way before entering the Columbia Way Stormwater Management Pond.

Based on GEI's field observations, the tributary flows intermittently and has been observed to be dry during summer months. Due to the topographic barrier at the southern end of the Land Holdings, fish movement into the tributary is not possible. As a result, the watercourse is considered to provide indirect fish habitat. No fisheries studies have been completed in the receiving watercourse upstream of Columbia Way (outside the Secondary Plan Area) or in the watercourse east of Mount Hope Road; therefore, these downstream reaches are conservatively identified as potential direct fish habitat.

2.4.7.2.2 TCC2

The area west of the wetland pond, where a feature identified as TCC2 appears in existing background mapping, historical aerial imagery, and LiDAR-derived DEMs, was reviewed during the HDFA field surveys. No HDF or watercourse was observed on the landscape in 2023. It is therefore inferred that this feature was removed when the former meadow area was converted to agricultural land between October 2022 and February 2023, and as a result, the LSS report did not identify any drainage feature west of the wetland pond.

Historical LiDAR DEM mapping suggests that TCC2 was at least partially excavated to facilitate drainage from the wetland pond and historically conveyed flows westward toward TCC1 and its downstream reaches. Historical mapping and aerial imagery do not indicate an eastward flow path associated with this feature. While TCC2 may have contributed some organic material to downstream systems, this contribution would have been relatively minor from an ecological perspective, particularly when compared to the downstream SWM pond, which is designed to function as an online wetland.

2.4.7.3 Headwater Drainage Feature Assessment

As shown in **Figure 5 (Appendix A.1.1)**, a total of eight discrete HDFs, some of which consisted of multiple defined reaches, were identified and evaluated within the NH Study Area within the Land Holdings. These features were divided into specific reaches based on the guidance for reach delineation in the HDFA Guidelines. A full evaluation of these features is provided in **Table 8 (Appendix A.1.2)**. Photographs of each HDF are provided in **Appendix A.1.3**. The physical and biological characteristics of each reach are summarized in the subsections below.

2.4.7.3.1 HDF H1

HDF H1 is located in the southern portion of the Secondary Plan Area and was observed flowing eastward from the wetland pond. This feature was divided into two separate reaches: H1-S2 was the wetland pond itself and H1-S1 was the swale running between the pond and the culvert at Mount Hope Road.

Reach H1-S2

Reach H1-S2 (the wetland pond on the tablelands) was identified as a wetland feature type. A photograph of this reach is provided in the photolog in **Appendix A.1.3**. As per the HDFA Guidelines (CVC & TRCA, 2014), the hydrology of the feature is identified at the pond outlet. The pond was actively discharging flow into the downstream HDF Reach H1-S1 on April 30, 2025, but had only standing water with no downstream flow on May 25, 2023. Given that there was no outflow from the pond during the Round 2 assessment, no Round 3 assessment was required or completed.

In addition to being identified as a wetland feature type, this HDF reach was identified as providing indirect fish habitat. It does not provide direct fish habitat due to the movement barrier at the Mount Hope Road culvert. One Gray Treefrog (*Dryophytes versicolor*) was heard calling from the pond during the 2023 amphibian call count surveys. Therefore, this feature was also identified as important terrestrial habitat, in accordance with the HDFA Guidelines. Terrestrial Crayfish

chimneys were also observed in the wetland and surrounding agricultural areas (see **Section 2.4.6.5**)

Based on the above and in accordance with the Figure 2 flow chart in the HDFA Guidelines, HDF Reach H1-S2 warrants a "Protection" management recommendation. However, removal of the wetland pond is proposed. Accordingly, if the wetland were to be removed and compensated for elsewhere, this HDF reach would warrant a "Mitigation" management recommendation to maintain the downstream ephemeral surface water inputs that this feature conveys to the off-site tributary of Cold Creek (TCC3; see photograph in **Appendix A.1.3**).

Reach H1-S1

Reach H1-S1 was identified as a generally poorly defined swale running eastward between the wetland pond and the culvert at Mount Hope Road (see photograph in **Appendix A.1.3**). The feature was flowing on April 30, 2025 (based on active discharge from the pond), but was dry on May 25, 2025, indicating an ephemeral hydrological function. Erosion of exposed agricultural soils in this HDF reach was also evident during the April site visit. The swale is located within a row crop agricultural field and has no natural riparian vegetation.

This HDF reach was identified as providing indirect fish habitat. It does not provide direct fish habitat due to the movement barrier at the Mount Hope Road culvert and general lack of suitable habitat conditions. This HDF reach was also not identified as providing any terrestrial habitat function.

Based on the HDFA Guidelines, a downstream HDF reach can not have a less restrictive management recommendation than an upstream reach, and therefore this feature warrants a "Protection" management recommendation based on the "Protection" management recommendation for H1-S2. However, if the wetland were to be removed and compensated for elsewhere, this HDF reach would warrant a "Mitigation" management recommendation to maintain the downstream ephemeral surface water inputs that this feature conveys to the off-site tributary of Cold Creek (TCC3).

2.4.7.3.2 HDF H2-S1

HDF H2-S1 is characterized as a poorly defined swale across an active agricultural field. It conveys seasonal overland flow east beneath Mount Hope Road. H2-S1 was flowing during the first-round survey but was dry and tilled through by the second-round survey. No riparian or terrestrial habitat was observed. This feature contributes ephemeral flow downstream but does not represent direct fish habitat. This reach was recommended for Mitigation, based on application of the HDFA Guidelines.

2.4.7.3.3 HDF H3-S1

HDF H3-S1 flows northeast across the central portion of the Secondary Plan Area, forming a narrow, poorly defined erosional swale through an active agricultural field before crossing beneath Mount Hope Road. Flowing only during the first-round survey, H3-S1 lacked riparian or terrestrial vegetation and was tilled through by the time of the second survey. This feature contributes ephemeral flow downstream but does not represent direct fish habitat. This reach was recommended for Mitigation, based on application of the HDFA Guidelines.

2.4.7.3.4 HDF H3A-S1

HDF H3A-S1 is a poorly defined erosional swale in an active agricultural field, connecting with H3-S1 approximately halfway along its length. The vegetative and flow conditions are identical to those of H3-S1. This reach was recommended for Mitigation, based on application of the HDFA Guidelines.

2.4.7.3.5 HDF H3B-S1

HDF H3B-S1 is a poorly defined erosional swale in an active agricultural field, connecting with H3-S1 at its intersection with Mount Hope Road. The vegetative and flow conditions mirror those of H3-S1. This reach was recommended for Mitigation, based on application of the HDFA Guidelines.

2.4.7.3.6 HDF H4

HDF H4 is located in the northern portion of the Secondary Plan Area and was found to consist of three distinct reaches (H4-S1, H4-S2 and H4-S3). While this feature was identified as a watercourse in background mapping (e.g., MNR, TRCA), GEI and the TRCA both reviewed this feature on site and agreed that it is an HDF. Correspondence with the TRCA regarding this feature is provided in **Appendix A.1.4**.

This HDF originates from agricultural field drainage north of the Land Holdings (reach H4-S1), flows through a wetland on and adjacent to the Secondary Plan Area (reach H4-S2) and then enters the Mount Hope Road roadside ditch (reach H4-S3). It ultimately crosses Mount Hope Road through a culvert adjacent to the Secondary Plan Area. **Reach H4-S1**

Reach H4-S1 is a narrow, poorly defined swale located between active agricultural fields. It conveyed seasonal topographic flow to the downstream wetland community during the first-round survey but was completely dry by the second. H4-S1 contributes ephemeral flow downstream but does not represent direct fish habitat. This reach was recommended for Mitigation, based on application of the HDFA Guidelines.

Reach H4-S2

Reach H4-S2 is a wetland feature extending south from the northern boundary of the Land Holdings. It retained water during the first-round survey and was partially dry during the second survey, with only isolated pockets of standing water in portions of the wetland. The feature exists within a riparian corridor transitioning from cultural thicket/woodland at the northern boundary to anthropogenically planted vegetation closer to Mount Hope Road. H4-S2 does not connect with the shallow pond community shown in **Figure 4 (Appendix A.1.1)**. It represents indirect fish habitat to occupied reaches downstream of the Land Holdings. This reach was recommended for Conservation, based on application of the HDFA Guidelines.

Reach H4-S3

Reach H4-S3 is a roadside ditch that receives seasonal flow from H4-S2. It generally lacks riparian or terrestrial vegetation beyond the ditch as it flows along the eastern boundary of the Land Holdings and eventually crosses beneath Mount Hope Road. H4-S3 represents indirect fish habitat to occupied reaches downstream of the Land Holdings.

Based on the HDFA Guidelines, a downstream HDF reach can not have a less restrictive management recommendation than an upstream reach, and therefore this feature warrants a "Conservation" management recommendation based on the "Conservation" management recommendation for H4-S2 (the upstream reach). However, this reach flows within the existing Mount Hope Road roadside ditch and is highly deteriorated as a result of historical ditching of the feature. The primary function of this reach is to convey flows from the upstream wetland (reach H4-S2) to the downstream (off-site) reach east of Mount Hope Road. Given the nature of the feature, Conservation is not specifically warranted to maintain this function. Therefore, a management recommendation of Mitigation has been provided for this reach to maintain the flow conveyance functions but provide flexibility in the management of the feature, given its function as a roadside ditch. Based on this function and the deteriorated nature of the reach within the Mount Hope Road ditch, conveying this reach within a pipe within the road alignment has been proposed. This is expected to maintain the important flow conveyance function of the reach without negatively impacting downstream form and functions of the feature.

2.4.7.3.7 HDF H5-S1

HDF H5-S1 is a poorly defined swale across an active agricultural field, conveying seasonal overland flow westward to the upstream end of the Cold Creek tributary. It was flowing during the first-round survey but was dry and tilled through by the second survey. No riparian or terrestrial habitat was observed. This feature contributes ephemeral flow downstream but does not represent direct fish habitat. This reach was recommended for Mitigation, based on application of the HDFA Guidelines.

2.4.7.3.8 HDF H6-S1

HDF H6-S1 is a poorly defined swale that conveys flow eastward through a cultural meadow community before connecting with the Cold Creek tributary. It was flowing during the first-round survey but was completely dry by the second. H6-S1 contributes seasonal flow downstream but does not represent direct fish habitat. This reach was recommended for Mitigation, based on application of the HDFA Guidelines.

2.5 Analysis of Ecological and Natural Heritage Significance

This section evaluates the presence, significance, and regulatory considerations of natural heritage features within the Land Holdings and the adjacent 120 m, as defined by the PPS (MMAH, 2024). In addition to significant natural heritage features identified in the PPS, this section evaluates KNHFs and KHFs per the Greenbelt Plan (MMA, 2017), significant natural heritage features per the Peel Regional Official Plan (2022) and the Future Caledon Official Plan (2025), TRCA-regulated features under O. Reg. 41/24, and requirements under the *Endangered Species Act*. Additional context regarding these documents is provided in **Section 2.2**.

2.5.1 Provincial Planning Statement

Eight types of natural heritage features and areas are defined in the PPS (MMAH, 2024), as follows:

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- SWH;
- Fish habitat;
- Habitat of Endangered and Threatened species; and
- Significant ANSIs.

The presence or absence of these features within the NH Study Area is discussed in the following subsections. Guidance from the NHRM (MNR, 2010) and related documents was used to assess the potential significance of natural heritage features and their associated functions.

2.5.1.1 Significant Wetlands

Within Ontario, PSWs are identified by the MNR or by their designates (e.g, OWES-certified wetland evaluators). Other evaluated or unevaluated wetlands may be identified by the Town of Caledon, TRCA, or by GEI during site-specific ecological surveys. Wetlands are defined in the NHRM (MNR, 2010) as:

> *"…lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of wetlands are swamps, marshes, bogs and fens."*

Where there are differences between GEI's ELC mapping and existing wetland mapping (i.e., MNR GeoHub mapping), GEI's mapping is considered more accurate it reflects current site conditions, based on detailed field surveys and feature staking with the TRCA and the Town of Caledon. Following the ecological surveys completed by GEI in 2022 to 2024, the following wetland features are currently present within the NH Study Area **(Figure 6A, Appendix A.1.1)**:

- Three wetland units are currently identified in MNR GeoHub mapping as part of the Castlederg PSW complex:
  - One located in the northern portion of the Secondary Plan Area;
  - One located to the west of the central portion of the Secondary Plan Area, within the Greenbelt Plan Area; and
  - One located along the two branches of the tributary of Cold Creek within the southern portion of the Secondary Plan area and to the west within the Greenbelt Plan Area.

- Eight wetland units are currently identified in the MNR GeoHub mapping as unevaluated wetlands:
    - Two located in the southern portion of the Secondary Plan Area;
    - Four located to the west of the Secondary Plan Area, within the Greenbelt Plan Area;
    - One located north of the Secondary Plan Area; and
    - One located east of the Secondary Plan Area.

Wetland Screening, Evaluation, and Re-evaluation

Under the latest *Ontario Wetland Evaluation System: Southern Manual, 4th Edition* (OWES; MNRF, 2022), wetland units are no longer considered as part of complexes, allowing for independent evaluation or re-evaluation of standalone wetland units. The revised 2022 OWES manual identifies two scenarios in which wetlands separated on the landscape are still treated as a single functional unit for evaluation purposes:

1. Areas consisting of very closely spaced small wetland ponds or pools (e.g., within 30 m of each other) interspersed with small pockets of upland forest (e.g., a "mosaic wetland" or a "slough wetland").
2. Wetlands along a river or lake that are separated by 30 m or less.

The first scenario is intended to capture closely spaced vernal pools and slough wetlands, while the second addresses closely spaced wetlands hydrologically connected by surface water features. Where neither of these criteria is met, wetland units may be evaluated or re-evaluated independently.

Six wetlands located within the Secondary Plan Area or the adjacent 30 m were identified for potential evaluation or re-evaluation under the 2022 OWES. As per the manual, wetlands under 2 ha in size are generally not evaluated unless a clear rationale exists. Two of the six were previously identified as part of an existing PSW complex and were therefore re-evaluated. The remaining four were screened using GEI's internal process to determine whether a full evaluation

was warranted based on the presence of attributes typically associated with higher OWES scores. One of these met the criteria for warranting a full evaluation, while the other three were determined to lack sufficient rationale and are therefore treated as non-PSWs **(Figure 6B, Appendix A.1.1)**.

In total, three wetlands were fully evaluated under the 2022 OWES. None of these wetlands met the thresholds for provincial significance and they are therefore classified as "Evaluated – Other" **(Figure 6B, Appendix A.1.1)**. The full OWES evaluation memo is provided in **Appendix A.1.5**.

2.5.1.2 Significant Coastal Wetlands

Within Ontario, Significant Coastal Wetlands are identified by the MNR or by their designates. Coastal wetlands are defined in the NHRM (MNR, 2010) as:

> *a) "any wetland that is located on one of the Great Lakes or their connecting channels (Lake St. Clair, St. Mary's, St. Clair, Detroit, Niagara and St. Lawrence Rivers); or*
> *b) any other wetland that is on a tributary to any of the above-specified water bodies and lies, either wholly or in part, downstream of a line located 2 kilometres upstream of the 1:100 year floodline (plus wave run-up) of the large water body to which the tributary is connected."*

There are no Significant Coastal Wetlands located within the NH Study Area.

2.5.1.3 Significant Woodlands

Significant woodlands are identified by the planning authority using criteria established by the MNR in the NHRM (2010), applicable provincial plans, and any additional criteria set by the planning authority. Woodlands are defined in the NHRM (MNR, 2010) as:

> *"…treed areas that provide environmental and economic benefits to both the private landowner and the general public, such as erosion prevention, hydrological and nutrient cycling, provision of clean air and the long-term storage of carbon,*

> *provision of wildlife habitat, outdoor recreational opportunities, and the sustainable harvest of a wide range of woodland products. Woodlands include treed areas, woodlots or forested areas and vary in their level of significance at the local, regional and provincial levels."*

For the purposes of identifying woodlands, treed areas separated by more than 20 m are considered separate woodlands. Contiguous agricultural hedgerows and narrow woodland patches are included as part of a woodland if they have a minimum average width of at least 40 m, and narrower sections meet a length-to-width ratio of 3:1 or less. Undeveloped clearings within woodland patches are generally included if the total area of each clearing is no greater than 0.2 ha.

Based on ELC completed by GEI in 2022 to 2024, the following wooded features (i.e., forests, woodlands, swamps, plantations) are currently present within the NH Study Area **(Figure 4, Appendix A.1.1)**:

- A deciduous forest (FOD5-2) located within the Greenbelt Plan Area;
- A deciduous forested community (FOD) located to the east of the Secondary Plan Area across Mount Hope Road, also located within the Greenbelt Plan Area;
- A cultural woodland (CUW1) community located north of the Secondary Plan Area, within the Greenbelt Plan Area; and
- A coniferous cultural plantation (CUP3) community located in the northern portion of the Secondary Plan Area.

Based on their locations, the three deciduous forests in the Greenbelt Plan Area will be evaluated for their significance according to the significant woodland criteria of the Greenbelt Plan (MMA, 2017) and associated technical paper (MNR, 2012), whereas the coniferous cultural plantation will be evaluated according to the Peel Regional Official Plan (2022) and Future Caledon Official Plan (2025) criteria.

Greenbelt Plan

The Greenbelt Plan (MMA, 2017) 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 [...]"*

The *Technical Definitions and Criteria for Key Natural Heritage Features in the Natural Heritage System of the Protected Countryside Area* (MNR, 2005) provides criteria for the evaluation of significant woodlands, based on their geographic location in relation to the Oak Ridges Moraine Conservation Plan area. The Land Holdings are located south of the Oak Ridges Moraine, and as such, woodland significance is evaluated based on the following criteria:

- **Size:** Any woodlands 4 ha or greater are significant; or
- **Natural composition:** Any woodlands containing 1 ha or more of naturally occurring (not planted) trees listed in the table in Appendix D that meet the definition of woodland: 1 ha or more; or
- **Age or Tree Size:** Any woodlands 1 ha or greater with either: a) 10 or more trees per ha that are either greater than 100 years old or 50 cm or more in diameter; or b) containing a basal area of at least 8 m^2 per hectare in native trees that are 40 cm or more in diameter; or
- **Proximity:** Any woodlands 1 ha or greater wholly or partially within 30 m of a: significant wetland; significant habitat of an endangered or threatened species; significant woodland; or
- **Rarity:** Any woodlands 0.5 ha or greater containing either a treed vegetation community with an NHIC (2024) ranking of S1–S3 or a plant species (consisting of 10 or more individual stems or 100 m^2 or more of leaf coverage) with an NHIC ranking of S1–S3 or a Coefficient of Conservatism (Oldham et al., 1995) ranking of 8–10.

The woodland within the Greenbelt Plan Area (FOD5-2 and CUW1) and the woodland located to the east across Mount Hope Road (FOD) meet the significance criteria for size, natural composition, proximity (i.e., to PSWs), and rarity, and are therefore identified as significant

woodlands, as shown in **Figure 7 (Appendix A.1.1)**.

The cultural woodland (CUW1) located to the north of the Secondary Plan Area does not meet the minimum size threshold of 0.5 ha to be considered a significant woodland.

Peel Regional and Future Caledon Official Plans

Woodlands, as defined by the Peel Regional Official Plan and the Future Caledon Official Plan, include woodlots, cultural woodlands, cultural savannahs, plantations, and forested areas and may also contain remnant of old growth forests. Both Official Plans further define woodlands as any treed area greater than 0.5 ha with a minimum average width of 40 m or more measured to crown edges that has:

a) a tree crown cover of over 60% of 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;
  ii. 750 trees measuring over five centimeters in diameter at breast height (1.37m), per hectare;
  iii. 500 trees measuring over 12 centimeters in diameter at breast height (1.37m), per hectare; or
  iv. 250 trees measuring over 20 centimeters 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 meters or more measured to crown edges;

The coniferous cultural plantation (CUP3) in the northern portion of the Secondary Plan Area does not meet the minimum size threshold of 0.5 ha required to qualify as a woodland under the Peel Regional Official Plan or the Future Caledon Official Plan. Therefore, this feature is not considered a significant woodland.

2.5.1.4 Significant Valleylands

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

Additional detailed criteria for identifying significant valleylands are provided in the Greenbelt Plan *Technical Paper 1: Technical Definitions and Criteria for Key Natural Heritage Features in the Natural Heritage System of the Protected Countryside Area* (MNR, 2012). These criteria include features such as a well-defined valley morphology and an average width of 25 m or more.

Valleylands are located outside the Secondary Plan Area but within the adjacent 120 m along the tributary of Cold Creek, which itself is a tributary to the Humber River. This tributary passes west of the Secondary Plan Area and through its southwest corner. A fluvial geomorphic assessment completed under separate cover for this feature determined that the northern extent of the watercourse is situated in an unconfined valley, while the southern extent (within the Secondary Plan Area) is regularly ploughed through and lacked a defined bed or banks at the time of the survey (GEI, 2024).

Based on the criteria outlined in the NHRM and the Greenbelt Plan Technical Paper, the valleylands along the tributary of Cold Creek do not meet the criteria for significance due to the following:

- Low degree of naturalness due to surrounding urban and agricultural land use (resulting in cultural vegetation communities and invasive species);
- Low community and species diversity;
- Likely absence of unique communities and species;
- Limited habitat for wildlife; and
- Limited linkage function due to barriers at Columbia Way and Mount Hope Road.

Therefore, there are no significant valleylands located within the Secondary Plan Area or the adjacent 120 m.

2.5.1.5 Significant Wildlife Habitat

SWH is one of the more complex natural heritage features to identify and evaluate. There are several provincial documents that discuss identifying and evaluating SWH including the NHRM (MNR, 2010), the *Significant Wildlife Habitat Technical Guide* (MNR, 2000), and the SWH Ecoregion Criteria Schedules. The Land Holdings are located in Ecoregion 6E and were therefore assessed using the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E* (MNRF, 2015a).

There are four broad categories of SWH types: seasonal concentration areas, rare vegetation communities and specialized wildlife habitat, habitats of species of conservation concern, and animal movement corridors. The following subsection discusses each of these broad categories in relation to the Land Holdings. Additional detail on the SWH analysis is provided in **Table 9 (Appendix A.1.2)**, and the locations of identified Confirmed and Candidate SWH types are shown in **Figure 8 (Appendix A.1.1)**.

2.5.1.5.1 Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather at one time of the year, or where several species congregate. Seasonal concentration areas include deer yards; wintering sites for snakes, bats, raptors, and turtles; waterfowl staging and molting areas; bird nesting colonies; shorebird staging areas; and migratory stopover areas for passerines or butterflies. Only the best examples of these concentration areas are designated as SWH. Areas that support Special Concern species or provincially vulnerable to imperiled species (S1–S3) or that support a large proportion of the population are examples of seasonal concentration areas that should be designated as significant.

No candidate or confirmed Seasonal Concentration Area SWH types are present within the

Secondary Plan Area.

The following **Candidate SWH** was noted within 120 m of the Secondary Plan Area:

- Raptor Wintering Areas – FOD east of Mount Hope Road; and
- Bat Maternity Colonies – FOD5-2 within the Greenbelt Plan Area and FOD east of Mount Hope Road.

2.5.1.5.2 Rare Vegetation Communities or Specialized Wildlife Habitat

Rare habitats are those with vegetation communities considered rare in the province. S-Ranks are rarity rankings applied to species at the provincial level and are part of a system developed by the Nature Conservancy (Arlington, VA). Generally, community types with S-Ranks of S1–S3 (extremely rare to rare/uncommon in Ontario), as defined by the NHIC, could qualify. These habitats are assumed to be at risk and likely support significant wildlife species.

No rare vegetation communities were identified within the Secondary Plan Area or the adjacent 120 m.

Specialized habitats are microhabitats that are critical to some wildlife species. The NHRM (MNR, 2010) defines specialized habitats as those that provide for species with highly specific habitat requirements, areas with exceptionally high species diversity or community diversity, and areas that provide habitat that greatly enhances species' survival. Only habitats identified as exceptional examples, such as supporting a great diversity of species or large number of individuals, are typically designated as significant.

No candidate or confirmed Specialized Wildlife SWH types are present within the Secondary Plan Area.

The following **Candidate SWH** was noted within 120 m of the Secondary Plan Area:

- Seeps and Springs – FOD5-2 and CUW1 within the Greenbelt Plan Area
- Woodland Raptor Nesting Habitat – FOD east of Mount Hope Road; and

- Woodland Area-sensitive Breeding Bird Habitat – FOD east of Mount Hope Road.

2.5.1.5.3 Habitat for Species of Conservation Concern

Species of conservation concern include those that are Special Concern and provincially rare (S1–S3, SH). Several specialized wildlife habitats are also included in this SWH category, such as terrestrial crayfish habitat and significant breeding bird habitats for marsh, open country, and early successional bird species. Habitats of species of conservation concern do not include habitats of Endangered or Threatened species as identified by the *Endangered Species Act*. **Section 2.5.1.9** discusses Endangered and Threatened species.

The following **Confirmed Special Concern and Rare Wildlife Species SWH** was noted within the Secondary Plan Area and the adjacent 120 m:

- Terrestrial Crayfish – MAS2-1/MAM2 and MAM2 communities within the southern portion of the Secondary Plan Area and SA/MAS2-1/MAM2-2 and MAS2-1/MAM2-2 communities located within the Greenbelt Plan Area **(Figure 8, Appendix A.1.1)**;
- Eastern Wood-pewee (Special Concern) – FOD5-2 and CUW1 within the Greenbelt Plan Area; and
- Wood Thrush (Special Concern) – FOD5-2 and CUW1 within the Greenbelt Plan Area.

The following **Candidate Special Concern and Rare Wildlife Species SWH** was noted within 120 m of the Secondary Plan Area:

- Special Concern Species: Eastern Wood-pewee – FOD east of Mount Hope Road Lands;
- Special Concern Species: Wood Thrush – FOD east of Mount Hope Road; and
- Rare Wildlife Species: Chestnut Schizura Moth (S3) – FOD5-2 and CUW1 within the Greenbelt Plan Area and FOD east of Mount Hope Road.

2.5.1.5.4 Animal Movement Corridors

Animal movement corridors are areas traditionally used by wildlife to move from one habitat to

another. This is usually in response to different seasonal habitat requirements. Animal movement corridors are only identified as SWH where a confirmed or candidate SWH has been identified by MNR or the planning authority.

For ecoregion 6E, animal movement corridors include Amphibian Movement Corridors (a required component of Wetland Amphibian Breeding Habitats SWH) and Deer Movement Corridors (a required component of Deer Yarding Areas and Deer Winter Congregation Areas). As none of these SWH types exist within the NH Study Area, animal movement corridors are also absent.

2.5.1.6 Fish Habitat

"Fish habitat" is defined in the federal *Fisheries Act, 1985* as "water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas." The definition for "fish" includes "(a) parts of fish, (b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and (c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals."

The large anthropogenic pond located at the northern end of the Land Holdings is an offline feature and, as such, does not provide fish habitat. Indirect fish habitat is present in both the watercourse and the HDFs within the Secondary Plan Area (see **Section 2.4.7.2** and **Figure 9, Appendix A.1.1**). Candidate direct fish habitat was identified in the watercourses outside the Secondary Plan Area, within the adjacent 120 m.

2.5.1.7 Habitat of Endangered and Threatened Species

Endangered and Threatened species are those identified on the SARO list (O. Reg. 230/08). GEI reviewed existing background information and identified known SAR records from the broader landscape surrounding the Land Holdings, as summarized in **Section 2.4.4**. Furthermore, GEI completed targeted ecological field surveys, the results of which are summarized in **Sections 2.4.5**

and **2.4.6**.

The Endangered and Threatened species identified through background review (**Section 2.4.4**) were evaluated to determine their presence and the potential for suitable habitat within the NH Study Area, based on GEI's ecological field survey results. The results of this evaluation are presented in **Table 10 (Appendix A.1.2)** and **Figure 10 (Appendix A.1.1)** and summarized below.

The following Candidate Habitat of Endangered and Threatened Species was noted within the Secondary Plan Area and the adjacent 120 m:

- SAR Bats (Endangered) – Several deciduous treed areas including hedgerows, CUW, and FOD communities are located within the Greenbelt Plan Area and may provide SAR bat habitat. There is presently no suitable SAR bat habitat within the Secondary Plan Area.

The following Candidate Habitats of Endangered and Threatened Species were noted within 120 m of the Secondary Plan Area:

- Acadian Flycatcher (Endangered) – Suitable habitat for this species may be present within the off-site FOD east of Mount Hope Road; and
- Red-headed Woodpecker (Endangered) – Suitable habitat for this species may be present within the off-site FOD east of Mount Hope Road.

No Endangered or Threatened species or their habitats were confirmed in the NH Study Area through the ecological field surveys.

2.5.1.8 Significant Areas of Natural and Scientific Interest

ANSIs are identified by the MNR as areas with provincially or regionally significant and representative geological or ecological features that provide life science or earth science values related to protection, scientific study, or education.

There are no ANSIs located within the NH Study Area.

2.5.2 Greenbelt Plan

The western portion of the Land Holdings outside the Secondary Plan Area is designated as Protected Countryside. The Greenbelt Plan (MMA, 2017) sets out policies to protect KNHFs and KHFs, as described in **Section 2.2.2**.

The following KNHFs and KHFs were identified within the Greenbelt Plan, located within the NH Study Area to the west of the Secondary Plan Area:

- Identified **KNHFs** include the following:
  - Candidate Habitat of Endangered and Threatened species (see **Section 2.5.1.7**);
  - Indirect fish habitat and candidate direct fish habitat (see **Section 2.5.1.6**);
  - Wetlands (see **Section 2.5.1.1**);
  - Significant woodlands (see **Section 2.5.1.3**);
  - SWH (see **Section 2.5.1.5**).
- Identified **KHFs** include the following:
  - Permanent and intermittent streams (see **Section 2.4.7.1**); and
  - Wetlands (see **Section 2.5.1.1**).

In accordance with Section 3.2.5 of the Greenbelt Plan, a minimum VPZ of 30 m is required for fish habitat, wetlands, significant woodlands, permanent and intermittent streams, lakes, and seepage areas and springs. All other KNHFs and KHFs require a VPZ which "is of sufficient width" to protect its form and function from the impacts of the proposed development.

In addition to KNHFs and KHFs, the Greenbelt Plan also protects KHAs. The following **KHAs** were identified based on background review within the Greenbelt Plan, located within 120 m to the west of the Secondary Plan Area:

- Significant groundwater recharge areas.

However, subsurface investigations by SEL primarily encountered silty clay and silty clay till, which are low permeability soils, and hydraulic conductivity testing indicated moderate to low

hydraulic conductivity. These findings do not support the background mapping of significant groundwater recharge areas. KHAs are further addressed in the hydrogeological sections of this LSS.

2.5.3 Peel Region and Future Caledon Official Plans

The following components of the **Greenlands System** of the Peel Regional Official Plan (2022) were identified within the NH Study Area:

- Core Areas designated and shown on Schedule C-2:
  - PSWs (see **Section 2.5.1.1**); and
  - Woodlands meeting one or more Table 1 criteria (see **Section 2.5.1.3**).
- Natural Areas and Corridors:
  - Evaluated non-PSWs (see **Section 2.5.1.1**);
  - SWH (see **Section 2.5.1.5**);
  - Indirect fish habitat and candidate direct fish habitat (see **Section 2.5.1.6**);
  - Candidate Habitat of Endangered and Threatened species (see **Section 2.5.1.7**); and
  - Stream corridor not defined as part of the Core Areas (see **Section 2.4.7.1**).
- Potential Natural Areas and Corridors:
  - Unevaluated wetlands (see **Section 2.5.1.1**);
  - Sensitive ground water recharge areas; and
  - Enhancement areas, buffers, and linkages.
- The NHS overlay of the Greenbelt Plan (MMA, 2017; see **Section 2.5.2**); and
- Urban River Valleys of the Greenbelt Plan (see **Figure 2, Appendix A.1.1**).

The Region does not provide buffer/setback requirements; rather, it defers to the Greenbelt Plan or Town's requirements, as applicable.

The following components of the **Natural Environment System** of the Future Caledon Official Plan (2025) were identified within the NH Study Area:

- Core Areas of the Greenlands System (see paragraph above) with the following corresponding **Natural Features and Areas**;
  - PSWs (see **Section 2.5.1.1**); and
  - Woodlands meeting one or more Table 1 criteria (see **Section 2.5.1.3**).
- Natural Areas and Corridors and Potential Natural Areas and Corridors of the Greenlands System (see paragraph above) with the following corresponding **Supporting Features and Areas**:
  - Evaluated non-PSWs (see **Section 2.5.1.1**);
  - Unevaluated wetlands (see **Section 2.5.1.1**);
  - SWH (see **Section 2.5.1.5**);
  - Indirect fish habitat and candidate direct fish habitat (see **Section 2.5.1.6**);
  - Candidate Habitat of Endangered and Threatened species (see **Section 2.5.1.7**);
  - Stream corridor not defined as part of the Core Areas (see **Section 2.4.7.1**);
  - Sensitive ground water recharge areas; and
  - Enhancement areas, buffers, and linkages.
- The NHS overlay of the Greenbelt Plan (see **Section 2.5.2**);
- Urban River Valleys of the Greenbelt Plan (see **Figure 2, Appendix A.1.1**); and
- The water resource system consisting of the following:
  - Permanent and intermittent streams (see **Section 2.4.7.1**);
  - Wetlands (see **Section 2.5.1.1**); and

Section 13.9.5 of the Future Caledon Official Plan states that “minimum buffer widths will be established in local subwatershed or equivalent studies prepared to the satisfaction of the Town”. Section 13.9.6 further states that “final buffer width(s) within New Community Areas and New Employment Areas will be determined through an environmental impact study, prepared to the satisfaction of the Town.” As a result, the minimum buffer widths presented within Section 13.8 do not apply.

2.5.4 Toronto and Region Conservation Authority

The unnamed tributary of Cold Creek, discussed in **Section 2.4.7.1**, is a regulated watercourse with a meander belt. The meander belt limits were determined by GEO Morphix, discussed further in the fluvial geomorphology sections of this LSS. All wetlands identified within the NH Study Area are also TRCA-regulated features, along with their 30 m areas of interference.

Within Section 7.3.1.4 of *The Living City* (2014) policies, the following setbacks are prescribed for natural hazards:

- 10 m buffer from the greater of long-term stable top of slope/bank, stable toe of slope, regulatory floodplain and/or meander belt; and
- 30 m buffer from PSWs or a 10 m buffer for all other wetlands.

Other natural heritage setbacks provided within *The Living City* are not included here, as the TRCA no longer provides comments on natural heritage considerations.

2.6 Existing Natural Heritage System

An NHS is defined in the NHRM (2010) as "an ecologically based delineation of nature and natural function" and "a system of connected or to be connected green and natural areas that provide ecological functions over a longer period of time and enable movement of species."

The Mount Hope West Secondary Plan NHS will encompass natural heritage features and natural hazards, along with their associated setbacks, to ensure the protection and enhancement of these features and their ecological functions. Its primary goal is to maintain and enhance habitat, foraging opportunities, and movement corridors for as many species as possible.

The NHS boundaries may be refined in Phase 2 to incorporate ecological offsetting and enhancement areas within the Proposed NHS.

2.6.1 Settlement Area Boundary Expansion Preliminary Natural Heritage

System

As discussed in **Section 2.2.3.2.1**, the SABE Scoped SWS (Wood et al., 2022) identified a Preliminary NHS within the SABE boundary. The Preliminary NHS for the Mount Hope West Secondary Plan Area is shown in Figure DA2-9c (Appendix E) of the SABE Scoped SWS, and a copy is included in **Appendix A.1.6** of this report. However, the SABE SWS acknowledges that this boundary was based largely on aerial interpretation and is subject to refinement following targeted field surveys.

Accordingly, the goal of this LSS is to identify and refine the Existing NHS based on site-specific ecological field data and in accordance with the Future Caledon Official Plan (2025).

2.6.2 Mount Hope West Secondary Plan Area Existing Natural Heritage System

Phase 1 of this LSS has characterized and assessed the significance of natural heritage features within the NH Study Area. This information was used to delineate the Existing NHS, discussed further in **Section 2.6.2** below. The Existing NHS is intended to supersede the Preliminary NHS of the SABE Scoped SWS.

2.6.2.1 Natural Heritage Features Summary

GEI completed an analysis of existing natural heritage features on the Land Holdings (see **Section 2.4**) followed by an evaluation of their significance against provincial and municipal criteria (see **Section 2.5**). In summary, the following natural heritage features were identified within the Study Area:

- PSWs and unevaluated wetlands (within Secondary Plan Area and adjacent 120 m)
- Significant woodlands (adjacent 120 m only)
- Confirmed SWH (within Secondary Plan Area and adjacent 120 m):
    - Confirmed Habitat for Species of Conservation Concern:

        - Terrestrial Crayfish – MAS2-1/MAM2 and MAM2 communities within the southern portion of the Secondary Plan Area and SA/MAS2-1/MAM2-2 and MAS2-1/MAM2-2 communities located within the Greenbelt Plan Area
        - Eastern Wood-pewee (Special Concern) – FOD5-2 and CUW1 within the Greenbelt Plan Area
        - Wood Thrush (Special Concern) – FOD5-2 and CUW1 within the Greenbelt Plan Area
- Candidate SWH (adjacent 120 m only):
    - Candidate Seasonal Concentration Areas:
        - Raptor Wintering Areas – FOD east of Mount Hope Road
        - Bat Maternity Colonies – FOD5-2 within the Greenbelt Plan Area and FOD east of Mount Hope Road
    - Candidate Specialized Wildlife Habitat:
        - Seeps and Springs – FOD5-2 and CUW1 within the Greenbelt Plan Area
        - Woodland Raptor Nesting Habitat – FOD east of Mount Hope Road
        - Woodland Area-sensitive Breeding Bird Habitat – FOD east of Mount Hope Road
    - Candidate Habitat for Species of Conservation Concern:
        - Special Concern Species: Eastern Wood-pewee – FOD east of Mount Hope Road Lands
        - Special Concern Species: Wood Thrush – FOD east of Mount Hope Road
        - Rare Wildlife Species: Chestnut Schizura Moth (S3) – FOD5-2 and CUW1 within the Greenbelt Plan Area and FOD east of Mount Hope Road
- Indirect fish habitat (with Secondary Plan Area and adjacent 120 m) and candidate direct fish habitat (within adjacent 120 m)
- Habitat of Endangered and Threatened species (adjacent 120 m only):
    - Candidate habitat for SAR bats (Endangered) – FOD east of Mount Hope Road as well as hedgerows, CUW1, and FOD5-2 within the Greenbelt Plan Area

  - Candidate habitat for Acadian Flycatcher (Endangered) – FOD east of Mount Hope Road
  - Candidate habitat for Red-headed Woodpecker (Endangered) – FOD east of Mount Hope Road
- Stream corridor not defined as part of the Core Areas (within Secondary Plan Area and adjacent 120 m)
- Enhancement areas, buffers, and linkages (within Secondary Plan Area and adjacent 120 m)
- The NHS overlay of the Greenbelt Plan (within 120 m of the Secondary Plan Area)
- Urban River Valleys of the Greenbelt Plan (within 120 m of the Secondary Plan Area)

The locations of these significant natural heritage features are shown in **Figures 6B to 10 (Appendix A.1.1)**.

2.6.2.2 Natural Heritage Feature Reassessment

The natural heritage features reassessed as part of delineating the Existing NHS for the NH Study Area are shown in **Figures 6B to 10 (Appendix A.1.1)**. These features were first reassessed based on the definitions of the SABE Scoped SWS, as summarized below:

- **Key Features**:
  - Much of the significant woodland located to the west of the Secondary Plan Area **(Figure 7, Appendix A.1.1)** was identified as a Supporting Feature in the Preliminary NHS but is identified as a Key Feature in the Existing NHS.
  - Wetland mapping **(Figure 6B, Appendix A.1.1)** was updated for the NH Study Area, and these features are included as Key Features in the Existing NHS.
  - Confirmed Special Concern and Rare Wildlife Species SWH areas **(Figure 8, Appendix A.1.1)** have been identified as Key Features in the Existing NHS.
- **Supporting Features**:

- All HDFs identified as Mitigation **(Figure 5, Appendix A.1.1)** are included as Supporting Features in the Existing NHS. This includes HDFs that were not identified in the Preliminary NHS as well as one HDF previously identified as a Key Feature.
- Historically, the southwest portion of the Secondary Plan Area on the Land Holdings consisted of an uncultivated meadow and was identified in the SABE Scoped SWS as a Supporting Feature. However, the area has since been converted to agricultural land use, and has therefore been removed from the Existing NHS mapping.

- **Other Features:**
  - The large anthropogenic pond at the northern end of the Land Holdings **(Figure 4, Appendix A.1.1)** was identified in the SABE Scoped SWS as requiring further assessment to determine its status. As this is an offline feature and does not provide fish habitat, it is not considered a Key Feature. The SABE Scoped SWS also identifies open aquatic habitats as Supporting Features but does not provide criteria for how this designation is to be assessed. This feature has been removed from the Existing NHS mapping.

The Future Caledon Official Plan (2025) designations and overlay designations are "Natural Features and Areas" and "Supporting Features and Areas." The natural heritage features and components of these designations are summarized in **Sections 2.2.5.1.2 and 2.2.5.1.3**. Accordingly, the natural heritage features of the NH Study Area were reassessed based on the definitions of the Future Caledon Official Plan., as summarized below:

- **Natural Features and Areas**:
  - Significant woodlands are considered Natural Features and Areas per the Official Plan and are therefore included in the Existing NHS. There is one significant woodland within the NH Study Area, located within the Greenbelt Plan Area.
  - PSWs are considered Natural Features and Areas per the Official Plan and are therefore included in the Existing NHS. There are two PSWs within the NH Study Area, located within the Greenbelt Plan Area.
- **Supporting Features and Areas**:

- Non-PSW wetlands are considered Supporting Features and Areas per the Official Plan and are therefore included in the Existing NHS. All wetlands within the Secondary Plan Area and most wetlands within the Greenbelt Plan Area are included in this designation.
- SWH is considered Supporting Features and Areas per the Official Plan and are therefore included in the Existing NHS. Where SWH overlaps with another natural heritage component designated as Key Features and Areas, the more restrictive designation prevails.
- Fish habitat is considered Supporting Features and Areas per the Official Plan and are therefore included in the Existing NHS. All watercourses and HDFs identified as providing indirect fish habitat or candidate direct fish habitat or are included in this designation.

Meadow and open aquatic habitats are not designated as either Natural Features and Areas or Supporting Features and Areas per the Official Plan and are therefore not part of the Existing NHS.

2.6.2.3 Ecological Setbacks

The establishment of ecological setbacks from retained natural heritage features helps to protect their form and function from potential development impacts. These setbacks are established in accordance with provincial and municipal policies. Section 13.10.5 of the Future Caledon Official Plan states that "minimum buffer widths will be established in local subwatershed or equivalent studies prepared to the satisfaction of the Town to support secondary planning and development in New Community Areas […]" This LSS recommends ecological setbacks for each natural heritage feature type within the Secondary Plan Area based on feature significance and ecological sensitivity, to be confirmed in consultation with the Town of Caledon and the TRCA.

Wetlands

Both the Greenbelt Plan (MMA, 2017) and the Future Caledon Official Plan prescribe a 30 m setback for all wetlands, regardless of their significance.

For the current Secondary Plan Area, which is intended to guide future intensification and development within the Secondary Plan Area identified in the Peel Regional Official Plan (2022) and the Future Caledon Official Plan, GEI proposes reduced setbacks of 15 m for wetlands that have been evaluated and determined to be non-PSWs. All PSWs would continue to require a 30 m setback.

For non-PSWs located within the Greenbelt Plan, setbacks would remain at 30 m as per provincial requirements. However, where these setbacks extend into the Secondary Plan Area, they would be reduced to a minimum of 15 m in accordance with the Secondary Plan, as shown in **Figure 6B (Appendix A.1.1)**. All PSWs would continue to require a 30 m setback.

Woodlands

The Greenbelt Plan requires a 30 m setback from significant woodlands, where the setback is contained fully within the Greenbelt Plan Area, while the Future Caledon Official Plan prescribes a 20 m setback from significant woodlands.

GEI recommends that the current Secondary Plan Area follow the same approach. Consequently, a 30 m setback from the significant woodland is shown within the Greenbelt Plan in **Figure 7 (Appendix A.1.1)**, whereas this setback is reduced to 15 m where it extends within the Secondary Plan Area.

Watercourses and Fish Habitat

The Greenbelt Plan (MMA, 2017) requires a 30 m setback from fish habitat. In addition, the TRCA requires a 10 m setback from the greater of the long-term stable top of slope or bank, stable toe of slope, regulatory floodplain, and/or meander belt.

GEI recommends that the Secondary Plan Area follow the TRCA's setback requirements. Accordingly, a 30 m setback is applied to watercourses located within the Greenbelt Plan Area, as shown in **Figure 9 (Appendix A.1.1)**. In addition, a 10 m setback is applied from the meander belt limit of the tributary and from the Conservation-ranked HDF throughout both the Greenbelt Plan

Area and the Secondary Plan Area.

Other Natural Heritage Features

There are no prescribed setbacks for other natural heritage feature types (e.g., SWH). This is consistent with provincial and municipal policies. However, these natural heritage features are typically associated with other features such as wetlands and woodlands, which do have prescribed setbacks. An evaluation of no net negative impacts to other natural heritage features or their functions will be completed as part of Phase 2 of this LSS.

2.6.2.4 Existing Natural Heritage System Mapping Summary

The Existing NHS was delineated based on the above reassessment of the natural heritage features of the NH Study Area. The outer limit of the Existing NHS was determined based on the greatest constraint, including both the natural heritage features and their associated setbacks. The updated NHS mapping for the Mount Hope West Secondary Plan Area (including the adjacent 120 m lands) is shown in **Figure 11 (Appendix A.1.1)**.

3.0 Fluvial Geomorphology

A fluvial geomorphological assessment has been completed for the central tributary that traverses the subject lands, as well as reaches downstream (east) of Mount Hope Road, to inform, in part, constraints to proposed development and support the stormwater management strategy for the Secondary Plan Area. The assessment for Phase 1 of the LSS included the completion of the following tasks:

- Review of available background reports and mapping (i.e., watershed/subwatershed studies, geology, topography, conceptual development plans)
- Refine watercourse reaches previously delineated in the SSWS (Wood 2022) based on a desktop assessment of available data and confirmed through field reconnaissance

- Review recent and historical aerial photographs to understand historical changes in channel form and function, land use and land cover
- Conduct reach-level rapid geomorphological field assessments following standard protocols (e.g., RGA, RSAT) to evaluate instream and riparian conditions
- Complete detailed geomorphological field surveys to support the overall erosion mitigation plan for stormwater management and the conceptual natural corridor design
- Review/confirm the erosion hazard delineated by others in support of defining, in part, the limit of development
- Prepare conceptual natural corridor design plans for the proposed channel realignment (planform, cross-sections, floodplain features, and bioengineering details)

3.1 Reach Delineation

Reaches are homogeneous segments of channel used in geomorphological investigations. Reaches are studied semi-independently as each is expected to function in a manner that is at least slightly different from adjoining reaches. This method allows for a meaningful characterization of a watercourse as the aggregate of reaches, or an understanding of a reach, for example, as it relates to a proposed activity. Reaches are typically delineated based on changes in the following:

- Channel planform
- Channel gradient
- Physiography
- Land cover (land use or vegetation)
- Flow, due to tributary inputs

- Soil type and surficial geology
- Historical channel modifications

This follows scientifically defensible methodology proposed by Montgomery and Buffington (1997), Richards et al. (1997), and the Toronto and Region Conservation Authority (2004). Reaches are first delineated as a desktop exercise using available data and information such as aerial photography, topographic maps, geology information and physiography maps. The results are then verified in the field.

Reaches within the Subject Lands were previously delineated at a high-level as part of the SWS (Wood, 2022) and subsequently reviewed in the field by GEI (2025). Based on site-specific detailed field work and to be consistent with ongoing studies west of the Subject Lands, the watercourse reach naming convention has been revised as part of the current study. The extent of Reach TCC(1)-2 identified in the SSWS was renamed THRE-1-1 and Reach TCC(1)-1 was subdivided and renamed to THRE-1-2 and THRE-1-3. Revised watercourse reach delineation and the locations and extents of HDFs delineated by GEI (2025) are graphically presented in **Appendix A.2.**

3.1.1 Reach Observations

Field investigations were completed on February 27, March 14 and March 26, 2025, and included the following observations on a reach basis:

- Descriptions of riparian conditions
- Estimates of bankfull channel dimensions
- Determination of bed and bank material composition and structure
- Confirmation of valley form (i.e., unconfined, partially confined, confined)
- Observations of erosion, scour, or deposition

- Collection of photographs to document watercourses, riparian areas, adjacent land use, and channel disturbances such as crossing structures

These observations and measurements are summarized in **Table 3-1**. Field descriptions, representative photographs and field sheets are also provided in **Appendix A.2**.

Table 3-1: General Reach Characteristics

Reach Name	Avg. Bankfull Width (m)	Avg. Bankfull Depth (m)	Bed Substrate	Bank Materials	Dominant Riparian Vegetation	Notes
THRE-1-1*	1.1	0.19	Predominantly clay, silt and a few boulders	Clay and silt	Narrow riparian buffer of grasses and herbaceous plants	Poorly defined with the exception of the downstream extent where two knickpoints l (0.55 and 0.63 m) and shallow scour pool (0.13 m) had formed
THRE-1-2**	3.66*	0.42*	Clay and silt		Moderate riparian buffer of grasses and mature trees	Channel was inundated at the time of assessment
THRE-1-3***	0.70	0.14	Clay and silt		Narrow riparian buffer of herbaceous vegetation	Poorly defined feature that gained definition at the downstream extent, flanked by agricultural fields
THRF-1	3.07*	0.28*	Clay/silt to boulders and parent material (till)		Wide continuous riparian buffer of mature trees	Heavily entrenched with high banks, evidence of erosion, terraces
THRF-2	2.26*	0.34*	Clay/silt and gravel	Clay/silt to gravel	Wide continuous riparian	Highly eroded with many treefalls, multiple relatively

					buffer of mature trees and shrubs	small knickpoints

* *Channel generally poorly defined, bankfull dimensions represent maximum measurements based on field observations*

***Channel dimensions based on detailed geomorphological assessments*

*** *Channel dimensions based on one cross-section*

THRE-1-1 was the furthest downstream reach of Tributary E on the Subject Lands. The majority of the reach was artificially straightened and cultivated, resulting in poor definition. Additionally, there was little to no riparian vegetation along the reach. The downstream extent of the reach had two knickpoints measuring 0.55 m and 0.63 m in hieght,, after which point the channel maintained some definition until it reached the confluence with **THRE-1**. Bed and bank substrates were composed of clay/silt and a few boulders. The maximum bankfull width and depth were 1.1 m and 0.19 m, respectively.

THRE-1-2 flowed along the margin and within a woodlot. Riparian vegetation was composed of grasses and trees. The channel widened upstream, though the forest was inundated with water at the time of the assessment. Historical air photos indicated that the current channel form could be due, at least in part, to historical modifications (dug ponds and tree clearing). Bed and bank substrates were composed of clay and silt and moderately sorted. A detailed assessment on the downstream extent of **THRE-1-2** indicated that the average bankfull width and depth were 3.66 and 0.42, respectively.

THRE-1-3 transitioned from forest to agricultural land uses. The downstream extent of the reach had a narrow riparian corridor with mature trees that encroached the channel that then transitioned to grasses. Riffle and pool morphology was absent and channel substrates were comprised of clay and silt. Bankfull width was approximately 0.70 m and bankfull depth was approximately 0.14 m.

THRF-1 was a forested reach in a confined valley system. The reach exhibited sinuous meanders, had a moderate gradient and a high degree of entrenchment, with banks approximately 2 m in height. Erosion was observed along the length of the reach and the channel was trapezoidal in shape. Riparian vegetation primarily consisted of large, mature trees. Woody debris and treefalls

were prevalent and undercuts of up to 0.64 m were measured. Bed and bank substrates ranged from clay/silt to boulders and exposed till. The reach contained predominantly riffles and channel substrates were poorly sorted. Based on detailed channel cross-section surveys, average bankfull channel width was 3.07 m and average bankfull channel depth was 0.28 m.

THRF-2 was located along Tributary F immediately east of Mount Hope Road. The reach contained a single meandering channel within a confined valley. It was moderately entrenched and had a moderate gradient. At the time of assessment, flow was absent and only pools of standing water were noted. The riparian vegetation consisted of mature trees and some shrubs. Ongoing bank erosion was noted, and undercutting was common throughout the reach. Two knickpoints were observed, indicative of channel adjustment (i.e. degradation). Fallen and leaning trees were present, along with accreting point bars. Bank substrates consisted of clay, silt and gravel, and where riffles were present, they also contained cobbles.

3.1.2 Rapid Assesments

Rapid assessments were completed to identify dominant geomorphic processes, document stream health, and to identify any areas of concern regarding erosion or instability. Channel instability was objectively quantified through the application of the Ontario Ministry of the Environment's (MOE) (2003) Rapid Geomorphic Assessment (RGA). Observations were quantified using an index that identifies channel sensitivity based on evidence of aggradation, degradation, channel widening, and planimetric adjustment. The index produces values that indicate whether a channel is stable/in regime (score <0.20), stressed/transitional (score 0.21-0.40), or adjusting (score >0.41).

The Rapid Stream Assessment Technique (RSAT) was also employed to provide a broader view of the system as it considers the ecological function of the watercourse (Galli, 1996). Observations were made of channel stability, channel scouring or sediment deposition, instream and riparian habitats, and water quality. The RSAT score ranks the channel as maintaining a poor (<13), fair (13-24), good (25-34), or excellent (35-42) degree of stream health.

The reaches were also classified according to a modified Downs (1995) Channel Evolution Model, which describes successional stages of a channel as a result of a perturbation, namely hydromodification. Understanding the current stage of the system is beneficial as this allows one to predict how the channel will continue to evolve or respond to an alteration to the system.

Although the RGA and RSAT tools are intended to be generally used on natural systems with defined channels, which are not present outside of the woodlot on the subject lands, results are reported below as they still provide an assessment of channel stability and overall stream health. A summary of the reach classifications and rapid assessment scores is provided in **Table 3-2**.

Table 3-2: Summary of Rapid Assessment Results

Reach	RGA (MOE, 2003)			RSAT (Galli, 1996)			Downs (1995)
	Score	Condition	Dominant Systematic Adjustment	Score	Condition	Limiting Feature(s)	
THRE-1-1	0.20	In Regime	Planimetric form adjustment	18	Fair	Riparian habitat conditions	S - Stable
THRE-1-2	0.28	In Transition	Aggradation and widening	26	Good	Channel scouring/ sediment deposition	M - migration
THRE-1-3	0.13	In Regime	Aggradation	23	Fair	Riparian habitat condition	M - migration
THRF-1	0.68	In Adjustment	Widening	24	Fair	Channel stability	E - enlarging
THRF-2	0.33	In Transition	Widening	20	Fair	Channel stability	E - enlarging

3.1.3 Detailed Geomorphological Assessments

Obtaining detailed geomorphological measurements and observations allows for a more complete characterization of channel geometry, flow and sediment characteristics. Instream surveys are

typically used to support natural corridor designs and erosion threshold calculations. A detailed geomorphological assessment was completed along Reach THRE-1-2 on March 14. 2025 in support of the proposed natural corridor design as it represented a more natural channel segment when compared to THRE-1-1 within the agricultural field. Detailed assessments were completed along Reaches THRF-1 and THRF-2 on April 14, 2025 and November 11, 2024, respectively. Both of these reaches were surveyed as they had relatively high RGA scores and are located downstream of the proposed SWMP that will outlet to the tributary at Mount Hope Road.

The survey at each location included the following measurements:

- Longitudinal survey of the channel centre line
- Detailed surveys of up to eight to ten detailed cross-sections
- Instream measurements of bankfull channel geometry, riparian conditions, bank material, bank height/angle, and bank root density at each surveyed cross-section
- Bed material sampling at each cross-section following a modified Wolman (1954) pebble count or substrate sample, as appropriate

The results of the detailed assessments are presented in

Table 3-3. A full summary of each detailed assessment is provided in **Appendix A.2**.

Table 3-3: Measured and Calculated Bankfull Channel Parameters

Channel Parameter	Reach		
	THRE-1-2	**THRF-1**	**THRF-2**
Measured			
Average bankfull channel width (m)	3.66	3.07	2.26
Average bankfull channel depth (m)	0.42	0.28	0.34
Bankfull Channel Gradient (%)	0.37	3.06	5.79
D_{50} (mm)	<2	19.1	<2.0
D_{84} (mm)	<2	58.9	46.0
Manning's n roughness coefficient	0.035	0.050	0.050
Computed			
Bankfull discharge (m^3/s)[a]	1.51	1.29	1.77
Average bankfull velocity (m/s)	0.97	1.50	2.33
Unit stream power at bankfull discharge (W/m^2)	15	126	446
Critical shear street (N/m^2)[b]	----	13.92	----
Flow competency for D50 (m/s)[c]	----	0.77	----
Flow competency for D84 (m/s) [c]	----	1.29	1.15

[a] *Based on Manning's equation*

[b] *Based on Shields diagram from Miller et al. (1997)*

[c] *Based on Komar (1987)*

4.0 Natural Hazards

4.1 Meander Belt Width Assessment

Most watercourses in southern Ontario have a natural tendency to develop and maintain a meandering planform provided there are no topographical or spatial constraints. When defining the limits of an erosion hazard for a watercourse, unconfined and confined systems are assessed differently (TRCA 2004 and MNR 2002). Unconfined systems are those with streams in open areas (i.e., valley not apparent) or with valley walls that are positioned at a sufficient distance where the channel cannot reasonably be expected to contact because of migration under existing or future hydrologic scenarios. In this type of setting, the extent of the erosion hazard is delineated by the meander belt width, which is defined as the lateral extent that a channel has historically occupied and will likely occupy in the future.

Following MNR (2002), the meander belt width can be applied, at minimum, based on 20 times the bankfull channel width. Alternatively, the meander belt width can be determined through a detailed geomorphological study that examines the largest channel meanders observed through historical and recent aerial photograph interpretation. The meander belt width can then be graphically defined using orthorectified aerial imagery by determining the channel centerline and the channel's central tendency (i.e., meander belt axis). In cases where the channel is not discernible in aerial photographs or the channel has been substantially modified, empirical models can be used to estimate the meander belt width.

Confined systems, in contrast, are those where a watercourse is contained within a defined valley where meander bend migration may be constrained by valley walls. Partially confined systems are those where meander bends are adjacent to only one valley wall and the watercourse is therefore restricted in migration and floodplain occupation on one side of the valley system. In these settings, where the channel is positioned within 15 m of a valley slope, the erosion hazard is generally defined by the toe erosion allowance, stable slope allowance, and erosion access allowance. In some instances, a meander belt width may also apply in partially confined systems (i.e., where the channel is greater than 15 m from the valley slope toe).

The central tributary within the Subject Lands was evaluated to be unconfined and as such, the meander belt width defines the erosion hazard. GEI (2025) previously completed a meander belt width based on meander amplitudes in historical and recent aerial imagery. A meander belt width of 33 m was delineated for Reaches THRE-1-2 and THRE-1-3, and a meander belt width of 18 m was delineated for Reach THRE-1-1. GEO Morphix has reviewed the previously delineated meander belt widths in the context of spring 2025 and summer 2026 field observations and measurements of channel dimensions. Given the extent of historical modifications, GEO Morphix completed a detailed review of empirical models to confirm the appropriateness of the 33 m and 18 m meander belt widths noted above.

Empirical modelling results are summarized in **Table 4-1**, below based on field-measured bankfull channel dimensions measured by GEO Morphix, channel slope calculated from topographic data, and drainage area information provided by Schaeffers Consulting Engineers.

Table 4-1: Summary of Modelled Meander Belt Widths for Existing Conditions

Reach	Modified Williams (1986) Area (m)*	Modified Williams (1986) Width (m)*	Ward et al. (2002) Width (m)	Ward et al. (2002) Drainage Area (m)*	TRCA (2004) (m)**	Recommended Meander Belt Width (m)
THRE-1-1	9	7	8	16	22	18
THRE-1-2	32	26	29	16	7	33
THRE-1-3	6	4	5	16	11	33

** Includes 20% factor of safety*

*** Includes one standard error (8.63 m) as factor of safety*

Regarding Reach THRE-1-1, the modelled belt widths based on channel dimensions are relatively low when compared to those based on drainage area. This is attributed to extensive channel modification due to agricultural land uses. Meander amplitudes measured in the field by GEO Morphix along this reach ranged from approximately 9.7 to 12.2 m. The 18 m meander belt width calculated by GEI (2025) is larger than amplitudes measured in the field and is within the range of belt widths calculated using the Ward et al. (2002) drainage area equation and TRCA (2004). It is

recommended that the 18 m meander belt width be adopted for the current study. Notably, this reach is proposed for realignment and a meander belt width for the designed channel is accommodated within the proposed corridor

For Reach THRE-1-2, the meander belt widths summarized in **Table 4-1** that are based on channel dimensions are comparable to the 33 m meander belt width delineated by GEI (2025), while modelled meander belt widths based on the Ward et al. (2002) drainage area equation and TRCA (2004) are substantially smaller. It is recommended that the 33 m meander belt width be adopted for the current study. This reach is also located within a woodlot and the limiting constraint in this area is therefore the drip line and associated buffer.

The meander belt widths calculated by GEO Morphix for Reach THRE-1-3 are substantially lower than the meander belt width delineated by GEI (2025). This is largely due to GEI not subdividing this reach north of the woodlot, as meander belt widths are typically delineated on a reach basis. This reach is located within the Greenbelt and proposed development is set well back from the tributary. For consistency with the downstream reach and the assessment completed by GEI (2025), it is recommended that the 33 m meander belt width be applied.

4.2 Erosion Hazards

As part of the Phase 1 investigation, a slope stability assessment has been completed to establish the erosion hazard limit and the results are presented in the report titled **"***Slope Stability Assessment for Proposed Residential Development, West of Mount Hope Road, Between Columbia Way and Castlederg Side Road, Town of Caledon***",** Reference Number: 2503-S010, dated: March 26, 2025, prepared by Soil Engineers Ltd. SEL (**Appendix A.3.1**).

The subject site is currently utilized as agricultural land and is surrounded by farm fields and residential properties. A valley slope, with a drainage ditch leading to a water channel at the bottom of the slope, is located at the southwest of the subject property.

The purpose of the slope stability assessment is to determine the stability of the existing slope,

and to establish the Long Term Stable Top of Slope (LTSTOS) for the proposed development. Visual inspection of the slope was carried out and it revealed that the slope is well vegetated, trees were in upright position and there were no signs of slope failure during the inspection. Inspection was carried at the bottom of the slope as well along the drainage ditch, and it was noted that active TOE erosions were observed along the bank at localised locations.

Based on our review of the topographic survey plan prepared by R-PE Surveyors, dated November 27, 2024 (**Appendix A.6**), and visual inspection of the slope, one Cross-Section was selected for the stability analysis, showing the most critical slope selection of the slope. The subsurface findings for the section was incorporated from geotechnical investigation carried out by SEL (Reference No. 2309-S138) (**Appendix A.3.2**). Borehole 5 was completed near the vicinity of valley slope.

The stability analyses were carried out using "SLIDE" developed by Rocscience Inc., using Bishop Method. the results of the analysis under existing condition for the Cross-Section did not meet the minimum FOS in accordance to Ontario Ministry of Natural Resources (OMNR) guideline requirement for active land use (minimum FOS of 1.5). Due to the presence of active toe erosion at the edge of the ditch, a toe erosion allowance of 8.0 m was incorporated, and the Cross-Section was re-analysed using a stable slope gradient of 2.9H:1V. The result yielded a FOS of 1.51, meeting the OMNR requirement of FOS 1.5. Furthermore, a development setback from manmade and environmental degradation will be required from the LTSTOS and this is subjected to the requirements of the Toronto and Region Conservation Authority (TRCA).

4.3 Flood Hazards

As a part of the Phase 1 works, existing TRCA hydraulic model covering the site area were reviewed for the delineation of existing flood lines. This section provides an overview of the hydraulic modelling undertaken to establish the baseline floodplain mapping relevant to the site. Note that to inform the hydraulic modelling, hydrologic modelling is undertaken to establish the site flows for the existing base conditions as well. The hydrologic modelling is described in

Section 6.1. The determined updated site flows are used as an input to the hydraulic modelling.

Hydraulic modelling is competed using the U.S. Army Corps of Engineers HEC-RAS 6.3.1. software in GEO-HECRAS. The TRCA provided their existing Humber River HEC-RAS watershed models. Three of these models were used to combine into one to allow for the establishment of a single existing conditions model covering the related site area and downstream analysis length. The three TRCA models used were the hum_77 Upper Humber model, the hum_25 Updated Humber River Revision 1 model, and the hum_20X Upper Humber Zone 2 model. Where reaches of either model connected, a junction was established.

The downstream analysis is performed along the downstream reaches from where changes to the original TRCA model are made, which include Tributary C and Tributary B of Cold Creek West, Main Humber Tributary A, and Cold Creek West up until its confluence with the Main Humber Tributary.

Based on the updated hydrologic flows (see **Section 6.1**), the hydraulic model was updated to present updated existing floodplain mapping. Existing floodplain mapping is provided in **Appendix A.3.3**.

An existing flood vulnerable area (FVA) is noted downstream of the site. This area is identified where Tributary A of the Main Humber River confluences with Cold Creek West, upstream of Caledon King Townline. This FVA was previously mapped by the TRCA. A detailed report prepared by Schaeffers Consulting Engineers describes the performed assessment in further detail. The *Floodplain Delineation and Channel Realignment Design Report – Mount Hope West* report is provided in **Appendix A.3.3**.

5.0 Groundwater

5.1 Hydrogeological Assessment

As a part of the Phase 1 investigation, the following assessments have been completed, and the results are presented in the report titled "*Hydrogeological Assessment for Proposed Residential*

Development, Northwest Quadrant of Mount Hope Road and Columbia Way, Town of Caledon", Reference Number: 2309-W138, Rev.2, dated February 26, 2026, prepared by Soil Engineers Ltd (**Appendix A.4.1**). The following summary presents the findings of the aforementioned hydrogeological assessment.

Based on the Development Concept Plan provided by KLM Planning. dated January 14, 2026, it is understood that the proposed development will include the construction of a single detached, semi-detached, Townhouse, Mid-Rise Residential block in the northeast corner, a commercial block in the southeast corner, a park block, 2 Storm Water Management Ponds (Eastern and Western), and a natural heritage system at the Subject Site. The proposed subdivision will also be provided with roads and municipal services. As the design details for the Commercial Block and Mid-Rise Residential Blocks were not available during the preparation of this report, the associated dewatering requirements will be evaluated once the details become available.

The current investigation revealed that:

- The Subject Site lies within the physiographic region of southern Ontario known as the South Slope and the landform is identified as Till Plain (Drumlinized).
- The Subject Site is located within an area mapped as Clay to silt-textured till (derived from glaciolacustrine deposits or shale) (5d).
- The Subject Site is located within the Humber River Watershed that falls in the Toronto and Region Conservation Authority (TRCA) jurisdiction.
- The ground surface elevation ranges approximately between 257.6 metres above sea level (masl) to 263.0 masl based on ground surface elevations measured at the borehole and monitoring wells' locations.
- The subsoil investigation has revealed that beneath the topsoil veneer, and the Earth fill at the western portion of the site mainly comprises silty clay and silty clay till with interbedded layers of silty fine sand within the northwestern portion of the Subject Site.

- The Subject Site is identified within a Significant Groundwater Recharge Area (SGRA) according to the regional-scale Source Water Protection mapping (Source Water Protection Information Atlas). SGRAs as areas where groundwater recharge occurs through permeable soils such as sand or gravel. Findings from the current site-specific investigation indicate that the Subject Site is primarily composed of silty clay and silty clay till—soil types known for their low permeability. This is further supported by hydraulic conductivity test results from in-situ hydraulic conductivity tests, which also demonstrated low permeability. Given the site's soil composition and the results of the current investigation, the Subject Site does not exhibit the characteristics of a Significant Groundwater Recharge Area.

- Based on the review of the Hydrographs and manual groundwater levels the highest and lowest stabilized shallow groundwater levels measured at El. 263.1 masl and 255.1 masl at BH/MW 12 and BH/MW 5, respectively.

- Based on the review of the Hydrographs and manual water table data, the highest and lowest stabilized water tables recorded in the installed piezometers interacting with the shallow stratigraphy measured at El. 262.1 masl and 256.3 masl at MP 1 and MP 12, respectively.

- The results of analysis for the unfiltered groundwater indicate no exceedance when compared and evaluated against the Region of Peel Sanitary and Storm Sewer Use By-Law parameters.

- The hydraulic conductivity estimates for the silty clay unit range from 2.0×10^{-6} m/sec to 4.9×10^{-8} m/sec, and silty clay till unit ranges from 6.2×10^{-7} m/sec to 5.0×10^{-8} m/sec. The estimated hydraulic conductivity of 1.3×10^{-7} m/sec and 6.2×10^{-7} m/sec for the silty clay and silty clay till, respectively, were used for the current assessment.

- The preliminary estimated short-term construction dewatering flow rate from the groundwater source, with a safety factor of 1.5 and a 2-year storm event for construction

of the proposed underground services, reaches up to 74,400.0 L/day, considering an open and active excavation trench with dimensions of 2 m width and 50 m length. As such, filing an EASR with the MECP is required for the excavation and construction of the proposed installation of the underground services.

- Based on a preliminary estimates, the anticipated dewatering flow rates, including groundwater seepage with a safety factor of 1.5 during storm events for the active excavation area for the proposed residential lots and blocks development that will be constructed below the seasonally high shallow groundwater table, reaches up to 107,600.0 L/day for proposed townhouse blocks, assumed to be comprising of eight (8) units, 16,350.0 L/day for the proposed single-detached residential units, and up to 22,350.0 L/day for the semi-detached units for two (2) attached units. As such, filing an EASR with the MECP is required for the construction of townhouse blocks, but not required for the construction and excavation of the single detached units and the semi-detached units.

- Based on preliminary estimates, the anticipated dewatering flow rates, including groundwater seepage with a safety factor of 1.5 during storm events for the active excavation area for the proposed SWM Ponds ranges from 252,300.0 L/day to 681,700.0 L/day. As such, filing an EASR with the MECP is required for the construction of the SWM Ponds.

- Obtaining a discharge permit from the Region of Peel may be required if the potential collected discharge water during construction is proposed to be discharged to the region's sewer system.

- The maximum estimated long-term foundation drainage flow rate of 71,200.0 L/day is below the MECP PTTW threshold limit of 379,000.0 L/day for the proposed development. As such, applying for PTTW with MECP is not required. However, obtaining a discharge agreement from the Region of Peel is required if the foundation drainage is proposed to be conveyed to the Region’s sewer system.

- The preliminary estimated zone of influence for any temporary construction dewatering array or dewatering area could extend up to 18.5, 12.3, 8.2, and 9.9 m from the conceptual dewatering wells or array considered around the proposed underground services, proposed residential units, Western SWM Pond, and Eastern SWM Pond, respectively. Based on the review of the details, Mount Hope Road and Columbia Way are located outside of the Zone of Influence for any temporary construction dewatering array or wells for Street N, Street B, Street C, Eastern SWM Pond and Western SWM Pond. As such, significant risk for ground settlement is not expected with respect to the proposed development. Record review indicates that there is a total of two (2) tributaries of the Cold Creek that outlet to the Humber River.

    a. One (1) Tributary is mapped in the Northern portion of the Subject Site, flowing from the west to the southeast direction. Based on the review of the draft plan, it is identified as the Natural Heritage System (NHS), and based on the review of the conceptual zone of influence for dewatering, the provincially significant wetland associated with the NHS is located outside the Zone of influence for the installation of underground services proposed beneath Street A, as well as the proposed nearby residential lots and blocks. As such, significant impacts to the above-noted natural feature are not expected with respect to the proposed development.

    b. The second tributary is located in the southern portion of the Subject Site, flowing from the east to the southwest direction and eventually south/southeasterly direction towards the Humber River. Based on the review of the proposed plan, the channel realignment is proposed for the tributary. As such, significant impacts to the above noted natural feature are not expected with respect to the proposed development.

- Records of water bodies (ponded waterbody) are mapped within the Subject Site and surrounding lands. Three (3) records are mapped in the north, central and south portions of the Subject Site.

a. Based on the review of Figure 5- Head Water Drainage Feature Assessment Map dated February 18, 2026, Project 2407713, prepared by GEI Consultant, presented in **Appendix A-4** and discussion with the ecologist, the central water body was not observed during the investigation.

b. A review of the Development Concept Plan provided by KLM Planning. dated January 14, 2026 Presented in **Appendix A-4**, indicates that the northern water body is located within the proposed Natural Heritage system area, and it is located outside of the preliminary estimated conceptual zone of influence for dewatering of the street E. Therefore, no Potential impacts are anticipated.

c. Additionally, it is understood that the water body and its associated unevaluated wetland located in the southern portion of the Subject Site located close to the SG 5 and the unevaluated wetland located near BH/MW 101 and MP 1 location is located within the development foot print and proposed to be removed as per the Figure 2 of the project 2407713 dated February 18, 2026 prepared by GEI presented in **Appendix A-4**. As such, significant impacts to the above noted natural features are not expected with respect to the proposed development.

- A review of the MECP well records confirmed that there is a total of twelve (12) water supply wells registered within a 500 m radius of the Subject Site. All twelve (12) water supply wells are for domestic use according to their first use status. Two (2) water supply wells are present within the Subject Site. However, considering the location of the water supply wells and proposed development, it is assumed that both water supply wells will be decommissioned if still existing. Furthermore, no other water supply wells are present within the zone of influence of the dewatering areas; therefore, no significant impacts to the water supply wells are anticipated with respect to the proposed development if it exists. Additionally, the Private Water Supply Well Survey (Pre-Construction monitoring Study) was completed and provided in the report titled “Private Water Supply Well Survey (Pre-Construction Monitoring Study, Proposed Residential Development, Northwest Quadrant

of Mount Hope Road and Columbia Way, Town of Caledon,", dated April 4, 2025 (SEL. Ref.2309-W138)

5.2 Water Balance and Groundwater Recharge

As a part of the Phase 1 investigation, the following site-wide assessment has been completed, and the results are presented in the report titled *Pre-and Post-development Water Balance Assessment, Northwest Quadrant of Mount Hope Road and Columbia Way, Town of Caledon*, Reference Number: 2309-W138, dated; May 28, 2025, prepared by Soil Engineers Ltd (**Appendix A.4.2**) A summary of the report is presented as follows:

- The water balance components were analyzed using long-term precipitation records (30-year average from 1991 to 2020) for both monthly and annual precipitation at a nearby weather station. This water balance method provides rough estimates of annual evapotranspiration, infiltration, and runoff volumes. These volumes were derived from the Albion Field Center (Climate ID. 6150103), located approximately 8.0 km southwest of the Subject Site. The 30-year records for average annual and monthly temperatures were also sourced from this station. Additionally, the water balance components (precipitation, infiltration, runoff, and evapotranspiration) were obtained from the Hydrologic Model from the Toronto and Region Source Protection Authority (TRSPA) tool. This included raw raster files for the water balance components from the Oak Ridges Moraine Groundwater Program (ORMGP). During a meeting on March 19, 2025, with the ORMGP, it was recommended to utilize the raster data from the hydrologic model provided by ORMGP. Therefore, a site-scale water balance analysis was completed Hydrologic Model from the TRSPA tool. The water balance method roughly estimates annual evapotranspiration, infiltration and runoff volumes. Based on the raster files provided by the ORMGP, the evapotranspiration in previous areas at the Site is 484 mm/yr, runoff is 135 mm/yr and infiltration (groundwater recharge) is 240 mm/yr.

- A review of the findings is indicated in the above-mentioned water balance assessment report. that a total decrease of 85,889.67 m^3/year and 51,779.76 m^3/year for ET and

infiltration, respectively, and an increase of 137,669.43 m^3/year for runoff are expected for the post-development Site. The findings indicates that a total loss of 55% and 67% in ET and infiltration, and a total gain of 319% is anticipated in runoff for the post-development Subject Site, respectively.

5.3 Water Supply Wells

A pre-construction water supply well monitoring program is completed and the findings are presented in a report titled: *Private Water Supply Well Survey (Pre-Construction Monitoring Studies*): dated April 04, 2025, issued as a Final Report (**Appendix A.4.3**). A review of the findings indicates that:

- Twenty-three (23) well records are located within the Study Area relative to the Subject Site boundaries (500 m radius of the Subject Site).
- SEL canvassed the Study Area and the occupants of the properties that possibly rely on water supply wells on March 20, 2025.
- Following the survey and canvassing program, SEL has received some authorization for the participating canvassed residents within 500 m of the Subject Site (Study Area). As such, the fieldwork is ongoing for the participating owners/residents. Any additional authorizations received from residents of the surveyed properties and information on the fieldwork will be provided in the subsequent submissions.

5.4 Monitoring

Drilling boreholes and construction of monitoring wells were conducted for geotechnical and hydrogeological investigations by SEL Ltd (SEL). Between September 23 and 26, 2023. The program consisted of the drilling of thirteen (13) boreholes (BH) and the installation of twelve (12) monitoring wells for geotechnical and hydrogeological assessment purposes.

Moreover, additional drilling and installation of the monitoring wells and mini piezometers (MP), and piezometer (PZ) were conducted for the hydrogeological assessment and wetland monitoring

program by SEL Ltd (SEL) between May 8 and May 9, 2024. The program consisted of the drilling and installation of nine (9) monitoring wells and twelve (12) mini piezometers for wetland monitoring and hydrogeological assessment. The locations of the boreholes and monitoring wells are shown on Drawing 2 of the preliminary Hydrogeological Assessment report dated May 28, 2025 (**Appendix A.4.1**). Additionally, three (3) deep monitoring wells were installed within the Subject Site between April 10 and 13, 2025. The locations of the boreholes and monitoring wells are shown on Drawing 2.

All Twenty (20) installed monitoring wells were utilized to measure and monitor groundwater level fluctuation. Monitoring wells BH/MW 1 to 7 and BH/MW 9 to 13 were developed on November 15, 2023, and BH/MW 101 to 108 and BH/MW 8 were developed on May 28, 2024. BH/MW 1, 8, 101 to 108 were instrumented with the automated transducer data logger to continuously monitor the groundwater level fluctuation. The monitoring program is currently ongoing and this report will be updated upon completion of the 2-year long-term groundwater and wetland monitoring program.

The stabilized groundwater levels were also measured manually over fourteen (14) monitoring events from November 15, 2023, to December 16, 2025. Details can be reviewed in the report titled: *"Hydrogeological Assessment for Proposed Residential Development, Northwest Quadrant of Mount Hope Road and Columbia Way, Town of Caledon*", Reference Number: 2309-W138, Rev.2, dated February 26, 2026, prepared by Soil Engineers Ltd."

6.0 Surface Water

6.1 Hydrologic Assessment

6.1.1 Existing Setting

The site was surveyed by R-PE Surveying Ltd. on November 27, 2023, to generate a detailed topographic map of the site area. The investigation also included a survey of existing culverts. The locations and sizes of existing culverts at the location of the site is provided within the topographic map of the site area, presented in **Appendix A.6**.

The existing site topography is relatively flat with land sloping slightly to the east and to the south. The site directs flows to the east into tributaries leading into Cold Creek of the Humber River Watershed, and south into a Tributary of the Main Humber River. An existing natural channel located to the south of the site drains to a tributary of the Main Humber River. The site is comprised of primarily agricultural lands.

A hydrogeological investigation conducted by Soil Engineers Ltd. revealed low permeability soils characterized as silty clay to silty clay till. In addition, the subject site generally has high shallow groundwater levels with elevations ranging from 255 to 263 masl while the original ground elevation range from 259 to 263 masl. The groundwater monitoring program is currently ongoing and the hydrogeological report will be updated upon completion of the 2-year long-term groundwater and wetland monitoring program.

6.1.2 Stormwater Management Criteria

As per the Town of Caledon's Design Criteria and the Toronto and Region Conversation Authority's Stormwater Management Criteria, the following guidelines will be used in the design of the site's stormwater management system:

Major and Minor System

- Storm sewers shall be designed to convey the 10-year return frequency storm without any surcharges;
- The Storm sewers shall be designed as per the Town of Caledon's IDF curve rainfall intensities with a minimum time of concentration of 10 minutes;
- The minimum pipe diameter for storm sewers is 300mmØ;
- Maximum full-bore velocity shall not be greater than 4 m/s, and minimum velocity shall not be less than 0.75 m/s.
- The major system shall be designed to convey the most of the 100-year storm event or

Regional Storm;

- The maximum flow depth shall be the lesser of 10 cm above the crown of the road or the water level up to the ROW.
- Runoff coefficients shall be determined based on land use as follows:
    - Parks & Open Space 0.30
    - Single Family Residential 0.65
    - Semi-detached Residential 0.70
    - Townhouse or Rowhouse 0.75
    - Commercial 0.90

Quantity Control:

Per the Town of Caledon and TRCA Stormwater Design Guidelines, quantity control is to be provided for the 2-to-100-year design storms to the appropriate Watershed Flood Control Criteria required by the Toronto and Region Conservation Authority (TRCA). Peak target flows are determined using the Humber River Sub-Basin 10 Equations summarized in Table 6-1.

Table 6-1 Humber River Unit Flow Equations

Return Period	Sub-Basin 36 Equations
2 Year	Q=3.142-0.233*ln(A)
5 Year	Q=5.557-0.427*ln(A)
10 Year	Q=7.443-0.578*ln(A)
25 Year	Q=9.838-0.757*ln(A)
50 Year	Q=11.920-0.921*ln(A)
100 Year	Q=14.140-1.096*ln(A)

Four storm distributions were examined to analyze the volume of runoff to be controlled. The 6-Hour AES and the 12-Hour AES as provided by the TRCA, the 4-Hour Chicago storm created with the Town of Caledon IDF curve, and the regional storm.

- Regional storm quantity control will be managed by the East Pond. The target peak flow for the regional storm is based on the pre-development regional storm flow to be further restricted by the capacity of the culvert crossing Mount Hope Road. The culvert capacity is more restrictive in comparison to only considering the pre-development drainage area.

- The West Pond is also proposed to attenuate the Regional storm as a best efforts solution as coordinated with the TRCA.

Quality Control

Per the Town of Caledon and TRCA stormwater design criteria, quality control shall provide Level 1 Enhanced treatment through the long-term removal of 80% Total Suspended Solids (TSS) controlling the 90th percentile runoff event.

Erosion Control

Per the Town of Caledon and TRCA stormwater design criteria, erosion control is to be provided via detention of the 25 mm-48 hr event.

Water Balance

Requirement to meet pre-development water balance to the greatest extent feasible. Per the Source Protection Information Atlas (MECP) the site is not in a wellhead protection area (WHPA) or SGRA.

CLI-ECA Requirements

Developments within Peel Region are required to comply with CLI-ECA requirements. The CLI ECA mandates controlling at least 27mm through retention methods (such as infiltration and

reuse) as much as possible, followed by filtration for the remaining amount. Conventional water quality control measures are permitted only after maximizing retention and filtration.

Site Plan (Commercial Block)

Erosion Control – Retention of 5 mm rainfall event on-site;

Water Balance – Maintain pre-development recharge conditions as part of the overall site;

Park Block

Convey 0.13 ha to the Clean Water Collectors and discharge to Wetland 11.

6.1.3 Existing Flows

The hydrologic assessment is performed by first acquiring existing TRCA VO hydrology models. The hydrology model is established in Visual OTTHYMO 6.2 (VO) software. For the hydrological assessment work, two models were acquired from the TRCA, prepared by Civica Infrastructure Inc., named as:

1. Humber – Large Storms – no ponds (2017) – this VO model is used as the basis for the regional storm assessment, using CNIII values. This model represents the future, uncontrolled conditions. Within this model, a scenario for the 350- and 500-year storms using CNII is available. This scenario has been used to model the 100-year storm scenarios as it represents future uncontrolled conditions.

2. Design Storm Scenarios (2015) – this VO model is used as the basis for assessments of storms of with 2- up to 50-year return periods. This model uses existing, controlled conditions.

At present, the TRCA is unable to provide a hydrology model for the future, uncontrolled conditions for the 100-year storm as this model is under development. Thus, the *Large Storms* model for the 350– to 500-year storms has been used to model the 100-year storm. The *Large Storms* model is established with future land use conditions and uncontrolled flows, making it

appropriate for use to delineate flood lines. The *Downstream Analysis Report* by Schaeffers Consulting Engineers details the hydrological assessment (2025) and catchment discretization applied for this analysis (**Appendix A.5.1**). The report summarizes the flows assessment and key hydrological nodes of the study. After adjustments to the TRCA VO model based on corrected catchment delineation, existing conditions peak flows were determined at downstream nodes. **Table 6-2** summarizes the existing conditions regional peak storm event flows at key downstream nodes from the Subject Lands area.

Table 6-2: Regional Storm Existing Downstream Peak Flows

River and Reach	Areal Reduction Factor	VO Element	Existing Peak Flow (m^3/s)
Cold Creek West – Reach B	98.2	1347	161.61
Cold Creek West – Reach C	98.2	7522	170.82
Cold Creek West – Reach D	97.1	7521	287.01
Main Humber Tributary A – Reach A	100	7520	26.09
Cold Creek West – Reach E	97.1	1850	299.35
Results are summarized from the *Downstream Analysis Report* prepared by Schaeffers Consulting Engineers (2025)			

Pre-development target flows for the stormwater management design have been established as described by the *Functional Serving and Stormwater Management Report* by Schaeffers Consulting Engineers (2025) (**Appendix A.5.2**). **Table 6-3** summarizes these target flows.

Table 6-3: Existing Culvert Flows from Subject Lands

Culvert	**Diameter (mm)**	**Slope**	**Drainage Area (ha)**	**Culvert Capacity (m^3/s)**	**Pre-development Peak Flow (m^3/s) [Regional Storm]**
1	2200	1.34%	10.18	1.33	1.01
2	1000	2.56%	7.81	1.14	0.92

Culvert	Diameter (mm)	Slope	Drainage Area (ha)	Culvert Capacity (m^3/s)	Pre-development Peak Flow (m^3/s) [Regional Storm]
3	600	3.39%	3.40	0.47	0.46
4	600	0.58%	6.41	0.10	0.80

6.2 Wetland Water Balance Risk Evaluation

GEI, Schaeffers, and SEL have prepared a preliminary Wetland Water Balance Risk Evaluation (WWBRE) in accordance with the Toronto and Region Conservation Authority's (TRCA) 2017 guidance document. The evaluation incorporates input from ecological, surface water engineering, and hydrogeological disciplines. The WWBRE to be updated once hydrogeological information related to dewatering is available and to reflect any future changes to the development proposal.

TRCA's risk evaluation protocol consists of identifying the potential magnitude of post-development hydrological change without mitigation, as well as assessing the ecological sensitivity of the wetland to that hydrological change. The magnitude of hydrological change and the ecological sensitivity of the wetland are then used in the wetland risk evaluation decision tree, shown in Figure 3 of TRCA's 2017 guidance document, which categorizes wetlands as being at no, low, medium, or high risk for hydrological impacts. Each risk category includes recommended measures for monitoring and water balance modeling.

6.2.1 Step 1: Identify Which Retained Wetland(s) May Be Impacted

A total of 15 wetlands were identified within the Subject Lands and the adjacent 120 m, as shown in **Appendix A.5.3.** Wetland catchment mapping was completed using GIS, PCSWMM, and AutoCAD based on the topographic survey for the subject site conducted by R-PE Surveying Ltd., dated November 27, 2023 (**Appendix A.6**), First Base Solutions Lidar Data, and Ontario Digital Terrain Model with 0.5 m resolution. Wetland catchments and their corresponding sizes are shown in **Appendix A.5.3**.

Of the 15 wetlands identified, two wetlands within the Secondary Plan Area (WT14 and WT15) are proposed for removal and were therefore excluded from the WWBRE. An additional eight wetlands (WT1, WT3, WT4, WT6, WT8, WT9, WT10, and WT12) have surface catchments located entirely outside the limits of the proposed development and have also been excluded from the WWBRE at this time.

However, it is acknowledged that the hydrogeological component related to dewatering has not yet been scored, and that dewatering of high magnitude and duration may have the potential to impact some of these excluded retained wetlands depending on the extent of the dewatering zone of influence. These wetlands may require inclusion in future WWBRE updates if their surface catchments are identified to be located within the dewatering zone of influence.

The remaining five retained wetlands (WT2, WT5, WT7, WT11, and WT13) have surface catchments overlapping with the proposed development, and thus the WWBRE was completed for these five wetlands, as discussed below.

6.2.2 Step 2: Identify the Magnitude of Potential Hydrological Change

As stated in the 2017 TRCA guidance document, "the following criteria are used to evaluate the magnitude of potential hydrological impact that a proposal may have on a wetland:

i. The proportion of impervious cover in the catchment of the wetland that would result from the proposal.

ii. The degree of change in the size of the wetland catchment.

iii. Water taking from, or discharge to, surface water bodies or aquifers directly connected to the wetland.

iv. The impact on locally significant recharge areas."

Impervious Cover

An impervious cover score (S) is used to evaluate this criterion. This score evenly distributes the

proportion of impervious cover that represents a given threshold of hydrological disturbance across the wetland's surface catchment regardless of the number of different landowners. Furthermore, this score also considers the area of the surface catchment that is protected by natural heritage and natural hazard designations. The equation for S is as follows:

$$S = \frac{(IC) \cdot (C_{dev})}{C}$$

Where IC is the proportion of impervious cover (calculated as a percentage between 0 and 100) proposed within the area of wetland surface catchment that is within the proponent's holdings, C_{dev} is the total developable area of the catchment (in ha), and C is the size of the wetland's catchment (in ha).

The equation for IC can be further broken down as the area (in ha) of impervious surface divided by the area of the catchment (in ha) owned by the proponent, multiplied by 100 to convert to a percentage:

$$IC = \frac{proposed\ area\ of\ impervious\ surface}{area\ of\ C\ owned\ by\ proponent} \cdot 100$$

Table 6-4 summarizes the calculation of impervious cover (IC) for each wetland catchment based on the proposed development footprint within the portion of the surface catchment owned by the proponent.

Table 6-4: IC Calculations

Wetland ID No.	Proposed Impervious Area in Catchment (ha)	Area of Catchment (ha) owned by Proponent	IC: Impervious Cover Proportion within Proponent's Holding (%)
WT2	0.94	7.67	12.2
WT5	0.29	4.64	6.2
WT7	1.97	21.95	9.0
WT11	2.43	28.27	8.6
WT13	7.03	73.23	9.6

The area of developable catchment (C_{dev}) was determined by excluding from the surface catchment any natural heritage features and natural hazards, along with their associated setbacks:

$$C_{dev} = C - areas\ of\ natural\ heritage, hazards, and\ setbacks$$

Natural heritage features and hazards for the Subject Lands and the adjacent 120 m were identified based on the Existing NHS key features mapping provided in Phase 1 **(Figure 11, Appendix A.1.1)**. For areas beyond the adjacent 120 m, background mapping from Geospatial Ontario was used, along with estimated setbacks based on general Greenbelt Plan, Town of Caledon, and TRCA setback policies for the area. Note that within the C_{dev} calculation, smaller setbacks are more conservative (i.e., push the equation towards stricter water balance monitoring). The designation of natural heritage features and hazards within this WWBRE includes floodplains and their 10 m setbacks, wetlands and their 30 m setbacks, and areas mapped as woodlands with no setbacks. These areas are anticipated to be protected from future development in perpetuity.

Table 6-5 summarizes the calculation of developable catchment area (C_{dev}) for each wetland, excluding natural heritage features, hazards, and associated setbacks.

Table 6-5: C_{dev} Calculations

Wetland ID No.	C: Wetland Catchment Area (ha)	Natural Heritage & Hazard Areas (ha)	C_{dev}: Developable Catchment Area (ha)
WT2	8.18	3.86	4.32
WT5	4.64	1.69	2.95
WT7	21.95	4.99	16.96
WT11	28.27	8.88	19.39
WT13	170.79	44.59	126.20

The equation for calculating S is shown below in its expanded form:

$$S = \frac{\left(\frac{proposed\ area\ of\ impervious\ surface}{area\ of\ C\ owned\ by\ proponent} \cdot 100\right) \cdot (C - areas\ of\ natural\ heritage, hazards, and\ setbacks)}{C}$$

Table 6-6 combines the IC and C_{dev} values to calculate the impervious cover score (S) for each wetland and identifies the corresponding magnitude of change in impervious cover based on the established threshold.

Table 6-6: Impervious Cover Magnitude of Change Calculations

Wetland ID No.	C (ha)	IC (%)	C_{dev} (ha)	S (%)	Impervious Cover Magnitude of Change
WT2	8.18	12.2	4.32	6.46	Low
WT5	4.64	6.2	2.95	3.91	Low
WT7	21.95	9.0	16.96	6.95	Low
WT11	28.27	8.6	19.39	5.90	Low
WT13	170.79	9.6	126.20	7.09	Low

An impervious cover (S) score of below 10% is considered to represent a low magnitude of change in impervious cover. Accordingly, all five wetlands were assigned a low score for impervious cover magnitude of change.

Catchment Size

To assess the potential hydrological impacts of the proposed development, the change in catchment size from pre- to post-development conditions was calculated for each wetland. This change is expressed as a percentage and used to evaluate the magnitude of impact associated with altered surface drainage areas.

Table 6-7 summarizes the pre- and post-development catchment areas, the percent change in size, and the corresponding magnitude of change ranking for each wetland

Table 6-7: Catchment Size Magnitude of Change Calculations

Wetland ID No.	Pre-development Catchment (ha)	Post-development Catchment (ha)	Change in Catchment Size	Catchment Size Magnitude of Change
WT2	8.18	7.85	-4.03%	Low
WT5	4.64	4.35	-6.25%	Low
WT7	21.95	19.88	-9.43%	Low
WT11	28.27	25.66	-9.23%	Low
WT13	170.79	173.28	1.46%	Low

A change in catchment size of less than 10% is considered to represent a low magnitude of change. Accordingly, all five wetlands were assigned a low score for catchment size magnitude of change.

Water Taking

A hydrogeological review of the proposed development is currently being completed by SEL; therefore, the information required for scoring the water taking component is not yet available. The WWBRE will be updated once details related to the magnitude and duration of dewatering, as well as the extent of the zone of influence, become available. If any wetlands previously excluded from the WWBRE are determined to have surface catchments within the dewatering zone of influence, or if water taking is anticipated from groundwater or surface water directly connected to these excluded wetlands, they will be incorporated into future WWBRE submissions.

Recharge Areas

Background mapping from TRCA (2025) and the Town of Caledon (2024) identifies portions of the Subject Lands as being located within a Significant Groundwater Recharge Area (SGRA). However, a hydrogeological review completed by SEL, including borehole data and hydraulic conductivity testing, assessed that the subsurface conditions are primarily composed of silty clay and silty clay till with low to moderate hydraulic conductivity. These site-specific findings do not meet TRCA's definition of a locally significant groundwater recharge area, as outlined in the WWBRE guidance document. As such, while background mapping suggests the presence of SGRAs, SEL's investigations do not support their delineation on-site. Therefore, no hydrological

impacts to locally significant recharge areas are anticipated.

Magnitude of Potential Hydrological Change

To evaluate the potential hydrological impact of the proposed development on each wetland, three of the four TRCA criteria were assessed: impervious cover within the wetland surface catchment, change in surface catchment size, and impacts to locally significant recharge areas. These criteria were used collectively to assign an overall magnitude of potential hydrological change. **Table 6-8** consolidates the results of each criterion for the five wetlands assessed in this WWBRE.

Table 6-8: Hydrological Change Component Scores and Ranking

Wetland ID No.	Impervious Cover Magnitude of Change	Catchment Size Magnitude of Change	Water Taking or Discharge Magnitude of Change	Impact to Recharge Areas Magnitude of Change	Hydrological Change Ranking
WT2	Low	Low	TBD	None	Low
WT5	Low	Low	TBD	None	Low
WT7	Low	Low	TBD	None	Low
WT11	Low	Low	TBD	None	Low
WT13	Low	Low	TBD	None	Low

At this time, hydrogeological data required to evaluate the water taking/discharge component is still under review by SEL and is not yet available. Therefore, the current ranking reflects only the available data for impervious cover, catchment size, and recharge area impacts. Based on the current assessment, all five wetlands are anticipated to experience a “low” magnitude of potential hydrological change. This ranking will be revisited once the hydrogeological review is complete and the water taking criterion can be scored.

6.2.3 Step 3: Assess the Sensitivity of the Wetland

As stated in the 2017 TRCA guidance document, to assess the sensitivity of a wetland to hydrological change five criteria are used:

- Hydrological classification;
- Vegetation community;
- Flora species;
- Fauna species; and
- SWH for hydrologically sensitive species.

The hydrological classification is assessed using OWES definitions (MNRF 2022). All five wetlands included in this WWBRE are classified as palustrine. Accordingly, additional ecological information regarding vegetation communities, flora and fauna species, and the presence of SWH for hydrologically sensitive species is required to assess each wetland's overall sensitivity to hydrological change.

The sensitivity of ELC vegetation communities is ranked in Appendix 2 of the 2017 TRCA guidance document. The sensitivity of individual flora and fauna species to hydrological change is ranked in Appendix 3. GEI scored each individual wetland subject to the WWBRE based on the results of ecological field surveys conducted between 2022 and 2024 (see **Sections 2.4.5 to 2.4.7**) as well as the results of the SWH assessment (see **Section 2.5.1.5**). These scores are summarized in **Table 6-9**.

Table 6-9: Wetland Sensitivity Component Scores and Ranking

Wetland ID No.	Highest Sensitivity ELC Code	Vegetation Community	High Sensitivity Flora Species	High Sensitivity Fauna Species	SWH Sensitivity	Wetland Sensitivity Ranking
WT2	MAS2-1	Medium	High	High	Low	High
WT5	MAS2-1	Medium	Low	Low	Low	High
WT7	MAS2-1	Medium	Low	High	Low	High
WT11	MAM2-2	Low	Low	Low	Low	Medium
WT13	MAS2-1	Medium	Low	Low	Low	High

Palustrine wetlands that contain any vegetation community, flora or fauna species, or SWH for hydrologically sensitive species ranked as "medium" or "high" sensitivity to hydrological change are classified as having "high" overall sensitivity. Palustrine wetlands that score "low" for all ecological components are classified as having "medium" overall sensitivity. Accordingly, four of the five wetlands subject to the WWBRE were assigned a "high" ranking while WT11 was assigned a "medium" ranking for sensitivity of the wetland to hydrological change.

6.2.4 Step 4: Risk Characterization

The risk to the hydrological integrity of the wetlands from the proposed development was assessed using the criteria evaluated in Steps 2 and 3, and the wetland risk evaluation decision tree provided in Figure 3 of the TRCA 2017 guidance document. This decision tree categorizes the risk of hydrological impacts to wetlands as "none," "low," "medium," or "high," with each risk category linked to corresponding recommendations for monitoring and water balance modeling.

For the current proposal, the magnitude of potential hydrological change to all five wetlands was evaluated as "low," as summarized in **Table 6-10**.

Table 6-10: Risk Decision Tree Results

Wetland ID No.	Hydrological Change Ranking	Wetland Sensitivity Ranking	Risk Evaluation Decision Tree
WT2	Low	High	Low
WT5	Low	High	Low
WT7	Low	High	Low
WT11	Low	Medium	Low
WT13	Low	High	Low

As a result, the wetland risk evaluation decision tree indicates that monitoring is not required. A non-continuous hydrological model, such as the Thornthwaite-Mather, with monthly or higher resolution output is required. A design mitigation plan is required to be developed to maintain the wetland water balance, as outlined in the TRCA's *Stormwater Management Criteria Document* (2012).

It should be noted that the magnitude of change related to water taking or discharge was not included in this risk evaluation due to the unavailability of data at the time of reporting. Should this information become available, the magnitude of hydrological change may be re-evaluated, which could alter the associated monitoring requirements.

6.3 Surface Water Monitoring

Twelve (12) mini piezometers were utilized to measure and monitor wetlands or surface water, including the existing watercourses and water bodies. The existing water bodies near the Subject Site were also equipped with staff gauges. The findings are provided in Appendix C (Page 2) of the "Hydrogeological Assessment for Proposed Residential Development, Northwest Quadrant of Mount Hope Road and Columbia Way, Town of Caledon", Reference Number: 2309-W138, Rev.2, dated February 26, 2026, prepared by Soil Engineers Ltd (Appendix A.4.1).

MP 1 to 12 were instrumented with the automated transducer data logger to continuously monitor the water table fluctuation in the wetland features. Furthermore, water table fluctuations were manually measured over eight (8) monitoring events from May 28, 2024, to December 16, 2025. Based on the review of the Hydrographs presented in Appendix D of the (Pages 11 to 22) and manual water table monitoring presented in Appendix C of the Hydrogeological Assessment Report Rev.2, the highest and lowest surficial water table interacting within the shallow stratigraphy measured at El. 262.1 masl and 256.3 masl at MP 1 and MP 12, respectively. Based on the review of the groundwater level monitoring programs, all piezometers, with the exception of MP 3, MP 6 and MP 11, remained dry between August 28 and December 16, 202

The stabilized groundwater levels were also measured manually over fourteen (14) monitoring events from November 15, 2023, to December 16, 2025. The water table monitoring beneath the Subject Site is currently ongoing, and this report will be updated upon completion of a 2-year long-term wetland monitoring program.

The surface water monitoring program is established in accordance with the guidelines provided in the Terms of Reference for Local Sub-watershed Studies, dated May 2024. Grab sampling will

be conducted between April and November, capturing at least one wet event (i.e., 10 mm of rain in 24 hours) and one dry event (i.e., 48 hours with no precipitation) per season as part of the surface water monitoring program. The monitoring program started in June 2024 for two years of monitoring, During the site visits conducted on June 17, 2024, August 29, 2024, and November 5, 2024, both creeks were observed to be dry at the established flow-station locations. During the visits on December 12 and 13, 2024, the Subject Site was covered in snow, and no water flow was encountered or recorded.

A site visit was completed on April 3, 2025, following a rainfall event of approximately 45 mm. During this visit, all four flow-monitoring stations experienced flooding due to heavy rainfall and widespread surface runoff. By the next site visit on May 5, 2025, both creeks were again observed to be dry at the established flow-station locations.

A total of four (4) surface water sample was taken at Flow Stations 1, 2, 3 and 4 on April 3, 2025, following a 45-mm rain event. The sampling was conducted to provide the background information for the preliminary understanding of the baseline water quality information as per Section 2.2.6 of the Terms of Reference for the Local Sub-Watershed Study, Dated May 2024. The background surface water quality Results are presented in **Appendix G of the** "Hydrogeological Assessment for Proposed Residential Development, Northwest Quadrant of Mount Hope Road and Columbia Way, Town of Caledon", Reference Number: 2309-W138, Rev.2, dated February 26, 2026, prepared by Soil Engineers Ltd (Appendix A.4.1)

Subsequent site visits on August 28, 2025, and October 24, 2025, also confirmed that both creeks remained dry. Finally, snow cover was observed during the site visit on December 16, 2025.

Please refer to Section 7.3 of the "Hydrogeological Assessment for Proposed Residential Development, Northwest Quadrant of Mount Hope Road and Columbia Way, Town of Caledon", Reference Number: 2309-W138, Rev.2, dated February 26, 2026, prepared by Soil Engineers Ltd (Appendix A.4.1). It is important to note that a long-term monitoring program for 2 years is ongoing.

Baseline surface water quality monitoring is being undertaken by GEO Morphix.Ltd east of Mount Hope Road. Monitoring was initiated in the spring of 2025 and will continue for a period of two (2) years. To date, one (1) wet weather sampling event has been completed during a 28 mm precipitation event. Laboratory results are not available at the time of this report, but will be included in subsequent submissions of the Local Subwatershed Study.

6.3.1 Surface Water Quality Monitoring – Tributary East of Mount Hope Road

In addition to the baseline surface water monitoring being conducted within the subject lands by Soil Engineers Ltd, GEO Morphix undertook baseline surface water quality monitoring in 2025 along the tributary east of Mount Hope Road downstream of proposed stormwater outlets. Baseline monitoring was conducted between the months of April and November at one location along **Reach THRF-1** (refer to location TH1 in **Appendix A.2**). In total, six sampling events were completed in 2025. During each season (spring, summer, fall), one wet/rain event (i.e., ≥10 mm of rain in 24 hours) and one dry event (i.e., 48 hours with no precipitation) were sampled. During wet weather events, separate grab samples were collected during the rising and falling limbs of the hydrograph. This approach is consistent with baseline surface water monitoring being completed by GEO Morphix on lands west of the current study area.

The grab samples for each wet weather and dry weather event were analyzed for the following parameters:

- Ammonia
- Anions (Nitrate, Nitrite, Phosphate, Chloride)
- BOD5 (Biochemical Oxygen Demand)
- Conductivity
- Dissolved Oxygen
- Metals (Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, P, K, Se, Si, Ag, Na, Sr, Tl, Sn, Ti, W, U, V, Zn, Zr)
- PAH (Polycyclic Aromatic Hydrocarbons)

- pH
- Alkalinity
- Total Kjeldahl Nitrogen (TKN)
- Total Phosphorous
- Total Suspended Solids (TSS)
- Turbidity

Discrete baseline water quality sampling was conducted during a minimum of three (3) wet events and three (3) dry events to capture a range of flow conditions. Sampling included in situ measurements of the following parameters during each event:

- Turbidity
- Dissolved Oxygen
- Conductivity

Surface water quality monitoring will continue along the tributary east of Mount Hope Road between the months of April and November of 2026.

Daily precipitation data for 2025 was acquired from a Bolton Weather Underground Station (Climate ID: ICALEDON5) located approximately 3.2 km south of the subject site. During the 2025 monitoring period (April 1 – November 30), precipitation was recorded on 75 of 244 monitoring days, and there were 18 occurrences of daily rainfall ≥10 mm. A summary of sampling events is presented in

Table 6-11**.**

Table 6-11 Wet and Dry Sampling Conditions in 2025

Event	Sampling Date and Time (yyyy-mm-dd hh: mm)	Event Type		Total Event Rainfall (mm)
1	2025-05-22 13:30	Ascending Limb	Rain	33.8
	2025-05-23 12:36	Receding Limb		
2	2025-06-02 13:24	Dry		0
3	2025-07-22 10:25	Dry		0
4	2025-08-19 15:36	Ascending Limb	Rain	36.8
	2025-08-20 11:30	Receding Limb		
5	2025-10-30 17:30	Ascending Limb	Rain	17.5
	2025-10-31 11:45	Receding Limb		
6	2025-11-18 12:30	Dry		0
7	2025-12-19 10:35	Rain/ Snow Melt		5.8

Water quality results were compared to the Provincial Water Quality Objectives (PWQO). During 2025 sampling, aluminum, copper and iron were measured to be in exceedance of the PWQO during most sampling events. Other parameters observed in exceedance infrequently include cadmium, cobalt, lead, vanadium and lastly, zinc. A full summary of exceedances observed in 2025 monitoring is included in **Appendix A.2**. All the parameters measured in exceedance of the PWQO during 2025 sampling efforts are heavy metals. As noted above, the principal surrounding land use is composed of agricultural fields. As such, the exceeding metals are likely sourced from agricultural applications (manure/fertilizers, pesticides etc.). Additionally, given the roadways nearby a likely source of heavy metals could also be airborne urban road dust. Urban road dust consists of small particles most commonly created from wear on vehicle parts (Hwang et al., 2016), including farm equipment. Lastly, exceedances may also be a baseline characteristic of the system as some parameters are naturally occurring in soil and rocks. Similar exceedances are common and have been observed in other watercourses in vicinity of the subject lands.

TSS and turbidity measurements taken at each sampling location during water quality monitoring events in 2025 are summarized in **Table 6-12**. Accredited laboratory results are included in **Appendix A.2** for reference. TSS and turbidity values were generally greater during rain events. This is a typical pattern of watercourses, as during the ascending and peak flows, the watercourse will have additional capacity to transport sediment, thus increasing the TSS/turbidity. As flow rates decline, suspended sediment falls out of suspension and is deposited back onto the bed. During the summer dry event a high TSS concentration was recorded. This result is likely not representative, as water levels were very low and stagnant, leaving little availability to collect an undisturbed sample. Generally, TSS concentrations were low during dry events, with a minimum recorded concentration of 5.0 mg/L, recorded during the first dry event of the season.

Table 6-12 Total Suspended Solids and Turbidity Measurements During Sampling Events

Event†	Total Event Rainfall (mm)	Total Suspended Solids (mg/L)	Turbidity (NTU)
		TH1	
2025 Rain Events			
1 (AL)	33.8	10	6.2
1 (RL)		15.7	37.3
4 (AL)	36.8	40	57.7
4 (RL)		88	OR
5 (AL)	17.5	Dry	Dry
5 (RL)			
7 (AL)	5.8*	4	7.3
2025 Dry Event			
2	0	5	3.2
3	0	132	187.1
6	0	5.7	3.1

†AL – Ascending limb of rain event
RL – Receding limb of rain event
*Rain/snow melt event

Dissolved oxygen concentration measurements at each sampling location during water quality monitoring events from 2025 are summarized in **Table 6-13**. Throughout the monitoring program, dissolved oxygen concentrations ranged from 1.81 to 10.90 mg/L. Dissolved oxygen

concentrations during rainfall events ranged from 8.43 to 10.90 mg/L, and 1.81 to 9.62 mg/L during dry events. During dry events that were sampled during low flow conditions, lower dissolved oxygen concentrations are expected. Notably, minimum dissolved oxygen concentrations in 2025 were observed during dry events in late summer, when flow continuity was limited or water was stagnant. **Appendix A.2** provides a complete record of discrete water quality measurements.

Table 6-13 Dissolved Oxygen Measurements During Sampling Events

Event†	Total Event Rainfall (mm)	DO (mg/L)	DO (%)
		TH1	
2025 Rain Events			
1 (AL)	33.8	10.54	94
1 (RL)		10.9	99
4 (AL)	36.8	10.04	105
4 (RL)		8.43	94
5 (AL)	17.5	Dry	Dry
5 (RL)			
7 (AL)	5.8	9.61	66
2025 Dry Event			
2	0	9.62	105
3	0	1.87	18
6	0	1.81	14

†AL – Ascending limb of rain event
RL – Receding limb of rain event

Conductivity measurements at each sampling location during water quality monitoring events are summarized in **Table 6-14.** The average conductivity measured during rain events was within the mid-range and is generally suitable for supporting aquatic organisms. During 2025 rain events, average conductivity ranged from 210 µs to 685 µs. During 2025 dry events, average conductivity ranged from 305 µs to 466 µs. Generally higher conductivity was observed earlier in the year, at the first rain and dry events in early spring. This can likely be attributed to the loading of road salt in the drainage area. A complete record of discrete water quality measurements is provided in **Appendix A.2**.

Table 6-14 Conductivity measurements during water quality sampling events

Event†	Total Event Rainfall (mm)	Conductivity (µs)
		TH1
2025 Rain Events		
1 (AL)	33.8	451
1 (RL)		685
4 (AL)	36.8	409
4 (RL)		268
5 (AL)	17.5	Dry
5 (RL)		
7 (AL)	5.8	210
2025 Dry Event		
2	0	566
3	0	305
6	0	416

6.4 Municipal Servicing

6.4.1 Water Supply Infrastructure

Currently, there is no water supply infrastructure at the project location. However, the following water supply infrastructure is expected to be within the vicinity of the subject site at the time of construction:

- Municipal watermain along Mount Hope Road, south of Columbia Way
- Watermain along Columbia Way

The Town of Caledon previously completed the Bolton Residential Expansion Study (BRES) to determine the best approach for urban boundary expansion. This study evaluated six different expansion options for the Bolton settlement area, assessing how each area would be serviced.

The subject site is located within the Option 2 lands. According to the BRES findings, the Option 2 lands are outside the elevation range of Pressure Zone 6 in Bolton's existing water distribution infrastructure. As a result, the development of the subject site will require the establishment of a new Pressure Zone 7 within Bolton.

A new Zone 7 booster pumping station has been identified at King Street and Coleraine Drive. Additionally, floating storage will be provided via an elevated tank to support flow equalization, fire demands, and emergency storage. The proposed elevated tank, which will service the site, is located in the northeast corner of the Option 1 lands, adjacent to Queen Street North. As per the latest information from the Bolton Water and Wastewater Class Environmental Assessment, the water supply infrastructure around the subject site is to start in 2027 and be complete in 2029.

A network of watermains is proposed to service the units within the subject site, which will then connect to the future watermain along Mount Hope Road at Street 'B' and Street 'G'. A watermain connection on Street 'A' and Columbia Way will also be made to complete looping. The future watermain along Mount Hope Road and Columbia Way will be sized in coordination with the Region of Peel at a later stage. Refer to Section 3.0 of the *Functional Serving and Stormwater Management Report* by Schaeffers Consulting Engineers (2025) for additional servicing demand details (**Appendix A.5.2**).

6.4.2 Sanitary Infrastructure

As previously noted, the subject site is located within the Option 2 lands. The ultimate sanitary servicing strategy, as proposed for the Bolton North Hill Landowners Group, involves directing flows from the Option 2 lands to a proposed sanitary system on Emil Kolb Parkway, which will ultimately connect to the proposed trunk sewer on Humber Station Road.

From there, flows will be pumped through twin 450 mm diameter forcemains to a 525 mm diameter trunk sewer, which will flow west by gravity along King Street before discharging into a 1200 mm diameter trunk sewer flowing south along Humber Station Road. The sanitary sewers directing the Subject Lands to the proposed sanitary system on Emil Kolb Parkway is expected to start in 2027 and complete in 2029.

The subject site will be serviced by sewers running along internal roadways. It is proposed to construct a sanitary sewer along Mount Hope Road, extending toward Emil Kolb Parkway, to allow sewage to discharge to Humber Station Road. The final design of the internal sanitary

sewers will be confirmed during the detailed design stage. Refer to Section 4.0 of the *Functional Serving and Stormwater Management Report* by Schaeffers Consulting Engineers (2025) for additional details of the Sanitary Serving Plan (**Appendix A.5.2**).

Phase 2 - Impact Assessment

Phase 2 provides a detailed characterization of the existing conditions, building off the outputs from Phase 1. The output from Phase 2 is an integrated and iterative impact assessment for all disciplines.

Phase 2 introduces the land use plan and includes a fulsome assessment of potential impacts on natural heritage and water resource features and functions as a result of proposed development. This report also includes an exploration of mitigation and management strategies for the proposed impacts.

Where appropriate, analytical tools are used to predict changes to existing conditions and assess potential land use scenarios in relation to subwatershed-based targets based on background data or baseline monitoring data collected during Phase 1. These impact analyses aim to identify preferred land use scenarios that meet the goals and targets identified within the SABE SWS and in Phase 1.

7.0 Natural Heritage (Terrestrial and Aquatic Systems)

7.1 Scope Overview

The purpose of this Phase 2 natural heritage study is to evaluate the potential impacts of the proposed development on the natural heritage features and ecological functions of the NH Study Area as well as outline proposed mitigation and compensation measures.

Phase 1 established the Existing NHS, shown in **Figure 11 (Appendix A.1.1)**. In Phase 2, the NHS is further refined to develop the proposed NHS, taking into consideration ecological restoration, enhancement, and long-term management opportunities. The Phase 2 assessment integrates findings from Phase 1 and informs SWM and hydrogeological assessments to support subwatershed-based targets. It includes a high-level evaluation of potential direct, indirect, and induced impacts; identification of areas of alteration and removal; development of mitigation and management strategies; coordination with other disciplines to support water balance and

restoration design; and review of opportunities for compensation, enhancement, and policy alignment.

Key components of this study include:

- Analysis of potential direct and indirect impacts of the proposed development on the natural heritage features, ecological functions, and species known to be present within the NH Study Area;
- Recommendations for mitigation measures to avoid or minimize impacts during and after development;
- Overview of proposed restoration and enhancement measures; and
- Mapping of the Proposed NHS.

7.2 Natural Environment Mitigation Hierarchy

A key consideration in developing a robust NHS that meets the targets and enhancement goals outlined in Phase 1 is the Net Gain Mitigation Hierarchy (see **Section 2.2.3.5**) per **Section 2.6.3.1** of the SABE Scoped SWS (Wood et al., 2022). This framework guides the protection, mitigation, and enhancement of ecological functions through a stepwise approach that prioritizes avoidance, minimizes impacts, and supports net ecological benefits. It aligns with provincial policies and best practices for sustainable development.

The hierarchy highlights the importance of long-term monitoring and adaptive management to maintain the effectiveness of mitigation and enhancement measures over time. It also incorporates climate adaptation measures to improve ecosystem resilience. Collaboration with the Town, conservation authorities, and other stakeholders is encouraged to help align outcomes with local and regional sustainability objectives.

This structured approach promotes conservation-first planning and supports offsetting unavoidable impacts through science-based restoration and enhancement. The hierarchy follows a logical sequence: first avoiding impacts through careful land use planning and early environmental

screening; then minimizing and mitigating effects where avoidance is not possible; followed by restoring degraded areas to improve ecological function. Opportunities to enhance the system by increasing ecological connectivity, resilience, or habitat quality are also considered. Where impacts cannot be fully addressed through these measures, compensation may be applied as a last resort, with the goal of achieving no net loss in terms of area or ecological function.

In applying the Natural Environment Mitigation Hierarchy to the proposed development, avoidance of natural heritage features and their functions was prioritized to the extent feasible through early site planning, environmental screening, and refinement of the development concept. The proposed layout reflects efforts to retain key natural features, establish VPZs, and direct development toward areas with lower ecological diversity and sensitivity. Given site configuration, engineering requirements, and broader land use planning objectives and targets, alternative layouts that would further reduce encroachment into the NHS were considered but would have constrained the ability to achieve these objectives and targets. Where complete avoidance was not feasible, ecological impacts were minimized through design measures.

The preferred development layout represents a balanced outcome that supports planned growth and efficient land use while maintaining and enhancing the existing NHS through mitigation, restoration, and enhancement measures. Additional discussion regarding the preferred development layout is provided in the supplementary memoranda submitted to the Town of Caledon on January 16, 2026, included in **Appendices B.1.2 and B.1.3**.

7.3 Impact Assessment and Mitigation Measures

This section evaluates the potential impacts of the proposed development on the natural heritage features of the NH Study Area, as identified in the biophysical characterization and significance analysis in Phase 1 (see **Section 2.0**), as well as those deemed relevant based on regulatory requirements or site-specific conditions. Potential impacts are assessed for both short- and long-term effects on natural heritage features and their ecological functions. Where appropriate, measures are identified to avoid or mitigate potential negative impacts.

Ecological impacts are generally categorized into three types:

1. **Direct impacts**: Typically associated with the physical removal or alteration of natural features resulting from development activities.
2. **Indirect impacts**: Changes to less visible functions or pathways that could degrade natural heritage features over time.
3. **Induced impacts**: Post-development effects that may result in increased demand on natural resources, leading to long-term cumulative environmental stress.

Figures 6B to 10 (Appendix A.1.1) provide a visual overview of the natural heritage constraints identified within the NH Study Area that are discussed in the following subsections. The resulting Existing NHS is shown in **Figure 11 (Appendix A.1.1)** and overlaid with the proposed Draft Plan in **Figure 1 (Appendix B.1.1)**. Potential direct and indirect impacts from the proposed construction activities are evaluated by natural heritage feature in **Sections 7.3.1 to 7.2.6**. Potential induced impacts are discussed separately in **Section 7.3.7**.

7.3.1 Wetlands

Four non-PSW communities are located within the Secondary Plan Area, and an additional seven wetlands—including PSW, non-PSW, and unevaluated wetlands—are located within the adjacent 120 m **(Figure 6B, Appendix A.1.1)**.

7.3.1.1 Direct Impacts

The proposed Draft Plan includes the proposed complete removal of two small tableland non-PSW communities located in the southern portion of the Secondary Plan Area, measuring approximately 0.18 ha and 0.12 ha. It also involves grading encroachment into approximately 0.05 ha of a non-PSW wetland in the northern portion of the Secondary Plan Area, along Mount Hope Road.

The proposed channel realignment requires the removal of approximately 0.35 ha of a highly disturbed riparian non-PSW community along the tributary of Cold Creek, also within the Secondary Plan Area. As part of this realignment, grading is also required at the southern tie-in

point near Columbia Way, which will result in additional encroachment of approximately 0.04 ha into a non-PSW located within the Greenbelt Plan Area. This southern tie-in point, including the policy basis from a natural heritage perspective, is discussed further in the supplementary memorandum included in **Appendix B.1.3**.

In total, approximately 0.76 ha of wetland area will be removed or directly impacted **(Figure 2, Appendix B.1.1)**. Proposed wetland replication within the realigned watercourse, as well as compensation for the tableland wetland removals and the additional grading-related encroachment, is discussed in **Section 7.4**.

7.3.1.2 Potential Indirect Impacts

7.3.1.2.1 Hydrology

Potential indirect impacts to wetlands within the NH Study Area include alterations to drainage and water balance. Development can significantly alter local hydrology by affecting surface runoff, infiltration, and groundwater flow, potentially changing both the quantity and direction of water movement. Modifying the grade of an area may redirect flows and disrupt the balance between infiltration and runoff. The introduction of impermeable surfaces, such as paved roads and buildings, further reduces infiltration capacity and increases surface runoff, potentially altering the natural water balance and drainage patterns critical for wetland function (MNR, 2010).

These hydrological changes could potentially have consequences for wetlands, which are generally sensitive to variations in water levels and hydrological inputs. The degree of sensitivity to hydrological changes varies by wetland type, but substantial alterations—whether increasing or decreasing water inputs—can potentially lead to shifts in wetland vegetation community types or even the loss of wetland vegetation characteristics if water availability becomes excessive or insufficient (MNR, 2010).

GEI, Schaeffers, and SEL have completed a Wetland Water Balance Risk Evaluation (WWBRE), in accordance with the TRCA's Guidance Document (2017b), provided in **Section 6.2**. The magnitude of potential hydrological change to all five wetlands subject to the WWBRE was

evaluated as "low". As a result, the wetland risk evaluation decision tree indicates that monitoring is not required. A non-continuous hydrological model with monthly or higher resolution output was required as well as a mitigation plan developed to maintain the wetland water balance, as outlined in the TRCA's *Stormwater Management Criteria Document* (2012).

Following the WWBRE, a feature-based water balance analysis was also completed by Schaeffers using the TRCA Water Balance Tool and Thornthwaite methodology. Of the five wetlands analyzed, four were predicted to experience runoff changes of less than 10%, and one an increase of 17%, which remains acceptable given its "low" risk classification. Full details of the analysis are provided in the *Functional Servicing and Stormwater Management Report* (**Appendix A.5.2**).

7.3.1.2.2 Construction-Related Disturbances

Construction activities pose risks to wetlands by increasing erosion and sedimentation through the exposure of bare soil during grading, excavation, and vegetation removal. Without effective erosion and sediment control (ESC) measures, sediment-laden runoff can carry nutrients and pollutants into wetlands, potentially degrading water quality and causing vegetation community shifts. These impacts may be particularly pronounced in areas with steep slopes or near sensitive ecological features. Dust generated by construction machinery can also settle on vegetation and aquatic features, potentially interfering with photosynthesis and harming wetland ecosystems (MNR, 2010).

Other construction-related disturbances near wetland edges may further degrade adjacent habitat quality. Improperly secured construction waste, such as plastics and packaging, can be carried by wind into surrounding natural areas. Additionally, soil and water contamination risks are heightened during construction due to accidental spills of fuels, oils, or other hazardous substances during equipment maintenance and refueling activities (MNR, 2010).

Other potential indirect impacts include noise disturbance, which may disrupt sensitive wildlife species, potentially altering their behavior or causing temporary displacement from wetland habitats. Invasive species introduction is another potential concern, as equipment and materials

entering the site could inadvertently transport seeds or plant fragments of invasive species, which may establish themselves and compete with native vegetation in the wetlands (MNR, 2010).

7.3.1.3 Mitigation Measures

7.3.1.3.1 Ecological Setbacks

The establishment of setbacks from wetlands helps protect the form and function of these retained natural areas from potential development impacts during construction and over the long-term. As outlined in **Section 2.6.2.2**, a 30 m setback is required within the Greenbelt Plan (MMA, 2017) for all wetlands. Within the Secondary Plan Area, a 30 m setback is required for PSWs and unevaluated wetlands, while a setback of 15 m applies to non-PSWs. In addition, revegetation of wetland setbacks is proposed as part of the restoration and enhancement strategy (see **Section 7.4**) to further support the ecological function of these buffer areas.

The Draft Plan and Grading Plan respect most setbacks from wetlands **(Figure 1, Appendix B.1.1)**. However, the proposed Development Concept incorporates a local road along much of the western boundary of the Secondary Plan Area, bordering the Greenbelt Plan Area. While most of the proposed road is located within the Secondary Plan Area, a short section encroaches into the Greenbelt Plan Area. The centreline of this encroaching road section is approximately 33 m long, while the western outer limit is approximately 118 m long. This difference is due to the road orientation relative to the Greenbelt Plan Area boundary and the angle of encroachment. In addition to the road footprint itself, grading within the Greenbelt Plan Area is required along the length of the western boundary of the road.

The proposed road does not encroach into wetland setbacks; however, a section of associated grading approximately 120 m in length encroaches up to 10 m into a non-PSW VPZ, which are designated as Supporting Features and Areas. The VPZ area currently consists of agricultural land and is therefore of low ecological sensitivity. With appropriate mitigation measures during construction and restoration of these areas to natural vegetation following construction, the wetland will not be negatively impacted by the proposed realignment. Net ecological gain is

expected following conversion of the VPZ from row crop agricultural to natural vegetation as part of the restoration and enhancement strategy.

Additional discussion regarding this encroachment, including the policy basis from a natural heritage perspective, is provided in the supplementary memorandum included in **Appendix B.1.3**.

7.3.1.3.2 Hydrology

To mitigate potential impacts to wetland hydrology and water quality, the proposed SWM strategy includes the construction of two wet ponds designed to meet quantity, quality, erosion, and volume control requirements. The West and East Ponds have been sized to control post-development peak flows to pre-development levels for the 2- through 100-year storm events, with the East Pond also providing regional storm control. Water quality control is provided through Enhanced Level treatment, targeting long-term removal of 80% Total Suspended Solids, while erosion control is achieved by detaining the 25 mm, 48-hour storm event in each pond.

Overall site-wide water balance objectives are supported through lot-level Low Impact Development (LID) measures, including infiltration trenches, topsoil amendments, and roof downspout disconnections, to promote infiltration and maintain pre-development recharge volumes to the extent feasible. Additionally, filter beds integrated into the wet ponds contribute to meeting CLI-ECA volume control requirements. Together, these measures are intended to preserve the hydrological function of wetlands retained within and adjacent to the Secondary Plan Area.

The findings of the feature-based water balance analysis support that the proposed SWM strategy is sufficient to maintain the hydrological function of the retained wetlands, with no additional mitigation measures required.

7.3.1.3.3 Construction Management Practices

A comprehensive ESC Plan has been prepared for the proposed development, in accordance with the *Erosion and Sediment Control Guide for Urban Construction* (TRCA, 2019). The ESC Plan includes both erosion and sediment control measures to minimize construction-phase impacts on retained wetlands and other sensitive features. Erosion control strategies include construction

phasing to limit soil exposure, immediate stabilization of stockpiled topsoil, and stabilization of inactive areas using methods such as mechanical seeding, hydroseeding, growth media blankets, or Terra Seeding. Sediment control measures include perimeter siltation fencing (e.g., double silt fence with straw bales), silt socks for energy dissipation and sediment capture, sediment traps sized according to guideline specifications, and temporary sediment ponds with a minimum 48-hour drawdown time. Cut-off swales and flow distributors are also incorporated and will be stabilized as per ESC guidelines. GEI recommends regular monitoring of ESC measures by a qualified inspector during construction to ensure ongoing effectiveness.

To further reduce potential impacts on retained natural features, construction equipment and materials should be stored as far as possible from wetlands, at a minimum distance of 30 m. Vehicle refueling and maintenance should occur off-site or in designated areas well away from wetlands to prevent accidental spills of fuels, oils, or other hazardous materials from entering these features. Additionally, all vehicles and equipment should arrive at the construction site clean and free of any soil or vegetation to prevent the introduction of invasive species. Before leaving the site, in line with best management practices, vehicles and equipment should be cleaned again in designated areas with appropriate containment to prevent the spread of invasive species to other areas.

7.3.1.3.4 Mitigation Summary

With the implementation of these mitigation and compensation measures, including ecological setbacks, SWM measures, the recommended ESC Plan, careful construction management practices, and ecological restoration and enhancement efforts—no net negative impacts are anticipated to the retained wetlands as a result of the proposed development.

7.3.2 Woodlands

Two significant woodlands are located within 120 m of the Secondary Plan Area, one located to the west within the Greenbelt Plan Area and one located to the east across Mount Hope Road **(Figure 7, Appendix A.1.1)**.

7.3.2.1 Direct Impacts

To allow for an appropriate tie-in of the realigned watercourse with the existing watercourse at the northernmost end, the proposed grading will encroach into a small portion of the significant woodland. This encroachment will include the removal of a small number of trees. Although these trees were staked as part of the woodland, these trees are more resemblant to a narrow hedgerow, as they are located on the opposite side of a small cultural meadow inclusion within the woodland. The majority of the grading will be limited to this small cultural meadow inclusion. Therefore, no negative impacts on the main body of the significant woodland are anticipated. This encroachment, including the policy basis from a natural heritage perspective, is discussed further in the supplementary memorandum included in **Appendix B.1.3**.

7.3.2.2 Potential Indirect Impacts

7.3.2.2.1 Construction-Related Disturbances

Potential indirect impacts on the significant woodland and other woodlands within the NH Study Area include construction-related disturbance and associated ecological stressors. Dust generated by heavy machinery may settle on vegetation, potentially interfering with photosynthesis and reducing plant health. Improperly secured construction waste, such as plastics and packaging, may be carried by wind into surrounding natural areas, degrading habitat quality. Additionally, soil and water contamination risks are heightened during construction due to the potential for accidental spills of fuels, oils, or other hazardous substances during equipment maintenance and refueling activities (MNR, 2010).

Other potential indirect impacts include noise disturbance and light pollution, which may disrupt sensitive wildlife species, potentially altering their behavior or causing temporary displacement from woodland habitats. Invasive species introduction is another concern, as equipment and materials entering the site could inadvertently transport seeds or plant fragments of invasive species, which may establish themselves and compete with native vegetation in the woodlands (MNR, 2010).

7.3.2.3 Mitigation Measures

7.3.2.3.1 Ecological Setbacks

The establishment of setbacks from woodlands helps protect the form and function of these retained natural areas from potential development impacts. As outlined in **Section 2.6.2.2**, a 30 m setback is required within the Greenbelt Plan (MMA, 2017) for significant woodlands, while a 15 m setback is required from significant woodlands within the Secondary Plan Area. In addition, revegetation of woodland setbacks is proposed as part of the restoration and enhancement strategy (see **Section 7.4**) to further support the ecological function of these buffer areas.

The Draft Plan respects all required setbacks from the significant woodland **(Figure 1, Appendix B.1.1)**. However, the Grading Plan includes some setback encroachments. As noted in **Section 7.3.1.3.1**, the proposed Development Concept incorporates a local road along much of the western boundary of the Secondary Plan Area, with a short section extending into the Greenbelt Plan Area. In addition to the road footprint itself, grading within the Greenbelt Plan Area is required along the length of the western boundary of the road.

The proposed road does not encroach into the significant woodland setback; however, a section of associated grading approximately 44 m in length encroaches up to 6 m into the significant woodland VPZ, which is designated as Supporting Features and Areas. The VPZ area currently consists of agricultural land and is therefore of low ecological sensitivity. With appropriate mitigation measures during construction and restoration of these areas to natural vegetation following construction, the woodland will not be negatively impacted by the proposed realignment. Net ecological gain is expected following conversion of the VPZ from row crop agricultural to natural vegetation as part of the restoration and enhancement strategy.

Some grading associated with the proposed watercourse realignment is also proposed within the setback of the significant woodland. These works will be mostly outside the tree protection zones identified for trees along the woodland edge in the Arborist Report (see **Appendix B.1.4**), with the exception of the tree removals discussed in **Section 7.3.2.1**. This work forms part of the proposed

ecological restoration and enhancement measures intended to improve the hydrological and ecological function of the aquatic and riparian ecosystem, discussed further in **Section 7.4**. As such, no long-term impacts are anticipated as a result of the proposed channel realignment.

Additional discussion regarding these encroachments, including the policy basis from a natural heritage perspective, is provided in the supplementary memorandum included in **Appendix B.1.3**.

7.3.2.3.2 Construction Management Practices

To further reduce potential impacts on retained natural features, construction equipment and materials should be stored as far as possible from woodlands, at a minimum distance of 30 m. Vehicle refueling and maintenance should occur off-site or in designated areas well away from woodlands to prevent accidental spills of fuels, oils, or other hazardous materials from entering these features. Additionally, all vehicles and equipment should arrive at the construction site clean and free of any soil or vegetation to prevent the introduction of invasive species. Before leaving the site, in line with best management practices, vehicles and equipment should be cleaned again to prevent the spread of invasive species to other areas.

7.3.2.3.3 Mitigation Summary

With the implementation of these mitigation measures—including the setback as shown in **Figure 1 (Appendix B.1.1)** and careful construction management practices—no net negative impacts are anticipated to the retained woodlands as a result of the proposed development.

7.3.3 Significant Wildlife Habitat

Confirmed and Candidate SWH types identified within the Secondary Plan Area and the adjacent 120 m are as follows **(Figure 8, Appendix A.1.1)**:

- Confirmed Habitat for Species of Conservation Concern:
  - Terrestrial Crayfish – MAS2-1/MAM2 and MAM2 communities within the southern portion of the Secondary Plan Area and SA/MAS2-1/MAM2-2 and MAS2-1/MAM2-2 communities located within the Greenbelt Plan Area

    - Eastern Wood-pewee (Special Concern) – FOD5-2 and CUW1 within the Greenbelt Plan Area
    - Wood Thrush (Special Concern) – FOD5-2 and CUW1 within the Greenbelt Plan Area
- Candidate SWH (adjacent 120 m only):
    - Candidate Seasonal Concentration Areas:
        - Raptor Wintering Areas – FOD east of Mount Hope Road
        - Bat Maternity Colonies – FOD5-2 within the Greenbelt Plan Area and FOD east of Mount Hope Road
    - Candidate Specialized Wildlife Habitat:
        - Seeps and Springs – FOD5-2 and CUW1 within the Greenbelt Plan Area
        - Woodland Raptor Nesting Habitat – FOD east of Mount Hope Road
        - Woodland Area-sensitive Breeding Bird Habitat – FOD east of Mount Hope Road
    - Candidate Habitat for Species of Conservation Concern:
        - Special Concern Species: Eastern Wood-pewee – FOD east of Mount Hope Road Lands
        - Special Concern Species: Wood Thrush – FOD east of Mount Hope Road
        - Rare Wildlife Species: Chestnut Schizura Moth (S3) – FOD5-2 and CUW1 within the Greenbelt Plan Area and FOD east of Mount Hope Road

The Confirmed SWH within the Secondary Plan Area consists of Terrestrial Crayfish habitat within existing wetland areas. Potential impacts and recommended mitigation measures for wetland areas, as outlined in **Section 7.3.1**, would also apply to protect the Confirmed SWH. Some additional discussion is provided in **Section 7.3.3.1**, below.

The Confirmed and Candidate SWH within the adjacent 120 m is located within the existing woodland communities. Potential impacts and recommended mitigation measures for woodland areas, as outlined in **Section 7.3.2**, would also apply to protect the Candidate SWH within 120 m of the Secondary Plan Area.

7.3.3.1 Terrestrial Crayfish

The proposed development includes the removal of two non-PSW wetlands that have been identified as Confirmed SWH for Terrestrial Crayfish. Terrestrial Crayfish chimneys were also observed within the agricultural fields both south and north of the significant woodland, both within the Secondary Plan Area and the Greenbelt Plan Area.

The restoration and enhancement plan outlined in **Section 7.4** includes the creation of additional wetland habitat both south and north of the significant woodland within the existing agricultural lands of the Greenbelt Plan Area, which are anticipated to successfully offset the proposed removal of Terrestrial Crayfish habitat from the Secondary Plan Area. Furthermore, Terrestrial Crayfish habitat elements will be considered during the detailed restoration design, and salvage opportunities will also be explored within the wetland areas proposed for removal. As such, no net negative impacts to Terrestrial Crayfish SWH are anticipated as a result of the proposed development.

7.3.4 Fish Habitat

Indirect fish habitat is present in both the watercourse and the HDFs within the Secondary Plan Area, and candidate direct fish habitat was identified in the watercourses and HDFs within the adjacent 120 m outside the Secondary Plan Area **(Figure 9, Appendix A.1.1)**.

7.3.4.1 Direct Impacts

The proposed development requires the realignment of the watercourse located in the southwestern portion of the Secondary Plan Area, as shown in **Figure 1 (Appendix B.1.1)**. The realigned channel has incorporated fluvial geomorphic considerations, including meander belt width delineation and natural channel design, and has addressed TRCA erosion hazard setback requirements.

The existing watercourse provides indirect fish habitat functions due to a downstream barrier that prevents fish passage and its intermittent flow regime. These indirect functions include seasonal

flow conveyance, water quality support, and contributions of sediment and organic material (e.g., leaves, woody debris), which may benefit downstream direct fish habitat. The portion of the watercourse proposed to be realigned has been degraded by agricultural activities on the Land Holdings (e.g., ploughing through the channel, absence of naturalized riparian vegetation), likely resulting in adverse effects on downstream habitat. GEI observed active erosion both where the channel is ploughed through and at its downstream end, where it flows over a steep topographic break at the edge of the agricultural field.

Realignment of the watercourse is anticipated to result in long-term enhancements to its indirect fish habitat functions. The new channel corridor will support a dynamically stable bed and banks, along with re-naturalized riparian zones due to the cessation of farming within the corridor. Anticipated ecological benefits include:

- Improved channel bed and bank stability, reducing erosion and fine sediment transport to downstream habitats;
- Increased morphological diversity, enhancing benthic invertebrate habitat and forage resources for downstream fish communities; and
- Establishment of riparian vegetation to stabilize banks, provide shade, and contribute organic material to the system.

Furthermore, the channel length will increase from approximately 253 m to 324 m, supporting greater habitat availability and complexity. This added length is expected to further enhance indirect fish habitat functions.

Despite these anticipated ecological benefits, construction of the realigned channel has the potential to temporarily affect fish and fish habitat within the downstream receiving watercourse through potential erosion, sedimentation, flow disruption, or accidental spills. Mitigation measures are discussed in **Section 7.3.4.3**.

7.3.4.1.1 Northern Headwater Drainage Feature

An approximately 120 m Mitigation-ranked section of the northern HDF H4 (reach H4-S3) will

be piped where it currently runs within the roadside ditch along Mount Hope Road. Although this reach provides indirect fish habitat functions, such as seasonal flow conveyance and organic material inputs, its location within the roadside ditch also introduces negative effects on downstream fish habitat. These include potential water quality impacts from winter road maintenance (e.g., salt and sand), vehicle-related contaminants, thermal impacts due to runoff from paved surfaces, and increased runoff flashiness. As a result, the net indirect fish habitat function of this roadside ditch reach is limited.

Piping this roadside ditch section will reduce the amount of open-channel HDF but is not expected to negatively affect indirect fish habitat functions. Removing this reach from the roadside ditch may reduce the associated water quality and quantity impacts. The proposed pipe will continue to convey flow from the upstream wetland and Conservation-ranked HDF (H4-S2) to downstream areas, thereby maintaining the seasonal conveyance function of H4-S3 while mitigating the negative influences of its current roadside setting.

It is recommended that DFO be consulted through the Request for Review process to confirm requirements under the *Fisheries Act*.

7.3.4.1.2 Mitigation-Ranked Headwater Drainage Features

The other Mitigation-ranked HDFs identified on the Land Holdings (H1, H2, H3, H5, and H6) provide minor indirect fish habitat functions through the conveyance of ephemeral flows from their local drainage areas to downstream headwater features and watercourses. These flows help support downstream (off-site) direct and indirect fish habitat. Cessation of ephemeral flow contributions to off-site features could potentially cause negative impacts to these habitat functions. As such, these features have been identified as mitigation features based on their role in conveying ephemeral off-site flows.

Reach H1-S1 includes a small wetland; however, the wetland is highly disturbed due to agricultural practices, and its indirect fish habitat functions are limited. The remaining HDF reaches are ploughed through and planted as part of regular farming operations and do not contain naturalized

riparian vegetation. These features likely convey fine sediments downstream, which may negatively affect water quality and fish habitat.

Mitigation HDFs H1, H2, H3, and H5 will be removed to accommodate the proposed development. No changes are proposed for H6. Mitigation measures associated with removal of these HDFs are discussed in **Section 7.3.4.3**.

7.3.4.2 Potential Indirect Impacts

7.3.4.2.1 Hydrology

Potential indirect impacts to fish habitat within the NH Study Area include alterations to drainage and water balance. Development can significantly alter local hydrology, which is critical for maintaining fish habitat, particularly in areas where fish rely on wetlands. Changes to surface runoff, infiltration, and groundwater flow can affect both the quantity and direction of water movement. Modifying the grade of an area may redirect flows and disrupt the balance between infiltration and runoff. The introduction of impermeable surfaces, such as paved roads and buildings, further reduces infiltration capacity and increases surface runoff, potentially altering the natural water balance and drainage patterns that support fish habitat (MNR, 2010).

7.3.4.2.2 Construction-Related Disturbances

Construction activities pose risks to fish habitat by increasing erosion and sedimentation through the exposure of bare soil during grading, excavation, and vegetation removal. Without effective ESC measures, sediment-laden runoff can carry nutrients and pollutants into aquatic habitats, potentially degrading water quality and impairing fish habitat. These impacts may be particularly pronounced in areas with steep slopes or near sensitive ecological features. Dust generated by construction machinery can also settle on aquatic features, potentially interfering with light penetration and disrupting aquatic ecosystem functions (MNR, 2010).

Other construction-related disturbances near aquatic features may further degrade adjacent habitat quality. Improperly secured construction waste, such as plastics and packaging, can be carried by

wind into surrounding watercourses and drainage features. Additionally, the risk of soil and water contamination increases during construction due to accidental spills of fuels, oils, or other hazardous substances during equipment maintenance and refueling activities (MNR, 2010).

7.3.4.3 Mitigation Measures

7.3.4.3.1 Ecological Setbacks

The establishment of setbacks from fish habitat helps to protect the form and function of these retained natural areas from potential development impacts. As outlined in **Section 2.6.2.2**, a 30 m setback is provided from the retained watercourses in the Greenbelt Plan (MMA, 2017) identified as providing candidate direct fish habitat in addition to a 10 m setback from any floodplains identified through TRCA mapping and any relevant erosion hazards. In addition, a 10 m setback is provided from the Conservation-ranked HDF providing indirect fish habitat within the Secondary Plan Area.

As the watercourse is proposed for realignment and the remaining Mitigation-ranked HDFs are proposed for removal, no additional ecological setbacks are proposed.

7.3.4.3.2 Hydrology

To mitigate potential impacts to fish habitat hydrology and water quality, the proposed SWM strategy includes the construction of two wet ponds designed to meet quantity, quality, erosion, and volume control requirements. The West and East Ponds have been sized to control post-development peak flows to pre-development levels for the 2- through 100-year storm events, with the East Pond also providing regional storm control. Water quality control is provided through Enhanced Level treatment, targeting long-term removal of 80% Total Suspended Solids, while erosion control is achieved by detaining the 25 mm, 48-hour storm event in each pond.

Overall site-wide water balance objectives are supported through lot-level Low Impact Development (LID) measures, including infiltration trenches, topsoil amendments, and roof downspout disconnections, to promote infiltration and maintain pre-development recharge

volumes to the extent feasible. Additionally, filter beds integrated into the wet ponds contribute to meeting CLI-ECA volume control requirements. Together, these measures are intended to preserve the hydrological function of wetlands and their associated indirect fish habitat functions within and adjacent to the Secondary Plan Area.

Mitigation of impacts to the indirect fish habitat functions of the Mitigation-ranked HDFs proposed for removal will be achieved as follows:

- **H1:** Hydrological contributions will be maintained through SWM pond discharge to the existing watercourse east of Mount Hope Road;
- **H2:** Ephemeral discharge at the existing outlet location at Mount Hope Road will be maintained through a proposed flow split from the East Pond to reflect pre-development drainage patterns and support downstream ecological function;
- **H3:** Ephemeral discharge at the existing outlet location will be maintained through a foundation drain collection system (depicted in Figure 5.4 in the Functional Servicing Report) that will discharge to the existing H3 outlet at Mount Hope Road; and
- **H5:** Ephemeral discharge from the small drainage area affected by the proposed development will be retained through rear-yard drainage from residences backing onto the urban boundary in this location. Rear yard drawing will be conveyed to a year-yard infiltration trench/swale network for outlet at the existing H5 location at the Secondary Plan boundary.

Together, these integrated SWM measures—including wet pond design, lot-level LID features (foundation drain collection system, infiltration trenches and vegetated swales), and associated discharge strategies for mitigation-ranked HDFs—are expected to maintain hydrological functions and prevent negative impacts to fish and fish habitat in downstream receiving watercourses. Although replication of the length of existing Mitigation HDFs is not required to maintain their function, the proposed vegetated swale network within the Secondary Plan Area will result in an increase in swale length relative to the existing HDFs. This will assist in maintaining HDF functions when combined with other flow discharges from SWM Ponds and foundation drain

collection system.

By supporting water balance, reducing sediment transport, and preserving water quality, the proposed SWM strategy provides protection for both indirect and direct fish habitat within and beyond the NH Study Area.

7.3.4.3.3 Construction Management Practices

A comprehensive ESC Plan has been prepared for the proposed development, in accordance with the *Erosion and Sediment Control Guide for Urban Construction* (TRCA, 2019). The ESC Plan includes both erosion and sediment control measures to minimize construction-phase impacts on retained wetlands and other sensitive features. Erosion control strategies include construction phasing to limit soil exposure, immediate stabilization of stockpiled topsoil, and stabilization of inactive areas using methods such as mechanical seeding, hydroseeding, growth media blankets, or Terra Seeding. Sediment control measures include perimeter siltation fencing (e.g., double silt fence with straw bales), silt socks for energy dissipation and sediment capture, sediment traps sized according to guideline specifications, and temporary sediment ponds with a minimum 48-hour drawdown time. Cut-off swales and flow distributors are also incorporated and will be stabilized as per ESC guidelines. GEI recommends regular monitoring of ESC measures by a qualified inspector during construction to ensure ongoing effectiveness.

To further reduce potential impacts on retained natural features, construction equipment and materials should be stored as far as possible from fish habitat, at a minimum distance of 30 m. Vehicle refueling and maintenance should occur off site or in designated areas well away from fish habitat to prevent accidental spills of fuels, oils, or other hazardous materials from entering aquatic features

To prevent negative impacts on fish and fish habitat during channel realignment activities, the following mitigation measures are recommended:

- Construction of the majority of the realigned channel should be completed in the dry, in isolation from the existing channel. This will allow construction to proceed without any

direct impacts on the existing channel until the upstream and downstream tie-ins are constructed.

- A temporary crossing structure over the existing channel may be necessary to facilitate construction of the realigned channel. Current farming practices involve driving equipment through the channel, but this could cause sediment and/or water quality issues and should be avoided during construction.
- Construction should occur outside the spring fisheries timing window (March 15 to July 1) to avoid disruption to fish in the downstream receiving watercourse. Construction in the summer is preferred, as the watercourse is expected to be generally dry during this period.
- Work-site isolation measures should be used when constructing the upstream and downstream tie-ins of the realigned channel with the existing channel. This may include a dam and pump system (or provisions for installing one if the watercourse is dry at the time of construction) to isolate the instream work area and bypass any flows present in the watercourse.
- The realigned channel should be stabilized prior to commissioning. Stabilization should be confirmed by a qualified professional before flipping flows into the new channel.
- Other ESC measures, along with spill prevention and response procedures, should be implemented during construction to minimize potential impacts on downstream fish and fish habitat.

With appropriate mitigation, along with monitoring and adaptive management, no negative impacts on fish and fish habitat are expected as a result of the channel realignment. It is recommended that DFO be consulted through the Request for Review process to confirm requirements under the *Fisheries Act*. Overall, the proposed realignment, which incorporates natural channel design, is expected to result in substantial long-term benefits to indirect fish habitat functions.

7.3.4.3.4 Mitigation Summary

With the implementation of the proposed mitigation measures— including ecological setbacks, SWM measures, the recommended ESC Plan, careful construction management practices, and

natural channel design—no net negative impacts to fish habitat are anticipated. Construction-phase impacts associated with the channel realignment will be minimized through timing restrictions, isolation of in-water works, and stabilization of the new channel prior to flow diversion. Long-term, the realigned channel is expected to enhance indirect fish habitat functions through improved stability, increased morphological diversity, and reestablishment of riparian vegetation. Together, these measures are expected to support the protection and improvement of fish habitat within and downstream of the NH Study Area.

7.3.5 Habitat of Endangered and Threatened Species

Candidate Habitat of Endangered and Threatened Species was identified within the Greenbelt Plan Area as follows **(Figure 10, Appendix A.1.1)**:

- Candidate habitat for SAR bats (Endangered) – FOD east of Mount Hope Road as well as hedgerows, CUW1, and FOD5-2 within the Greenbelt Plan Area;
- Candidate habitat for Acadian Flycatcher (Endangered) – FOD east of Mount Hope Road; and
- Candidate habitat for Red-headed Woodpecker (Endangered) – FOD east of Mount Hope Road.

To allow for an appropriate tie-in of the realigned watercourse with the existing watercourse at the northernmost end, the proposed grading will require removal of three potential bat habitat trees, based on the results of a bat habitat tree assessment completed by GEI in December 2025. Prior to the removal of any trees identified as suitable SAR bat roosting habitat, the Proponent will be required to address all applicable requirements under SAR legislation in effect at the time of project implementation.

7.3.6 Migratory Birds

GEI observed a total of 29 confirmed, probable, or possible breeding bird species within the Land Holdings and adjacent 120 m during breeding bird surveys. Among these, Killdeer (*Charadrius vociferus*) and Horned Lark (*Eremophila alpestris*)—species known to nest in bare ground

environments such as row crop agricultural fields—were documented as probable breeders within the Land Holdings.

In accordance with the *Migratory Birds Convention Act*, the proponent is responsible for ensuring that no active bird nests are present within the work area prior to the start of construction. As outlined in the Arborist Report (see **Appendix B.1.4**), tree removals are required as part of the proposed development. Additionally, although groundcover vegetation is limited, potential interactions with migratory birds remain possible, particularly for species like Killdeer and Horned Lark that nest on bare ground.

To comply with the *Migratory Birds Convention Act*, tree and other vegetation removals as well as earth-moving activities should occur outside the breeding bird timing window (March 30 to August 30). If these activities are planned within the breeding bird timing window, a qualified ecologist should conduct a nest sweep survey no more than 48 hours prior to tree and other vegetation removal as well as ground-disturbing activities. This survey will confirm whether construction can proceed without impacting migratory birds or their nests.

7.3.7 Potential Induced Impacts

Human occupancy of the proposed new community introduces the potential for long-term indirect impacts on adjacent retained natural areas. These potential impacts include encroachment, recreational use, artificial light, and noise, each of which can affect ecological integrity if not managed appropriately.

7.3.7.1 Encroachment

Encroachment impacts may result from activities such as the collection of firewood, clearing of natural vegetation (e.g., tree removal or mowing), disposal of yard waste or litter, and the use of fertilizers, pesticides, road salt, and oil, and informal trail creation. Free-ranging domestic animals can also disturb the small vertebrate fauna of retained natural areas through predation or general disturbance. Cats, in particular, are known to have serious impacts on small mammal and bird populations (Blancher, 2013; Loss et al., 2013).

To mitigate these impacts, the proposed development includes ecological setbacks that reduce the interface between residential uses and natural areas, thereby discouraging informal access and minimizing disturbance. To further support the function of these buffers, all rear yards that back onto the NHS will be fenced without gates, and no formal trails are proposed within the NHS or associated ecological setbacks. Together, these measures are intended to minimize the potential for human encroachment into protected areas, such as through mowing, dumping of yard waste, or informal gardening.

In addition, a brochure should be prepared and distributed to homeowners bordering the NHS to raise awareness of the potential impacts of residential activities on adjacent natural features. This brochure should include information on fertilizer and pesticide use, responsible gardening practices (e.g., using native rather than non-native plants), proper yard waste disposal, and pet management (e.g., keeping domestic cats indoors).

With implementation of these measures—alongside the ecological setbacks—no negative impacts on the ability of the buffer to protect the form and function of the adjacent natural features are anticipated.

7.3.7.2 Recreational Use

Recreational use of retained natural areas by residents may lead to the trampling of vegetation, soil compaction, erosion, and the destruction of habitat. This activity could also result in the introduction and spread of invasive non-native plant species, which may outcompete and displace native species (Saunders et al., 1991). Non-native plant introductions can occur through the intentional planting of decorative species in landscaped areas, as well as through seeds carried on residents' shoes or domestic animal fur (Foxcroft et al., 2013).

To mitigate these impacts, the proposed development includes ecological setbacks that create a buffer between residential areas and natural features, helping to discourage recreational use and informal access, including ad hoc trail creation. As noted in **Section 7.3.7.1**, no formal trail systems are planned within the NHS or its associated setbacks, and all rear yards that back onto the NHS

will be fenced without gates. These measures will limit unintentional recreational pressure on sensitive areas and reduce the potential for disturbance or the spread of invasive species.

7.3.7.3 Artificial Light

Artificial light associated with residential development can disrupt wildlife activity patterns, particularly for nocturnal species and migratory birds, which are sensitive to the disorienting effects of light (Longcore & Rich, 2004). Artificial light can also reduce nocturnal pollination, negatively affecting plant reproductive success (Knop et al., 2017).

To mitigate these effects, GEI encourages the use of shielded light fixtures designed to direct light downward and away from sensitive natural features. This approach aligns with guidelines such as the DarkSky International's recommendations for outdoor lighting and the City of Toronto's Green Standard (Version 4) for Low-rise Residential (2022). Implementing these measures will minimize light spill and reduce its potential impacts on adjacent habitats.

7.3.7.4 Noise Pollution

Noise pollution, particularly from post-development sources such as traffic, HVAC systems, and general human activity, has the potential to disrupt wildlife activity patterns. Songbirds are especially vulnerable to noise interference, as their communication relies on acoustic signals, which can be masked by low-frequency urban sounds (Proppe et al., 2013).

To mitigate these impacts, the proposed development includes ecological setbacks that provide physical separation from noise sources, helping to reduce sound levels reaching natural features and maintain more suitable acoustic conditions for wildlife.

7.3.7.5 Cumulative Impacts

Cumulative impacts refer to the combined, long-term effects of multiple stressors associated with development—including artificial light, noise, human presence, encroachment, and hydrological alteration—on the ecological integrity of retained and downstream natural features. While any one

activity may appear minor in isolation, the layering of these influences over time can degrade habitat quality, reduce biodiversity, and impair ecosystem functions, particularly along feature edges or in already fragmented landscapes.

To address these risks, the proposed development integrates a series of mitigation measures aimed at reducing both individual and cumulative impacts. These include ecological setbacks from natural features, the exclusion of formal trails within the NHS and associated setbacks, and permanent fencing to limit encroachment. Education materials for adjacent homeowners will further support stewardship and minimize additional stressors such as inappropriate landscaping practices or free-ranging pets. Together, these measures are intended not only to prevent localized degradation but also to reduce the incremental pressures that often drive long-term ecological decline.

From a hydrological perspective, the removal of multiple HDFs within a developing landscape has the potential to result in cumulative changes to downstream flow regimes and water quality, which in turn could affect fish habitat. However, as described in this report, the Mitigation-ranked HDFs proposed for removal on the Land Holdings provide only limited ephemeral flow contributions, and the proposed SWM strategy is designed to maintain water balance, reduce sediment transport, and preserve water quality in downstream aquatic systems. As such, no cumulative impacts on fish habitat are anticipated.

Similarly, several isolated wetlands located on tablelands will be removed to accommodate the proposed development, contributing to a cumulative loss of wetland area from the Land Holdings. However, as detailed in **Section 7.4**, compensation measures involving the replication of wetlands in more ecologically strategic locations—adjacent to other natural features within the Greenbelt Plan Area—are expected to result in more functionally diverse and resilient wetland habitats over the long term. Accordingly, the removal of these wetlands is not expected to result in adverse cumulative impacts.

7.4 Conceptual Restoration and Enhancement Strategy

This section outlines a conceptual restoration and enhancement strategy to demonstrate how ecological features and functions will be replicated or enhanced within the Proposed NHS. The Proposed NHS builds on the Existing NHS described in **Section 2.6** of this LSS and integrates additional components identified in the SABE Scoped SWS, Part B (Wood et al., 2022), including more detailed considerations for linkages and enhancements.

For the purposes of this Phase 2 LSS:

- The Preliminary NHS refers to the NHS identified in the SABE Scoped SWS (Wood et al., 2022);
- The Existing NHS refers to the system defined in the Phase 1 LSS (see **Section 2.6**); and
- The Proposed NHS refers to the refined NHS presented in this Phase 2 LSS.

This conceptual restoration and enhancement strategy is designed to achieve a net gain in ecological function and area post-development and to support the restoration of impacted wetland and watercourse areas on site. The strategy outlines high-level restoration and enhancement measures that aim to maintain the long-term integrity and resilience of the Existing NHS. These measures will be further refined in consultation with the Town of Caledon and the TRCA following approval of the conceptual strategy and will be detailed in a future Restoration and Enhancement Design Brief. Preparation of the detailed plan and drawings should be led by a Certified Ecological Restoration Practitioner (CERP) and a qualified Landscape Architect.

7.4.1 Overview of the Settlement Area Boundary Expansion Natural Heritage System

As discussed in Section 2.6.3.1 of the SABE Scoped SWS, Part B (Wood et al., 2022), the Preliminary NHS includes the following components, intended to establish a resilient and connected natural heritage network:

- Key Features;

- Supporting Features;
- Other Features;
- Linkages; and
- Enhancements.

Although refinements to the Preliminary NHS are anticipated through the LSS process, the goal is to maintain or increase the total NHS area, with a focus on enhancing ecological function.

The following subsections describe the Proposed NHS in relation to the SABE Scoped SWS Preliminary NHS components, the Phase 1 LSS findings and Existing NHS components, the natural environment mitigation hierarchy (**Section 7.2**), and the Phase 2 LSS impact assessment (**Section 7.3**). They also identify high-level goals and objectives as well as best practices for restoration and enhancement.

7.4.2 Natural Heritage Features Proposed for Removal

The conceptual restoration and enhancement strategy has been developed in accordance with the natural environment mitigation hierarchy outlined in **Section 7.2**, which prioritizes avoidance, minimization, and mitigation of impacts, followed by compensation where necessary.

Accordingly, natural heritage features within the Land Holdings designated as Core Areas (per the Peel Regional Official Plan; 2022) and Natural Features and Areas (per the Future Caledon Official Plan; 2025) will be retained, with minor encroachment in the southeastern corner of the significant woodland. Natural heritage features proposed for removal are designated as Natural Areas and Corridors (per the Peel Regional Official Plan) and Supporting Features and Areas (per the Future Caledon Official Plan). These features consist of common, low-diversity communities that are relatively isolated on the landscape and have been previously impacted by ongoing agricultural land management practices. Compensation for these proposed removals will incorporate enhancements to ecological form and function as well as connectivity across the local landscape compared to existing conditions.

The existing watercourse in the southwestern portion of the Land Holdings is proposed to be

realigned to accommodate the planned development. The existing watercourse, which currently provides indirect fish habitat functions, has been previously impacted by agricultural activities, exhibits signs of active erosion, and has sparse and heavily disturbed riparian vegetation. The realigned channel will be designed using natural channel design principles to improve bed and bank stability, enhance morphological diversity, and establish healthy riparian vegetation. These enhancements are expected to improve the ecological function of the channel and provide long-term benefits to downstream aquatic systems.

To facilitate the proposed development, two small tableland wetlands (~0.18 ha and ~0.12 ha) are proposed for removal, and some proposed grading along Mount Hope Road encroaches into the wetland (~0.05 ha) in the northern portion of the Land Holdings. In addition, the proposed realignment of the watercourse in the southern portion of the Land Holdings will require the removal of a highly impacted riparian wetland along the existing channel (~0.35 ha). Where the realigned channel is proposed to tie into the existing watercourse, some grading encroachment into a small area of wetland at the southern end (~0.04 ha) and significant woodland at the northern end (~0.12 ha) is required within the Greenbelt Plan Area. Proposed feature removals and encroachments are shown in **Figure 2 (Appendix B.1.1)**.

7.4.3 Ecological Offsetting Approach

Ecological offsetting is a mitigation strategy used to compensate for unavoidable impacts to natural heritage features, applied only after all reasonable opportunities for avoidance, minimization, and mitigation have been exhausted. In alignment with the natural environment mitigation hierarchy outlined in **Section 7.2**, offsetting is proposed for features that would be removed through the proposed development to support a net ecological benefit through targeted restoration and enhancement efforts. This approach is subject to the approval of the applicable planning authority and will be carried out in accordance with TRCA's *Guideline for Determining Ecosystem Compensation* (2023b; hereafter referred to as "the TRCA Compensation Guideline").

To offset ecological impacts resulting from the proposed channel realignment and the removal of

non-significant wetland features, compensation is proposed through natural channel design, wetland creation, and associated habitat enhancements within the Greenbelt Plan Area. These restoration and enhancement efforts are intended to support the long-term integrity of Caledon's Existing NHS by enhancing biodiversity, hydrological function, and habitat connectivity across the landscape. Further details, including restoration goals and objectives, applicable design guidelines, and a high-level restoration concept plan, are provided in the following subsections.

7.4.3.1 Municipal Ecological Offsetting Guidelines

At present, neither the Town of Caledon nor the Region of Peel have a formal ecological offsetting guideline. However, the Future Caledon Official Plan (2025) provides direction for compensation in certain circumstances within the SABE. Section 13.9.2 of the Future Caledon Official Plan states that ecosystem replication or compensation may be considered only after avoidance, minimization, and mitigation options have been evaluated. Section 13.9.9 further notes that replication may be appropriate in situations where retaining a feature in situ within an urbanizing landscape would result in impacts that cannot be reasonably mitigated.

Although the Town's ecosystem compensation guideline is not yet finalized, it is referenced in Section 13.3.4 of the Future Caledon Official Plan, alongside applicable conservation authority requirements. The SABE Scoped SWS, Part B (Wood et al., 2022) outlines two types of compensation: "Like-for-Like Compensation", which replicates the same habitat type, and "Alternative Habitat Compensation", which introduces different but ecologically valuable habitat types. In line with both the Future Caledon Official Plan and the SABE Scoped SWS (Wood et al., 2022), compensation should only proceed where it offers a net ecological benefit and where other options have been reasonably considered.

7.4.3.2 Toronto and Region Conservation Authority Ecological Offsetting Guidelines

The TRCA's *Guideline for Determining Ecosystem Compensation* (2023b) provides a framework for addressing unavoidable impacts to natural heritage features. The TRCA Compensation

Guideline is grounded in a mitigation hierarchy—avoid, minimize, mitigate, and finally compensate—which aligns with the approach described in **Section 7.2** of this report.

When compensation is required, the TRCA Compensation Guideline outlines methods for determining appropriate replacement areas, applying compensation measures, and monitoring outcomes. Two key principles inform compensation requirements: replication of ecosystem structure (e.g., basal area for treed communities) and land base (e.g., area of natural feature removed). Compensation must ensure no net loss of natural area, with a minimum 1:1 ratio applied to land base. Compensation ratios may vary by feature type, with open communities generally requiring lower ratios than treed communities due to differences in structure and recovery timelines.

7.4.4 Ecological Offsetting Goals and Objectives

The restoration strategy for the Mount Hope West Lands is intended to enhance and expand Caledon's Existing NHS through targeted restoration and enhancement efforts that support long-term ecological function and landscape connectivity. Restoration activities will focus on the creation of new wetland features, implementation of natural channel design for the realigned watercourse, and reinforcement of ecological linkages between the two Existing NHS areas within the Greenbelt Plan Area. The restoration goals and objectives that will guide the proposed ecological offsetting strategy are outlined below.

The restoration goals consist of the following:

1. Establish restored wetland and watercourse features that replicate the ecological structure and function of impacted areas and enhance landscape-level connectivity.
2. Support natural hydrological processes through the application of natural channel design and the establishment of appropriate wetland hydroperiods.
3. Increase native species richness and improve vegetation community structure within the restoration areas.
4. Enhance habitat diversity and complexity to support a range of native wildlife, including

bats, amphibians, birds, pollinators, and other species of conservation concern.

5. Minimize anthropogenic disturbance and promote the long-term integrity and resilience of the Existing NHS.
6. Contribute to climate adaptation and mitigation through increased natural cover and biodiversity.

The restoration objectives consist of the following:

1. Align restoration efforts with the policies of the Town of Caledon and the TRCA, as well as current best practices in ecological restoration.
2. Create a naturalized watercourse corridor using natural channel design principles, including appropriate meander geometry, substrate composition, and riparian vegetation.
3. Construct wetlands with suitable topography and hydrological inputs to support meadow marsh and shallow marsh communities.
4. Plant a diverse mix of native shrubs and herbaceous groundcover sourced from appropriate seed zones to establish resilient, self-sustaining vegetation communities.
5. Select plant species that enhance wildlife foraging opportunities and support pollinators.
6. Install habitat features such as brush piles, coarse woody debris, and basking structures to increase microhabitat availability.
7. Enhance terrestrial connectivity by planting native vegetation within linkage areas between Existing NHS areas.
8. Monitor site conditions and vegetation performance to support adaptive management and support successful restoration outcomes.

7.4.5 Conceptual Ecological Offsetting Plan

As discussed in the SABE Scoped SWS (Wood et al., 2022) and summarized in **Section 2.2.3.5** of this LSS, general targets were established for the Preliminary NHS to inform land use planning and decision making within the SABE lands, with the goal of achieving a net benefit to the NHS. The SABE recognizes that certain vegetation communities—such as open/early successional habitats, wetlands, and woodlands—may be removed through future development. These

communities are identified in Table 2.3.5.5 of the SABE Scoped SWS, Part B (Wood et al., 2022). Significant natural features have been identified for protection as part of the NHS, while opportunities for protection, enhancement, or restoration of supporting features and functions are encouraged where feasible.

Specific ecosystem compensation requirements have not been recommended through the SABE Scoped SWS (Wood et al., 2022) and are instead deferred to site-specific studies to determine appropriate on-site compensation. In accordance with SABE NHS targets, no net loss in wetland or woodland cover is permitted, and cash-in-lieu compensation is not recommended. If cash-in-lieu compensation is considered through future planning applications, it must be consistent with the TRCA Compensation Guideline, which accounts for the cost of restoring both ecosystem structure and land base. However, the primary intention remains implementation of on-site ecological compensation to support a net gain in ecological function and area within Caledon's Existing NHS.

All compensation measures will be designed in accordance with the TRCA Compensation Guideline, which emphasizes replication of both ecosystem structure (e.g., vegetation composition, basal area) and land base (e.g., area of feature removed). Site-specific implementation of this offsetting strategy will be guided by the restoration goals and objectives outlined in **Section 7.4.4**. This approach is expected to result in net ecological gain by replacing low-functioning, relatively isolated features that have historically experienced regular agricultural disturbance with diverse, strategically located wetland and riparian habitats that support the integrity and connectivity of the broader NHS.

7.4.5.1 Natural Channel Design

To support aquatic ecosystem health and improve overall watercourse corridor function, the existing degraded and undefined reach of the watercourse in the southwestern portion of the Land Holdings will be realigned and replaced with a naturalized, meandering channel reach. The new channel has been designed by GEO Morphix Ltd. using fluvial geomorphic principles, with the goal of restoring natural channel processes, improving aquatic habitat conditions, and integrating

wetland and riparian features into a cohesive ecological corridor (see **Appendix A.2**).

The channel will follow a shallow–deep undulating form to mimic a natural system, extend wet and dry periods, and enhance conditions for aquatic and riparian species. Channel length will increase from approximately 253 m to 324 m, supporting greater habitat availability and complexity. Online and offline wetland features are integrated throughout the corridor, as described in **Section 7.4.5.1**. These riparian wetlands will provide water retention, sediment capture, and a range of hydroperiods to support diverse vegetation communities.

The corridor will also include habitat enhancements such as pools, woody debris, native plantings, and features like raptor poles and rock piles to support wildlife use. Meander belt width and channel dimensions have been designed to maintain long-term stability while increasing ecological value.

7.4.5.2 Wetland Restoration

A key opportunity for ecological offsetting is within the Greenbelt Plan Area, where compensation activities can increase ecosystem diversity and connectivity between the two Existing NHS areas at the northern and southern ends of the Greenbelt Plan Area. For Mount Hope West, compensation is proposed within the Greenbelt Plan Area at a minimum 1:1 ratio for the approximately 0.76 ha of non-PSW wetland features that will be removed or altered to accommodate development and the proposed realignment of the southern watercourse.

The removed non-PSWs are common, low-diversity communities, previously impacted by agricultural activities. While these wetlands are not considered significant, they provide contributions to the broader ecological fabric of the landscape and will be compensated through restoration efforts that improve overall wetland ecological function, connectivity, and resilience. Compensation wetlands will be designed to support more complex habitat structure and native vegetation species assemblages, providing a greater diversity of available wildlife habitat compared to the removed wetlands. As such, these measures are expected to result in a net ecological gain relative to existing conditions.

Approximately 0.26 ha of the proposed wetland restoration area will be integrated into the realigned channel corridor (see **Section 7.4.5.1**) to compensate for the removal of approximately 0.35 ha of degraded riparian wetland currently associated with the watercourse reach proposed for realignment (the remaining ~0.09 ha to be compensated as tableland wetland, discussed in the following paragraph). These riparian wetlands are proposed as both online and offline features and are intended to enhance terrestrial and aquatic habitat within the corridor by increasing ecological diversity and floodplain complexity. They will include irregularly shaped forms with submerged and dry mounds to promote edge effects and habitat heterogeneity, supporting a range of hydroperiods and vegetation communities. Depressional storage areas within the corridor are expected to sustain wetland and wet meadow vegetation, contributing to water polishing, sediment retention, and moderated flow into the main channel (see **Appendix A.2** for additional detail). Approximately 0.04 ha of disturbed wetland area associated with the southern tie-in point of the realigned channel near Columbia Way will be restored in situ.

Removal of the two southern tableland wetlands (~0.18 ha and ~0.12 ha), encroachment into the northern wetland (~0.05 ha), and removal of degraded riparian wetland (~0.09 ha) will be compensated as tableland wetlands just north of the significant woodland. These compensation wetlands are proposed to be located near existing wetland features, to create a larger, contiguous woodland–wetland complex that enhances local habitat connectivity and ecological function. Wetland restoration areas will be graded and planted to support a diversity of native vegetation communities, including meadow marsh and shallow marsh. These areas are expected to support a variety of native wildlife, including amphibians, birds, bats, and pollinators. By replacing low-diversity, relatively isolated wetland communities with more complex and better-connected habitats, the proposed compensation strategy is expected to result in a net ecological gain relative to existing conditions.

Figure 3 (Appendix B.1.1) identifies the proposed locations for this ecological offsetting. All created wetlands will be buffered by a minimum 30 m VPZ, consistent with Greenbelt Plan (MMA, 2017) policies. These setbacks will be vegetated using a native upland seed mix, as described in **Section 7.4.5.3**, which will provide additional protection for the created wetlands and support

long-term ecosystem stability.

7.4.5.3 Woodland Restoration

Compensation is proposed for approximately 0.12 ha of significant woodland that will be disturbed to accommodate the northern tie-in for the realigned channel. More than half of this area overlaps with proposed wetland removal that is already being compensated through wetland restoration (see **Section 7.4.5.2**) and consists of a meadow marsh area with a single Willow (*Salix* sp.) tree that was staked as part of the woodland. The remaining portion of the woodland removal area is largely a cultural meadow inclusion. Overall, the majority of the 0.12 ha area is open area, with a limited number of individual tree removals required.

Despite much of the affected area being comprised of open meadow and meadow marsh, woodland compensation is proposed for the entire 0.12 ha removal area to support meaningful offsetting of impacts to woodland structure and function. Based on tree inventory data presented in the Arborist Report (see **Appendix B.1.4**), the woodland removal area has a calculated live tree basal area of approximately 9.99 m²/ha. Woodland compensation will therefore be provided at a minimum 2:1 ratio, in accordance with the TRCA Compensation Guideline. Woodland restoration will be provided along the existing woodland dripline.

Figure 3 (Appendix B.1.1) identifies the proposed location for this ecological offsetting. The woodland restoration area will be buffered by a minimum 30 m VPZ, consistent with Greenbelt Plan policies. These buffer areas will be vegetated using a native upland seed mix, as described in **Section 7.4.5.4**, providing additional protection for the significant woodland and the restored woodland area and supporting long-term ecosystem stability and connectivity.

7.4.5.4 Seeding of the Natural Heritage System Buffer

All non-vegetated areas located south and east of the significant woodland, as well as the setbacks surrounding the wetland restoration areas, will be seeded with a native upland meadow mix. This mix will include herbaceous groundcover species to establish diverse, self-sustaining meadow habitat.

The resulting vegetation will promote the development of a thatch layer over time, creating suitable conditions for ground-nesting birds and providing important resources for pollinators and the species that rely on them. Establishing native meadow habitat in these areas will enhance local biodiversity, support wildlife movement, and contribute to a more structurally and functionally diverse NHS.

7.4.5.5 Landscape Connectivity Enhancement

The Greenbelt Plan Area contain two Existing NHS areas located at the northern and southern ends of the Land Holdings. Under current conditions, these Existing NHS areas are separated by expanses of actively managed agricultural land, which results in reduced ecological connectivity and habitat quality. While this agricultural landscape does not constitute a physical barrier to wildlife movement, the absence of continuous natural cover limits opportunities for wildlife use, hydrological interaction, and the exchange of vegetation propagules between these two Existing NHS areas.

As there are no roads or built infrastructure separating the two Existing NHS areas, the Greenbelt Plan Area present an opportunity to strengthen existing ecological connectivity through targeted restoration and enhancement measures. The proposed tableland wetland compensation and buffer enhancements have therefore been strategically located between the two Existing NHS areas to improve functional connectivity by increasing the extent and continuity of natural cover across the intervening agricultural landscape.

The tableland wetlands are intended to function as intermediate habitat features that reduce the extent of exposed or disturbed land between the two Existing NHS areas and provide localized habitat resources for wildlife moving across the landscape. By situating these wetlands adjacent to existing natural features within the Greenbelt Plan Area, the restoration strategy builds upon existing ecological value and supports improved terrestrial and semi-aquatic wildlife movement. Species such as amphibians, small mammals, pollinators, and ground-nesting birds are expected to benefit from increased availability of cover, foraging habitat, and microhabitat diversity within the restoration area.

In addition to terrestrial connectivity benefits, the proposed restoration and enhancement measures contribute to improved hydrological continuity across the Greenbelt Plan Area. The establishment of new tableland wetlands, riparian wetlands associated with the realigned watercourse, and seeded buffer areas will create a larger, more integrated woodland–wetland complex that supports a broader range of hydroperiods and vegetation communities. The expansion of native wetland and upland vegetation within the proposed restoration area will reduce local landscape fragmentation and support incremental strengthening of ecological connectivity between the two Existing NHS areas.

An evaluation of landscape connectivity alternatives and rationale for the preferred restoration and enhancement approach is provided in the supplementary memorandum in **Appendix B.1.2**.

7.4.6 Next Steps and Implementation

The restoration and enhancement strategy presented in this Phase 2 LSS is conceptual and intended to guide early-stage planning and discussions with the Town of Caledon and the TRCA. The ecological offsetting approach, including wetland creation, channel realignment, and associated habitat enhancements, reflects current site conditions and policy frameworks and will be further refined in consultation with the Town of Caledon and the TRCA following approval of the conceptual strategy.

The detailed ecological offsetting approach will be provided in a Restoration and Enhancement Design Brief to support implementation. This detailed plan should be led by CERPs and supported by qualified LAs, who will prepare the associated design drawings. The Design Brief will outline:

- Site-specific restoration designs and supporting drawings (e.g., grading, planting, and soil preparation plans);
- Selection of native species sourced from appropriate seed zones;
- Placement of wildlife habitat features and erosion control measures; and
- Invasive species management strategies, if required.

The Restoration Plan will also consider relevant site-specific factors such as hydrology, soil

conditions, and topography. Reference ecosystems and/or ELC-based target communities will guide the selection and design of vegetation communities, and wetland hydroperiod requirements will inform water balance and habitat function. The plan will also identify opportunities for habitat enhancements that support target wildlife groups such as bats, amphibians, birds, and pollinators.

7.5 Proposed Natural Heritage System

The Proposed NHS for the Mount Hope West Secondary Plan Area builds upon the Existing NHS described in **Section 2.6**, with refinements to account for the proposed wetland removals, watercourse realignment, and the conceptual restoration and enhancement strategy outlined in **Section 7.4**. It incorporates ecological offsetting measures and strengthened linkages to support the long-term function, connectivity, and resilience of the NHS.

The Proposed NHS was delineated in accordance with the natural environment mitigation hierarchy (**Section 7.2**), applicable planning policies, and technical guidance, including the SABE Scoped SWS (Wood et al., 2022), the TRCA's *Guideline for Determining Ecosystem Compensation* (2023b), and relevant municipal and provincial frameworks. Where feasible, the Proposed NHS maintains and enhances the structure, function, and connectivity of natural heritage features and their associated VPZs.

Figure 4 (Appendix B.1.1) illustrates the Proposed NHS, including all retained natural features, enhancement areas, and linkages. The natural heritage components of the Proposed NHS are as follows:

- **Woodlands (Retained):** The significant woodland within the Greenbelt Plan Area will be retained, with minor encroachment (~0.12 ha) in the southeastern corner from the proposed channel realignment which will be compensated for along the existing woodland dripline at a minimum 2:1 ratio. No other woodlands within the Secondary Plan Area or the adjacent 120 m meet the criteria for significance and are therefore not included in the Proposed NHS.

- **Wetlands (Retained and Created):** All wetlands located within the Greenbelt Plan Area will be retained, with minor encroachment (~0.04 ha) in one wetland from the proposed channel realignment which will be restored in-situ. Within the Secondary Plan Area, two non-PSW tableland wetlands, one non-PSW riparian wetland, and a small area of non-PSW along Mount Hope Road (totaling ~0.76 ha) will be removed and compensated for through the creation of new wetland features in the Greenbelt Plan Area at a minimum 1:1 ratio.
- **Watercourse Corridors (Retained and Realigned):** All watercourses will be retained, including the reach of TCC1 proposed to be realigned and restored to provide a functional, naturalized corridor with riparian enhancements. The realigned channel has been designed with natural channel design principles.
- **Natural Hazards:** The Proposed NHS incorporates hazard features and associated setbacks, including the meander belt and erosion hazard setbacks of the retained and realigned portions of TCC1. The proposed channel realignment addresses these hazards through appropriate siting and design.
- **Vegetated Buffers:** Minimum setbacks have been applied to KNHFs, KHFs, and natural hazards in accordance with relevant policies (see **Section 2.6.2.2**).

The Proposed NHS emphasizes ecological connectivity through three principal linkages:

- **Existing Northern Linkage:** The retained wetland in the northern portion of the Secondary Plan Area supports terrestrial wildlife movement, while the HDF flowing through it provides hydrological connectivity across the landscape.
- **Existing Southwestern Linkage:** This corridor is formed to the west of the Secondary Plan Area in the southern portion by the significant woodland and the tributary of Cold Creek, which supports terrestrial and aquatic wildlife movement as well as provides hydrological connectivity.
- **Proposed Central Linkage:** The proposed restoration and enhancement strategy aims to connect the existing northern and central linkage areas through restoration of the intervening agricultural lands to wetland and meadow. This will increase the connected extent of woodland, wetland, meadow, and aquatic habitats within the NH Study Area,

enhancing both naturalized area patch size as well as the overall connectivity of the existing linkage system.

Restoration and enhancement measures will focus on increasing native species diversity; improving woodland, wetland, aquatic, and riparian habitat structure; and creating a variety of microhabitats for wildlife. These restoration and enhancement measures will be further refined in consultation with the Town of Caledon and the TRCA following approval of the conceptual restoration and enhancement strategy and will be detailed in a Restoration and Enhancement Design Brief.

8.0 Erosion Mitigation Assessment

8.1 Erosion Threshold Calculations

Erosion thresholds are used to determine the magnitude of flow required to potentially entrain and transport bed and/or bank material (Garcia 2008; Villard and Parish 2003). As such, they are used to inform erosion mitigation strategies in channels influenced by conceptual flow and stormwater management plans. An erosion threshold was modelled from detailed field observations of Reaches THRF-1 and THRF-2. The two reaches were selected for an erosion threshold analysis as they were identified as the most erosion-sensitive reaches that are within the potential zone of impact along the receiving watercourse east of Mount Hope Road.

The erosion threshold is a theoretical value, typically expressed as a critical discharge or shear stress, at which entrainment of sediment would occur based on the physical properties of the bed and bank materials. Due to variability between bed and bank composition and structure, erosion thresholds are determined for both bed and bank materials. The lower of the bed and bank erosion thresholds is adopted, as it provides the more conservative and limiting estimate for the subject reach.

Reach THRF-1 is located downstream of THRF-2 and drains an area of 60 hectares. Based on the results of the detailed assessment, bank materials in this reach were identified as hard clay. Using

the criteria for entrainment of hard clay from Julien (1998), a critical velocity of 0.76 m/s was applied, yielding a critical discharge of 0.326 m^3/s for the bank materials. The bed materials were composed of a mixture of graded silt to cobbles, with a corresponding critical velocity of 1.14 m/s based on Julien (1998), resulting in a critical discharge of 0.465 m^3/s. As the more conservative value, the critical discharge for the bank materials (0.326 m^3/s) was adopted as the erosion threshold for Reach THRF-1. With a drainage area of 60 ha, the defined critical discharge yields a unitary erosion threshold of 0.0054 $m^3/s/ha$.

Reach THRF-2, located upstream of THRF-1, drains a smaller contributing area of 13.1 hectares. The bank materials in this reach consist of clay till. Based on Fischenich (2001), a critical velocity of 1.00 m/s was used to evaluate the erosion threshold of the bank materials, resulting in a critical discharge of 0.305 m^3/s. Bed materials were more resistant, ranging from clay to cobbles, with a critical velocity of 1.52 m/s (Fischenich, 2001), yielding a slightly higher critical discharge of 0.466 m^3/s. As the more conservative value, the critical discharge for the bank materials (0.305 m^3/s) was adopted as the erosion threshold for Reach THRF-2. Using a drainage area of 13.1 ha, the defined critical discharge yields a unitary erosion threshold of 0.023 $m^3/s/ha$.

Channel parameters and erosion threshold results are summarized in

Table 8-1. For a detailed summary of the full assessment, refer to **Appendix A.2**.

Table 8-1: Channel Parameters and Erosion Threshold Results

Channel parameters	THRF-1 (downstream of THRF-2)	THRF-2 (upstream of THRF-1)
Drainage area (ha)	60	13.1
Gradient (%)	3.06	5.99* (reach gradient including a clay knickpoint)
		3.80 (gradient upstream from knickpoint)
		4.32 (gradient downstream from knickpoint)
Bankfull width (m)	3.07	2.26
Bankfull depth (m)	0.28	0.34
Manning's n	0.050	0.050
D50 (mm)	19.1	<2.0
D84 (mm)	58.9	46.0
Calculated bankfull discharge (m^3/s)	1.29	2.54
Calculated bankfull velocity (m/s)	1.50	3.33
Erosion threshold		
Bank		
Criteria	Hard clay	Clay till
Critical velocity (m/s)	0.76 (Julien, 1998)	1.00 (Fischenich, 2001)
Apparent shear stress (N/m^2)	40.78	32.89
Critical discharge (m^3/s)	0.326	0.305
Bed		
Criteria	Graded silt to cobbles	Clay to cobbles
Critical velocity (m/s)	1.14 (Julien, 1998)	1.52 (Fischenich, 2001)
Apparent shear stress (N/m^2)	49.23	65.11
Critical discharge (m^3/s)	0.465	0.466
Erosion threshold (m^3/s)	**0.326**	**0.305**
Unitary erosion threshold ($m^3/s/ha$)	**0.0054**	**0.023**

** To remain conservative, the reach gradient including the knickpoint was used to calculate the erosion threshold for **THRF-2** and to perform the erosion exceedance analysis*

8.2 Pre- to Post-Development Erosion Exceedance Assessment

In support of the proposed stormwater management (SWM) plan, an erosion exceedance analysis was completed for the receiving watercourse (CVC, 2015; TRCA, 2012). Runoff from the proposed SWM pond will be directed to the tributary east of Mount Hope Road (i.e., Reaches THRF-2 and THRF-1). Using the results of the erosion threshold analysis and event-based hydrological modelling provided by Schaeffers Consulting Engineers (2025) for post- and pre-development conditions, additional analyses regarding the impacts of SWM controls on potential erosion within the watercourses were completed with GEO Morphix's in-house model, based on the following three indices:

1) Cumulative time of exceedance (t_{ex})
2) Cumulative effective volume (CEV)
3) Cumulative effective work/stream power index (CEWI)

The post- and pre-development hydrological modelling reflects changes to the hydrological regime resulting from implementing SWM measures within the catchment. For each of the modeling nodes, event-based hydrological simulation results were provided by Schaeffers Consulting Engineers. Streamflow discharge was provided at 5-minute intervals for existing and proposed conditions. Two distinct scenarios (uncontrolled and controlled) were modelled under various storm event magnitudes (25 mm, 2-year, 5-year, and 10-year events). The modeled post-development scenarios with stormwater management controls accounted for a 24-hour extended detention time and an initial abstraction (IA) value of 1.5 mm.

Erosion exceedance modelling results indicate that the proposed SWM plan effectively mitigates the risk of increases in erosion potential within the receiving watercourse. Of the modeled erosion indices, the CEWI (ωeff) is considered the most relevant with respect to erosion potential, as it reflects both the flow magnitude and exceedance duration of a given erosion event. Results over +/-5% are considered to be significant enough to result in a detectable change in erosion potential within the receiving watercourse. Of secondary relevance is the CEV indicator, representing the total streamflow volume which exceeds the established critical discharge during the stormflow

event. The pre-development and post-development hydrographs are included in **Appendix A.2**. The results for the 25 mm storm event under uncontrolled conditions are shown in **Table** 8-2. The results for the pre- and post-development analysis for the 25mm, 2-year, 5-year, and 10-year storm events are provided in **Table 8-3** and **Table 8-4**.

Table 8-2: Results of the 25mm event-based hydrology exceedance analysis for the post- to pre- development under uncontrolled conditions for Reach THRF-1 and THRF-2

Scenario		CEV (m^3)	ωeff (N/m^2)	Duration of exceedances (hrs)
THRF-1	**Pre**	0	0	0
	Post	1494.9	48.61	1.5
	Change (%)	**----**	**----**	**----**
THRF-2	**Pre**	0	0	0
	Post	742.8	51.95	0.75
	Change (%)	**----**	**----**	**----**

Table 8-3: Results of the event-based hydrology exceedance analysis for the post- to pre-development under controlled conditions for Reach THRF-1

Scenario		CEV (m^3)	ωeff (N/m^2)	Duration of exceedances (hrs)
25mm	**Pre**	0	0	0
	Post	0	0	0
	Change (%)	----	----	----
2-Year	**Pre**	2305.5	75.19	3.92
	Post	1055.7	34.28	3.42
	Change (%)	-54.2	-54.41	-12.77
5-Year	**Pre**	7132.8	232.94	5.25
	Post	4452.6	145.82	5.17
	Change (%)	-37.6	-37.40	-1.59
10-Year	**Pre**	9201.3	298.83	4.75
	Post	5993.4	195.79	4.92
	Change (%)	-34.9	-34.48	3.51

Table 8-4: Results of the event-based hydrology exceedance analysis for the post- to pre-development under controlled conditions for Reach THRF-2

Scenario		CEV (m^3)	ωeff (N/m^2)	Duration of exceedances (hrs)
25mm	**Pre**	0	0	0
	Post	0	0	0
	Change (%)	----	----	----
2-Year	**Pre**	0	0	0
	Post	0	0	0
	Change (%)	----	----	----
5-Year	**Pre**	319.5	22.13	2.08
	Post	0	0	0
	Change (%)	----	----	----
10-Year	**Pre**	1063.8	74.44	2.67
	Post	0	0	0
	Change (%)	----	----	----

These modelling results indicate that the proposed SWM plan effectively reduces erosion potential along the receiving watercourse. The model predicts that erosion potential along Reach THRF-2 is completely mitigated for storm events up to and including the 10-year storm. For Reach THRF-2, the erosion exceedance modeling indicates significant post-development decreases in erosion potential. The predicted decreases in erosion potential may help increase channel stability by reducing active degradation and widening within the watercourse. As such, the proposed SWM plan is not anticipated to exacerbate erosion within the channel, and thus adequately addresses concerns relating to potential erosion impacts of the development on the receiving watercourse.

Based on comments received to date from the Town of Caledon and the TRCA, continuous hydrology modelling will be required for the erosion exceedance assessment. The tributary east of Mount Hope Road is proposed to receive discharge from the Mount Hope West Secondary Plan Area and the Bolton North Hill Secondary Plan Area. Surface water quantity monitoring for the tributary east of Mount Hope Road was collected in 2024 and 2025 by others in support of the

Bolton North Hill Secondary Plan Area. Surface water data collection will continue in 2026 to ensure sufficient data is collected for calibration. This data will also be used to calibrate the continuous model for the current study. In advance of the calibrated modeling being available, GEO Morphix will undertake an interim sensitivity analysis with the currently available model, which will be submitted under separate cover. This approach has been accepted by the Town of Caledon and TRCA for a separate Local Subwatershed Study.

An updated erosion exceedance analysis will be completed using the calibrated continuous hydrology provided by Schaeffers Consulting Engineers, when available. Similar to the event-based analysis completed to date and outlined below, the interim sensitivity analysis and the updated erosion exceedance analysis will use an in-house model to evaluate the potential for changes in key erosion indices within the receiving tributary east of Mount Hope Road. The erosion mitigation analyses will be completed following TRCA (2012) guidelines.

9.0 Proposed Conceptual Corridor Design

Reach THRE-1-1 is proposed for realignment as part of future development. This reach has been significantly impacted by agricultural land use activities (i.e. removal of natural riparian vegetation and channel straightening) and geomorphological field observations suggest that a significant portion of this feature may be ploughed during the growing season. The proposed design provides an opportunity to replace the existing morphologically limited feature with a dynamically stable channel containing shallow and deep undulating typology with cross-section dimensions closer to that of a naturalized watercourse conveying similar flows.

The design will complement the existing channel located within the upstream woodland and will significantly improve channel form and function per unit length. The channel realignment and naturalization are expected to improve riparian and aquatic conditions and provide a well-developed bankfull channel with morphological variability. Improvement in morphology and function will provide additional benefits to sediment balance, floodplain storage, vegetation communities and terrestrial habitat features, edge impacts, water balance, fish passage and water

quality. The proposed design will result in a more complex corridor system with riparian wetlands and aquatic and terrestrial habitat elements.

The primary objectives of the design are to:

- Restore the physical form of the channel including planform and in-channel characteristics
- Ensure channel stability and function during low flow periods
- Improve the function of the channel and promote interaction with the floodplain and offline wetlands
- Improve water quality by extending detention of water through offline wetland features
- Create a low-flow channel that accommodates, at most, the 1.25-year return flow to improve the function of the channel corridor and increase interactions with the floodplain
- Create a floodplain that includes interconnected wet meadow and linear wetland features of variable depth, shape, and hydroperiod
- Provide a mix of coarse and fine sediment sources throughout the low-flow channel and floodplain
- Enhance aquatic habitat through the provision of a morphologically diverse channel with spatially varied flow
- Improve riparian habitat by installing woody plantings and dynamic floodplain features
- Mitigate potential hazards to the development as well as lands surrounding the development

In the development of a natural channel design, the length of the watercourse proposed to be realigned is typically replicated or exceeded, to provide an overall gain in habitat. The length of the existing channel to be realigned for **Reach THRE-1-1** is approximately 253 m. The length of channel proposed in the design is approximately 321 m. The additional length of channel provides a significant increase in the area for restoration and habitat enhancement.

Given the limited channel form and previous impacts from agricultural practices, the proposed realignment provides an opportunity for improved riparian conditions and restore well-developed bankfull channels with morphological variability. Proposed bankfull channel parameters for each

corridor are summarized in **Table 9-1** and are to be refined at the detailed design stage. Additional technical details for the corridor design, as well as the design plans, are provided in **Appendix A.2** of this report.

Table 9-1: Bankfull parameters for Reach 1 and Reach 2

Channel parameter	Reach 1		Reach 2	
	Shallow	Deep	Shallow	Deep
Bankfull width (m)	1.50	2.10	1.50	2.10
Average bankfull depth (m)	0.15	0.22	0.15	0.30
Maximum bankfull depth (m)	0.20	0.40	0.20	0.60
Bankfull width-to-depth ratio	10.34	9.31	10.34	7.00
Channel gradient (%)	1.05	0.35	6.90	2.33
Bankfull gradient (%)	0.35		2.33	
Average radius of curvature (m) *	4		4	
Riffle-pool spacing (m) **	13		13	
Manning's roughness coefficient, *n*	0.04	0.03	0.04	0.03
Mean bankfull velocity (m/s) †	0.63	0.64	1.61	1.93
Bankfull discharge (m^3/s) †	0.14	0.30	0.35	1.21
Discharge to accommodate (m^3/s)	0.12		0.12	
Tractive force at bankfull (N/m^2)	21	14	135	137
Stream power (W/m)	14	10	237	276
Unit stream power (W/m^2)	9	5	158	132
Froude Number (unitless)	0.53	0.43	1.35	1.12
Maximum grain size entrained (m) ††	0.02	0.01	0.14	0.14
Mean grain size entrained (m) ††	0.02	0.01	0.10	0.07

** Based on Williams (1986)*
*** Based on Hey and Thorne (1986)*
† Based on Manning's equation; as pools contain ineffective space, the velocity and discharge conveyed in them are not representative
†† Based on Shields equation assuming Shields parameter equals 0.06 (gravel)

In addition to the low-flow channel, both online and offline wetland features are proposed within

the corridor. These features enhance terrestrial habitat by increasing diversity and providing a more natural floodplain form. Approximately 0.35 ha (3,500 m^2) of existing wetland along Reach THRE-1-1 is proposed for removal as part of the development. The total area of the online, offline wetland features and wet meadow area proposed within the corridor is approximately 0.26 ha (2,600 m^2). Variability is provided to ensure that a range of water depths and hydroperiods are provided from year-to-year.

The channel corridor will be restored using native plant species, including appropriate species for the seed mix. The plantings are intended to enhance the terrestrial habitat by providing species and habitat diversity, increasing floodplain soil stability, and increasing floodplain roughness and sedimentation.

10.0 Groundwater

As a part of the Phase 2 investigation, the following assessments have been completed, and the results are presented in the report titled "*"Hydrogeological Assessment for Proposed Residential Development, Northwest Quadrant of Mount Hope Road and Columbia Way, Town of Caledon", Reference Number: 2309-W138, Rev.2, dated February 26, 2026, prepared by Soil Engineers Ltd (Appendix A.4.1)*

Based on the Development Concept Plan provided by KLM Planning. dated January 14, 2026, it is understood that the proposed development will include the construction of a single detached, semi-detached, Townhouse, Mid-Rise Residential block in the northeast corner, a commercial block in the southeast corner, a park block, 2 Storm Water Management Ponds (Eastern and Western), and a natural heritage system at the Subject Site. The proposed subdivision will also be provided with roads and municipal services. As the design details for the Commercial Block and Mid-Rise Residential Blocks were not available during the preparation of this report, the associated dewatering requirements will be evaluated once the details become available.

The current investigation revealed that:

- The Subject Site lies within the physiographic region of southern Ontario known as the South Slope and the landform is identified as Till Plain (Drumlinized).

- The Subject Site is located within an area mapped as Clay to silt-textured till (derived from glaciolacustrine deposits or shale) (5d).

- The Subject Site is located within the Humber River Watershed that falls in the Toronto and Region Conservation Authority (TRCA) jurisdiction.

- The ground surface elevation ranges approximately between 257.6 metres above sea level (masl) to 263.0 masl based on ground surface elevations measured at the borehole and monitoring wells' locations.

- The subsoil investigation has revealed that beneath the topsoil veneer, and the Earth fill at the western portion of the site mainly comprises silty clay and silty clay till with interbedded layers of silty fine sand within the northwestern portion of the Subject Site.

- The Subject Site is identified within a Significant Groundwater Recharge Area (SGRA) according to the regional-scale Source Water Protection mapping (Source Water Protection Information Atlas). SGRAs as areas where groundwater recharge occurs through permeable soils such as sand or gravel. Findings from the current site-specific investigation indicate that the Subject Site is primarily composed of silty clay and silty clay till—soil types known for their low permeability. This is further supported by hydraulic conductivity test results from in-situ hydraulic conductivity tests, which also demonstrated low permeability. Given the site's soil composition and the results of the current investigation, the Subject Site does not exhibit the characteristics of a Significant Groundwater Recharge Area.

- Based on the review of the Hydrographs and manual groundwater levels the highest and lowest stabilized shallow groundwater levels measured at El. 263.1 masl and 255.1 masl at BH/MW 12 and BH/MW 5, respectively.

- Based on the review of the Hydrographs and manual water table data, the highest and lowest stabilized water tables recorded in the installed piezometers interacting with the shallow stratigraphy measured at El. 262.1 masl and 256.3 masl at MP 1 and MP 12, respectively.

- The results of analysis for the unfiltered groundwater indicate no exceedance when compared and evaluated against the Region of Peel Sanitary and Storm Sewer Use By-Law parameters.

- The hydraulic conductivity estimates for the silty clay unit range from 2.0 x 10^{-6} m/sec to 4.9 x 10^{-8} m/sec, and silty clay till unit ranges from 6.2 x 10^{-7} m/sec to 5.0 x 10^{-8} m/sec. The estimated hydraulic conductivity of 1.3 x 10^{-7} m/sec and 6.2 x 10^{-7} m/sec for the silty clay and silty clay till, respectively, were used for the current assessment.

- The preliminary estimated short-term construction dewatering flow rate from the groundwater source, with a safety factor of 1.5 and a 2-year storm event for construction of the proposed underground services, reaches up to 74,400.0 L/day, considering an open and active excavation trench with dimensions of 2 m width and 50 m length. As such, filing an EASR with the MECP is required for the excavation and construction of the proposed installation of the underground services.

- Based on a preliminary estimates, the anticipated dewatering flow rates, including groundwater seepage with a safety factor of 1.5 during storm events for the active excavation area for the proposed residential lots and blocks development that will be constructed below the seasonally high shallow groundwater table, reaches up to 107,600.0 L/day for proposed townhouse blocks, assumed to be comprising of eight (8) units, 16,350.0 L/day for the proposed single-detached residential units, and up to 22,350.0 L/day for the semi-detached units for two (2) attached units. As such, filing an EASR with the MECP is required for the construction of townhouse blocks, but not required for the construction and excavation of the single detached units and the semi-detached units.

- Based on preliminary estimates, the anticipated dewatering flow rates, including groundwater seepage with a safety factor of 1.5 during storm events for the active excavation area for the proposed SWM Ponds ranges from 252,300.0 L/day to 681,700.0 L/day. As such, filing an EASR with the MECP is required for the construction of the SWM Ponds.

- Obtaining a discharge permit from the Region of Peel may be required if the potential collected discharge water during construction is proposed to be discharged to the region's sewer system.

- The maximum estimated long-term foundation drainage flow rate of 71,200.0 L/day is below the MECP PTTW threshold limit of 379,000.0 L/day for the proposed development. As such, applying for PTTW with MECP is not required. However, obtaining a discharge agreement from the Region of Peel is required if the foundation drainage is proposed to be conveyed to the Region's sewer system.

- The preliminary estimated zone of influence for any temporary construction dewatering array or dewatering area could extend up to 18.5, 12.3, 8.2, and 9.9 m from the conceptual dewatering wells or array considered around the proposed underground services, proposed residential units, Western SWM Pond, and Eastern SWM Pond, respectively. Based on the review of the details, Mount Hope Road and Columbia Way are located outside of the Zone of Influence for any temporary construction dewatering array or wells for Street N, Street B, Street C, Eastern SWM Pond and Western SWM Pond. As such, significant risk for ground settlement is not expected with respect to the proposed development. Record review indicates that there is a total of two (2) tributaries of the Cold Creek that outlet to the Humber River.

    a. One (1) Tributary is mapped in the Northern portion of the Subject Site, flowing from the west to the southeast direction. Based on the review of the draft plan, it is identified as the Natural Heritage System (NHS), and based on the review of the conceptual zone of influence for dewatering, the provincially significant wetland

associated with the NHS is located outside the Zone of influence for the installation of underground services proposed beneath Street A, as well as the proposed nearby residential lots and blocks. As such, significant impacts to the above-noted natural feature are not expected with respect to the proposed development.

b. The second tributary is located in the southern portion of the Subject Site, flowing from the east to the southwest direction and eventually south/southeasterly direction towards the Humber River. Based on the review of the proposed plan, the channel realignment is proposed for the tributary. As such, significant impacts to the above noted natural feature are not expected with respect to the proposed development.

- Records of water bodies (ponded waterbody) are mapped within the Subject Site and surrounding lands. Three (3) records are mapped in the north, central and south portions of the Subject Site.

    a. Based on the review of Figure 5- Head Water Drainage Feature Assessment Map dated February 18, 2026, Project 2407713, prepared by GEI Consultant, presented in **Appendix A-4** and discussion with the ecologist, the central water body was not observed during the investigation.

    b. A review of the Development Concept Plan provided by KLM Planning. dated January 14, 2026 Presented in **Appendix A-4**, indicates that the northern water body is located within the proposed Natural Heritage system area, and it is located outside of the preliminary estimated conceptual zone of influence for dewatering of the street E. Therefore, no Potential impacts are anticipated.

    c. Additionally, it is understood that the water body and its associated unevaluated wetland located in the southern portion of the Subject Site located close to the SG 5 and the unevaluated wetland located near BH/MW 101 and MP 1 location is located within the development foot print and proposed to be removed as per the

Figure 2 of the project 2407713 dated February 18, 2026 prepared by GEI presented in **Appendix A-4**. As such, significant impacts to the above noted natural features are not expected with respect to the proposed development.

A review of the MECP well records confirmed that there is a total of twelve (12) water supply wells registered within a 500 m radius of the Subject Site. All twelve (12) water supply wells are for domestic use according to their first use status. Two (2) water supply wells are present within the Subject Site. However, considering the location of the water supply wells and proposed development, it is assumed that both water supply wells will be decommissioned if still existing. Furthermore, no other water supply wells are present within the zone of influence of the dewatering areas; therefore, no significant impacts to the water supply wells are anticipated with respect to the proposed development if it exists. Additionally, the Private Water Supply Well Survey (Pre-Construction monitoring Study) was completed and provided in the report titled "Private Water Supply Well Survey (Pre-Construction Monitoring Study, Proposed Residential Development, Northwest Quadrant of Mount Hope Road and Columbia Way, Town of Caledon,", dated April 4, 2025 (SEL. Ref.2309-W138)

11.0Surface Water

11.1 Hydrologic Assessment

The *Downstream Analysis Report* by Schaeffers Consulting Engineers details the hydrological assessment (2025) and catchment discretization applied for this analysis (See **Appendix A.5.1**). The report summarizes the catchment discretization undertaken for the Post Development condition considering the Mount Hope West Subject Site (SCE Post Dev Scenario) as well as proposed future conditions which considers additional developed lands to the west of the Subject Site. The additional proposed developed lands come from Bolton North Hill Landowners Group (BNHG) (BNHG Post Dev Scenario).

Section 6.1.3 describes the TRCA VO models used for the hydrological assessment. VO models are updated to represent both the SCE Post Dev Scenario and the BNHG Post Dev Scenario. These

are uncontrolled scenarios without SWM facilities. Catchment areas and input parameters were calculated and applied to the model as described in the *Downstream Analysis Report* by SCE (2025) (See **Appendix A.5.1**). **Table 11-1**, **Table 11-2**, and

Table 11-3 present a summary of peak flows for the SCE Post Development scenario, the BNHG Post Development scenario, and the SCE Modified Existing model scenario. Refer to **Table 6-2** for node descriptions.

Table 11-1: Summary of Peak Flows in the SCE Post Development Scenario (m^3/s)

Storm	Node				
	Cold Creek			Main Humber Tributary A	Cold Creek End
	1347	7522	7521	7520	1850
Regional	160.4	170.2	286.5	26.9	298.1
100	31.6	34.2	57.9	17.0	61.4
50	14.3	15.9	38.1	8.6	41.0
25	10.8	12.4	30.5	7.6	33.4
10	7.3	8.9	22.0	6.1	24.6
5	2.6	3.0	5.6	3.9	7.2
2	1.6	1.8	3.3	2.8	4.5

Table 11-2: Summary of Peak Flows in the BNHG Post Development Scenario (m^3/s)

Storm	Node				
	Cold Creek			Main Humber Tributary A	Cold Creek End
	1347	7522	7521	7520	1850
Regional	160.1	169.8	286.3	30.8	295.9
100	31.6	34.1	57.9	21.9	60.6
50	14.3	15.9	38.0	10.6	41.1
25	10.8	12.3	30.5	9.4	33.5
10	7.3	8.9	22.0	6.1	24.6
5	2.6	3.0	5.6	5.1	7.3
2	1.6	1.8	3.3	3.6	4.6

Table 11-3: Summary of Peak Flows in the SCE Modified Existing Scenario (m^3/s)

Storm	Node				
	Cold Creek			Main Humber Tributary A	Cold Creek End
	1347	7522	7521	7520	1850
Regional	161.6	170.8	287.0	26.1	299.4
100	32.1	34.5	58.3	15.4	61.8
50	14.4	16.0	38.2	8.2	41.2
25	10.9	12.5	30.6	7.2	33.6
10	7.4	9.0	22.1	5.7	24.7
5	2.6	3.0	5.6	3.7	7.2
2	1.6	1.9	3.4	2.5	4.5

The pose development conditions scenarios were compared against the SCE modified existing peak flows. **Table 11-4** and

Table 11-5 show the compared peak flow values.

Table 11-4: SCE Post Development and SCE Modified Existing Peak Flow Comparison (m^3/s)

Storm	Node				
	Cold Creek			Main Humber Tributary A	Cold Creek End
	1347	7522	7521	7520	1850
Regional	-1.2	-0.6	-0.5	0.8	-1.2
100	-0.4	-0.4	-0.3	1.5	-0.4
50	-0.1	-0.1	-0.1	0.4	-0.2
25	-0.1	-0.1	-0.1	0.4	-0.2
10	-0.1	-0.1	-0.1	0.3	-0.1
5	-0.1	-0.1	-0.1	0.3	-0.1
2	0.0	0.0	0.0	0.2	0.0

Table 11-5: BNHG Post Development and SCE Modified Existing Peak Flow Comparison (m^3/s)

Storm	Node				
	Cold Creek			Main Humber Tributary A	Cold Creek End
	1347	7522	7521	7520	1850
Regional	-1.5	-1.0	-0.8	4.7	-3.5
100	-0.5	-0.4	-0.4	6.5	-1.2
50	-0.1	-0.1	-0.1	2.4	-0.1
25	-0.1	-0.1	-0.1	2.2	0.0
10	-0.1	-0.1	-0.1	0.3	-0.1
5	-0.1	-0.1	-0.1	1.4	0.1
2	0.0	0.0	0.0	1.1	0.1

The flow assessment makes clear that generally peak flows are the same or slightly less than the existing conditions flows at the nodes of interest along Cold Creek. The nodes presented are from along the main watercourses. As only a small percentage of the overall catchment for these nodes is urbanized, peak flows appear to decrease. Node 7520 is located downstream of the Mount Hope West site. SWM facilities are proposed to deliver flows to this watercourse. Node 7520 shows a peak flow increase under the SCE Post Development scenario and greater peak flow increases under the BNHG Post Development scenario. The *Downstream Analysis Report* details this assessment further.

11.2 Hydraulic Assessment

The post development scenario peak flows are applied to the HEC-RAS Model, as described in Section 4.3. Updated floodplain mapping was generated using the BNHG Post Development scenario model results to represent the proposed future uncontrolled flood lines for the Regional and 100-year storm. The mapping and documentation of the results is summarized in the *Floodplain Analysis Report* by SCE (2025) (**Appendix A.3.3**).

As presented in

Table 11-5**,** the tributary along node 7520 has a FVA at its downstream end, but is otherwise a confined channel. The increases to peak flow presented are contained within the channel corridor, and impacts to the FVA are not observed. The *Floodplain Analysis Report* details this assessment (**Appendix A.3.3**). Overall, conveyance of flood flows has remained unaffected

A preliminary design the proposed channel realignment was completed to demonstrate the hydraulic feasibility of the channel. Detailed design of the channel will take place at a later stage in the Project design process. The *Floodplain Analysis Report* details the methods and results of the preliminary channel design (**Appendix A.3.3**).

11.3 Climate Impact Assessment

An impact assessment is completed to evaluate precipitation scenarios impacted by climate change on the proposed site and SWM plan. The purpose of this assessment is to provide a preliminary overview of future conditions at the site. Per direction from the TRCA and the Town, the proponent continues to be required to adhere to the design of the regulatory storm in this area.

Watershed level climate scenarios prepared by the TRCA were collected to perform a qualitative analysis. As well notable historical storms and future scenario intensity-duration-frequency (IDF) curves were used to assess the capacity of proposed SWM infrastructure. Historical storms and IDF information were obtained in coordination with the Town of Caledon and the TRCA.

Climate change models analyze various future scenarios to predict future climate. The Intergovernmental Panel on Climate Change (IPCC) defines sscenarios used to represent possible future development pathways for societies. These scenarios are called Shared Socioeconomic Pathways (SSP). For this assessment, a medium emissions scenario (SSP2-4.5) and a high emissions scenario (SSP5-8.5) are applied to a timescale of 2071-2100.

11.3.1 Qualitiative Review

The TRCA provided climate information for the Humber River Watershed under a memo entitled *Summary of the Climate Projections for the Humber River Watershed and If-Then-So Analysis*

(2023). **Table 11-6** and **Table 11-7** summarize key climate parameters relevant to assessing the future hydrological setting of the Subject Site.

Table 11-6: Summary of Modelled Historical and Future Climate for each Climate Period under the SSP2-4.5 Climate Scenario

Climate Parameter	Variable Name	SSP2-4.5 Modelled Historical		SSP2-4.5 Modelled Future		Trend
		1961-1990	1981-2010	2041-2070	2071-2100	
		50th	50th	50th	50th	
Mean Temperature (°C)	Annual	6.9	7.5	10.3	11.2	↑
	Winter	-5.8	-5.1	-1.7	-0.5	↑
	Spring	5.5	6.1	8.7	9.6	↑
	Summer	18.9	19.5	22.1	23	↑
	Fall	8.7	9.3	11.8	12.7	↑
Maximum Temperature (°C)	Annual	11.9	12.4	15.2	16.1	↑
	Winter	-1.8	-1.2	1.6	2.8	↑
	Spring	10.7	11.3	14	15	↑
	Summer	24.8	25.4	28.3	29.2	↑
	Fall	13.4	14.1	16.7	17.6	↑
Minimum Temperature (°C)	Annual	1.9	2.5	5.3	6.2	↑
	Winter	-9.8	-9	-5.1	-3.7	↑
	Spring	0.3	0.9	3.4	4.2	↑
	Summer	13	13.6	16	16.9	↑
	Fall	3.9	4.6	7	7.9	↑
Total Precipitation (mm)	Annual	805.6	819.9	887.4	900.5	↕
	Winter	174.1	178.3	201	212.7	↑
	Spring	196.3	200.9	224.4	232.2	↑
	Summer	212.3	216.5	222.5	217.3	↕
	Fall	209.5	211.4	229.3	223.5	↕
Extreme Precipitation	Max Precipitation in 1 day (mm)	36.9	36.9	41.2	43.3	↑
	Max Precipitation in 3 days (mm)	54	54.7	60.9	62.9	↑
	Simple Daily Intensity Index (SDII) (mm/day)	5	5	5.4	5.5	↑

	95th Percentile Precipitation (mm)	11.5	11.7	12.7	12.8	↑

50th percentile results are summarized above. Refer to *Summary of Climate Projections for the Humber River Watershed and If-Then-So Analysis*, TRCA, October 10 2023 for full data set.

Table 11-7: Summary of Modelled Historical and Future Climate for each Climate Period under the SSP5-8.5 Climate Scenario

Climate Parameter	Variable Name	SSP5-8.5 Modelled Historical		SSP5-8.5 Modelled Future		Trend
		1961-1990	1981-2010	2041-2070	2071-2100	
		50th	50th	50th	50th	
Mean Temperature (°C)	Annual	6.9	7.5	11.1	13.6	↑
	Winter	-5.8	-5.1	-0.7	1.9	↑
	Spring	5.5	6.1	9.6	11.8	↑
	Summer	18.9	19.5	22.9	25.6	↑
	Fall	8.7	9.3	12.7	15.2	↑
Maximum Temperature (°C)	Annual	11.9	12.4	16.1	18.5	↑
	Winter	-1.8	-1.2	2.5	4.9	↑
	Spring	10.7	11.3	14.9	17.2	↑
	Summer	24.8	25.4	29	31.8	↑
	Fall	13.4	14.1	17.5	20.1	↑
Minimum Temperature (°C)	Annual	1.9	2.5	6.2	8.7	↑
	Winter	-9.8	-9	-3.9	-1.1	↑
	Spring	0.3	0.9	4.2	6.4	↑
	Summer	13	13.6	16.8	19.5	↑
	Fall	3.9	4.6	7.8	10.3	↑
Total Precipitation (mm)	Annual	805.6	820.1	892.3	934.2	↕
	Winter	174.1	178.3	206.7	228.5	↑
	Spring	196.3	200.9	229.5	244.6	↑
	Summer	212.3	216.6	215.5	214.2	↕
	Fall	209.5	211.4	227.1	232.2	↑
Extreme Precipitation	Max Precipitation in 1 day (mm)	36.9	36.9	42.9	45.8	↑
	Max Precipitation in 3 days (mm)	54	54.7	62.4	67.3	↑

	Simple Daily Intensity Index (SDII) (mm/day)	5	5	5.5	5.8	↑
	95th Percentile Precipitation (mm)	11.5	11.7	12.8	13.5	↑
50th percentile results are summarized above. Refer to *Summary of Climate Projections for the Humber River Watershed and If-Then-So Analysis*, TRCA, October 10 2023 for full data set.						

Table 11-6 and **Table 11-7** summarize climate model results for the medium emissions scenario (SSP2-4.5) and a high emissions scenario (SSP5-8.5), respectively. Impacts to climate parameters under the 2071-2100 time period relative to the historical values are more significant under the high emissions scenario. However, both scenarios exhibit the same trends across climate parameters. **Table 11-8** compares the results of the 2071-2100 time period to the historical values of 1961-1990 for both climate scenarios presented.

Table 11-8: Comparison of 2071-2100 Against 1961-1990 for SSP5-8.5 and SSP2-4.5 Scenarios

Climate Parameter	Variable Name	SSP5-8.5		SSP2-4.5	
		Delta	Percent Difference	Delta	Percent Difference
Mean Temperature (°C)	Annual	6.7	65%	4.3	48%
	Winter	7.7	395%	5.3	168%
	Spring	6.3	73%	4.1	54%
	Summer	6.7	30%	4.1	20%
	Fall	6.5	54%	4.0	37%
Maximum Temperature (°C)	Annual	6.6	43%	4.2	30%
	Winter	6.7	432%	4.6	920%
	Spring	6.5	47%	4.3	33%
	Summer	7.0	25%	4.4	16%
	Fall	6.7	40%	4.2	27%
Minimum Temperature (°C)	Annual	6.8	128%	4.3	106%
	Winter	8.7	160%	6.1	90%
	Spring	6.1	182%	3.9	173%
	Summer	6.5	40%	3.9	26%
	Fall	6.4	90%	4.0	68%

Total Precipitation (mm)	**Annual**	128.6	15%	94.9	11%
	Winter	54.4	27%	38.6	20%
	Spring	48.3	22%	35.9	17%
	Summer	1.9	1%	5.0	2%
	Fall	22.7	10%	14.0	6%
Extreme Precipitation	Max Precipitation in 1 day (mm)	8.9	22%	6.4	16%
	Max Precipitation in 3 days (mm)	13.3	22%	8.9	15%
	Simple Daily Intensity Index (SDII) (mm/day)	0.8	15%	0.5	10%
	95th Percentile Precipitation (mm)	2.0	16%	1.3	11%

By the results presented in the summary tables, the Humber River Watershed can expect to see increases in temperature through each season. This would include increases to the minimum, mean, and maximum temperatures. Temperature increases can lead to greater evaporation and transpiration, influencing the existing hydrological cycle. As well, warmer temperatures in the winter may imply an increase to snowmelt rates and seasonal surface flows as a result.

Both climate scenarios see increases to total precipitation, particularly in the spring and winter. The SSP5-8.5 and SSP2-4.5 climate scenarios for 2071-2100 show increase in annual precipitation by approximately 129 mm and 95 mm, respectively. This ranges from 11 – 15 % different from the historical climate parameter values for 1960-1990. Increases to the intensity of precipitation is noted under the extreme precipitation climate parameter. Increases to the maximum 1-day and 3-day precipitation events range from 6 mm to 13 mm between both climate scenarios relative to the 1960-1990 historical values. The modelled results for 2071-2100 show that maximum 1-day and 3-day precipitation may increase to as high as 67 mm.

Increased precipitation would lead to increased runoff, placing additional stress on to the stormwater management systems in place. Additionally, more intensity in precipitation events generally may cause additional risk for urban flooding due to greater rates of runoff from intense storms. Increased urban runoff may be associated with a decline in surface water quality, due to additional runoff from roads and agricultural lands. It should be noted that the *Downstream*

Analysis Report and *Floodplain Analysis Report* document the Regional (Hazel) Storm's impacts to site hydrology (**Appendix A.5.1 and A.3.3**, respectively). The Regional Storm describes a storm where approximately 206 mm of precipitation falls over a 12-hour time frame.

Impacts to the climate of the Humber River Watershed are documented by TRCA and summarized within **Table 11-6** and **Table 11-7.** Impacts to site hydrology, with respect to stormwater management and flood protection, are to be monitored and assessed as further information and guidance is made available.

11.3.2 Quantitative Review of Climate Change Adjusted IDF Curves

A quantitative assessment is performed to assess the capacity of SWM infrastructure on site such as the SWM pond storage. The following storms were applied for the assessment of SWM infrastructure:

- Future IDF Curve for SSP2-4.5 2071-2100 (10- to 100-year storms)
- Future IDF Curve for SSP5-8.5 2071-2100 (10- to 100-year storms)

IDF curves for the 2071-2100 time period representing the medium emissions scenario (SSP2-4.5) and high emissions scenario (SSP5-8.5) were taken from ClimateData.ca for a timescale of 2071-2100. The *Toronto Met Res* climate station IDF curve was used as it was the closest station in proximity to the Subject Lands. The future total precipitations are summarized in **Table 11-9**.

Table 11-9: Future Total Precipitation (mm) IDF Summary for Future Climate Scenarios

Return Period Storm	SSP2-4.5		SSP5-8.5	
	6-hour	12-hour	6-hour	12-hour
10	78.0	82.8	90.0	96.0
25	96.0	98.4	108.0	115.2
50	102.0	109.2	120.0	132.0
100	114.0	120.0	138.0	144.0

The existing Toronto Bloor AES storm hyetographs were converted to mass curves. The future climate scenarios total precipitation was applied to the mass curves to create the storm events. **Table 11-10** summarizes the results of the capacity assessment on the proposed SWM ponds of the Subject Site.

Table 11-10: Summary of SWM Ponds Capacity under Climate Scenarios

Return Period Storm	SSP2-4.5				SSP5-8.5			
	6-hour		12-hour		6-hour		12-hour	
	East	West	East	West	East	West	East	West
10	Y	Y	Y	Y	Y	Y	Y	Y
25	Y	Y	Y	Y	Y	Y	Y	Y
50	Y	Y	Y	Y	Y	Y	Y	Y
100	Y	Y	Y	Y	Y	Y	Y	Y
Y – Capacity of the SWM Pond is sufficient; N – Capacity was breached in the model								

Model results indicate that the East SWM pond does not exceed storage under any of the modelled scenarios. This result is reasonable as Regional Storm quantity controls are included within this SWM pond proposed design. The West SWM pond is also not breached under any of the modelled storm events. The West SWM pond is proposed to attenuate the Regional Storm as much as possible. The West SWM pond is sized for the 100-year storm (requiring 8600 m^3 of storage). Some additional storage has been provided to provide attenuation in the Regional Storm Event to the greatest extent (11,000 m^3 total storage) (see **Appendix A.5.2**). Sizing of pipe capacities will be complete at the Draft Plan stage of submission. Pipe capacities shall be sized such that the minimum cleansing velocities are met between facilities and the subdivision. Larger pipe capacities in general provide greater flexibility for changes in hydrology as a result of changing climate.

11.3.3 Quantitative Review of Hisotrical Storms

An assessment of four historical storms has been completed to assess the capacity of SWM

infrastructure on site such as the SWM pond storage. The assessment is completed through a continuous model in Vo to apply observed precipitation data to the proposed site. The historical storms being assessed were selected based on communications with the TRCA and the Town of Caledon. The storms assessed include the following: August 19 2008, July 8 2013, July 16 2024, and August 17 2024.

Continuous precipitation data was retrieved from the TRCA precipitation gauge HY037 (King Albion Vaughan Station). This TRCA gauge station is the closest in proximity to the subject site and has adequate data coverage for the storms of interest. A continuous VO model was established to model the historical storms with the proposed site areas and proposed SWM pond infrastructure. The purpose of the model is to identify how the proposed site responds to the resulting runoff from the historical major storms and whether the proposed ponds can meet the demands of these historical storms. Table 11-11 summarizes the results of this assessment.

Table 11-11 Summary of SWM Ponds Capacity under Historical Storms

	Timeseries Start	Timeseries End	Total Precipitation (mm)	West Pond Volume Used (m^3)	East Pond Volume Used (m^3)
August 19 2005	2005-08-19 0:00	2005-08-20 23:55	50.4	4353	6453
July 8 2013	2013-07-08 0:00	2013-07-08 23:55	58.2	2845	4185
July 16 2024	2024-07-10 0:00	2024-07-19 23:55	79.8	3011	4319
August 17 2024	2024-08-17 0:00	2024-08-18 23:55	59.6	2845	4185

The proposed ponds provide quantity control beyond the 100-year storm requirement. The east pond is sized to provide Regional Storm controls with a total capacity of approximately 27,000 m^3. The west pond is sized to near the level of Regional Controls with a total capacity of 11,000 m^3 (see **Appendix A.5.2**). The maximum volume required for storage under each of these

historical storms are well within the available storage capacities of the proposed SWM ponds. Thus, the assessment determines that these historical storms are adequately managed by the proposed ponds.

12.0 Municipal Servicing

12.1 Water Supply Infrastructure

The proposed water supply plan for the Subject Site is documented within Section 3.0 of the FSR provided under **Appendix A.5.2**. This includes preliminary fire and peak daily water demand calculations, preliminary layout of the internal water supply systems and external connection points, and alignment with the Region of Peel Water and Wastewater Master Plan.

Region of Peel has previously completed a feasibility study for the Bolton community area to review the best approaches for urban boundary expansion. This study evaluated different expansion options for the Bolton settlement area which includes the project location, assessing how each area would be serviced. A new Zone 7 booster pumping station has been identified at King Street and Coleraine Drive. Additionally, floating storage will be provided via an elevated tank to support flow equalization, fire demands, and emergency storage. The proposed elevated tank, which will service the site, is located adjacent to Queen Street North.

A network of watermains is proposed to service the units within the subject site, which will then connect to the future watermain along Mount Hope Road at Street ‘B’ and Street ‘G’. A watermain connection on Street ‘A’ and Columbia Way will also be made to complete looping. The future transmission mains along Mount Hope Road and Columbia Way will be sized in coordination with the Region of Peel at a later stage. The transmission mains along Mount Hope Road, Emil Kolb Parkway, and Columbia Way will be 400 mm to 600 mm in diameter.

Phase 1 of the development requires a temporary BPS to boost domestic pressures. The temporary BPS is proposed to be located directly southeast of the West Pond Block, adjacent to Columbia Way. Intended to operate until the Region’s permanent infrastructure upgrades are complete. Please refer to details in Section 3.3 and 3.4 of the FSSR report (Appendix A.5.2).

The water supply demands are presented in **Table 12-1** and **Table 12-2**. Please note that pressures within the watermains will be verified via hydrant tests once the infrastructure is constructed. Supporting calculations can be found in **Appendix B** of the FSSR Report (**Appendix A.5.2**).

Table 12-1: Ultimate Water Supply Servicing Demands

Expected Population	Average Demand (L/s)	Peak Hour Demand (L/s)	Maximum Day Demand (L/s)	Fire Flow (L/s)	Max Demand + Fire Flow (L/s)
2,555	8.57	25.71	17.14	267	284.14

Table 12-2: Phase 1 Water Supply Servicing Demands

Expected Population	Average Demand (L/s)	Peak Hour Demand (L/s)	Maximum Day Demand (L/s)	Fire Flow (L/s)	Max Demand + Fire Flow (L/s)
1,349	4.52	13.58	9.10	267	276.10

The fire flow requirements for the townhouse units have been calculated in accordance with the latest Fire Underwriters Survey (FUS) 2020 guidelines, as these unit types are expected to have the highest flow requirement.

12.2 Sanitary Infrastructure

The proposed sanitary servicing plan for the Subject Site is documented within Section 4.0 of the FSR provided under Appendix A.7. This includes preliminary sanitary flow calculations, design and layout of servicing systems, alignment with the Region of Peel Water and Wastewater Master Plan, and alignment with planned capital projects.

The future servicing of the Subject Lands was considered in the Bolton Water and Wastewater Feasibility Study (Regional of Peel). The ultimate sanitary servicing strategy, as proposed for the Bolton North Hill Landowners Group, involves directing flows from the Subject Lands to a

proposed sanitary system on Emil Kolb Parkway, which will ultimately connect to the proposed trunk sewer on Humber Station Road.

From there, flows will be pumped through twin 450 mm diameter forcemains to a 525 mm diameter trunk sewer, which will flow west by gravity along King Street before discharging into a 1200 mm diameter trunk sewer flowing south along Humber Station Road. The sanitary sewers directing the Subject Lands to the proposed sanitary system on Emil Kolb Parkway is expected to start in 2027 and complete in 2029. The proposed lots will be serviced by sewers running along internal roadways. It is proposed to construct a sanitary sewer along Mount Hope Road, extending toward Emil Kolb Parkway, to allow sewage to discharge to Humber Station Road.

Phase 1 of the development requires a temporary SPS to restrict discharge rates to the allowable limit of 15 L/s. The temporary SPS is proposed to operate until the Region's permanent infrastructure is in place. Specifically, the sanitary sewage system along Emil Kolb Parkway. The temporary SPS will be located southwest of the intersection between Street "C" and Mount Hope Road. Once decommissioned, sanitary flows going to the SPS can be connected to the sanitary sewer along Mount Hope Road. Please refer to details in Section 4.3 and 4.4 of the FSSR report (Appendix A.5.2). The final design of the internal sanitary sewers will be confirmed during the detailed design stage.

Table 12-3: Ultimate Sanitary Servicing DemandsTable 12-4 **and Table 12-4** presents the sanitary servicing demands. Supporting calculations can be found in **Appendix C** of the FSSR Report (**Appendix A.5.2**).

Table 12-4: Phase 1 Sanitary Servicing Demands

Area (ha)	Expected Population	Average Flow (L/s)	Harmon's Peaking Factor (L/s)	Peak Flow (L/s)	Infiltration (L/s)	Total Flow (L/s)
14.65	1,349	4.53	3.71	16.81	3.81	20.62

12.3 Grading

A grading plan has been prepared and is provided under **Appendix B.3**. The grading plan is based on the draft plan prepared by SGL Planning (**Appendix A.7**). The grading plan shows road centerline grades every 20 m. The elevations of the road centerlines were established to provide sufficient cover for the underground storm, sanitary and clean water collector sewers. Grading of the road centerlines is also completed to ensure that sufficient clearance will be maintained between the proposed development's basements and the groundwater contours. As well, site grading is informed by the existing drainage divide which splits the site into east and west flow directions. The proposed site grading aims to preserve the existing drainage conditions.

The retaining wall and areas requiring 3:1 slope grading have also been identified on the plan for. A detailed grading plan including lot grading will be provided at the detailed design stage. Potential impacts to the NHS from grading activities has been documented under **Section 7.3.2.3.1**.

Phase 3 - Management, Implementation and Monitoring

Phase 3 of the study builds upon the findings and recommendations established in Phase 2, with a focus on the practical implementation of the preferred land use scenario and associated infrastructure, environmental, and servicing strategies. This phase translates high-level land use and environmental objectives into actionable steps that support a phased, coordinated, and sustainable development approach.

The primary purpose of this phase is to guide the management and implementation of the various development considerations, and also the monitoring program as it pertains to the development, and ensure compliance with applicable criteria and/or policies, which protect the natural environment, and accommodate the anticipated growth of the Mount Hope area.

This phase addresses key technical, environmental, and planning considerations necessary to support the transition from concept planning to draft plan of subdivision applications and eventual construction. This integrated and holistic approach ensures that the environmental and sustainability needs are balanced with infrastructure and community needs. The detailed subsections that follow provide discipline-specific strategies, recommendations, and requirements to guide the next stages of the development.

13.0 Management and Implementation

13.1 Stormwater Management

The following section presents the stormwater management (SWM) strategy for the proposed development on the Subject Lands which has been prepared as part of the Phase 3 study. It will discuss the proposed storm servicing plan including the end-of-pipe SWM facilities as well as the LID measures that will service the Subject Lands. The SWM strategy will demonstrate conformance with all applicable SWM criteria identified as part of the Phase 1 study. Detailed information including relevant calculations and modelling is being provided as part of the Functional Servicing and Stormwater Management Report (FSSR) which is included in **Appendix A.5.2**.

13.1.1 Stormwater Management Strategy

A dual drainage SWM scheme is proposed. The minor system, consisting of storm sewers, will be designed to capture and convey 10-year flows, while the major system, consisting of overland flow routes (i.e., ROWs), will handle excess flows beyond the 10-year event. The minor and major system shall be designed to the satisfaction of the Town of Caledon and will safely convey flows to two (2) downstream SWM facilities.

The two (2) SWM facilities are proposed to be wet ponds (referred to as the East Pond and West Pond). The ponds shall provide the required quality, quantity, and erosion control (extended detention), consistent with the previously established SWM criteria, for a majority of the Subject Lands. The ponds will also provide filtration via filter beds to satisfy CLI-ECA volume control requirements. This will be in conjunction with lot-level controls which will provide retention. A portion of the site will also drain uncontrolled due to grading constraints. This consists of primarily backyard areas. Please see the FSSR **(Appendix A.5.2)** for the storm drainage plan and storm servicing plan respectively. Preliminary SWM pond drawings are included in **Appendix B.3**.

Table 13-1 summarizes the post-development drainage areas, imperviousness values, and outlet locations. **Table 13-2** summarizes the required active storage volumes for each pond to meet quantity control criteria. **Table 13-3** summarizes the required permanent pool volumes for each pond to meet quality control criteria. **Table 13-4** summarizes the erosion control measures.

LID measures are intended to mimic the pre-development hydrology of the development by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source. For this development, infiltration trenches are proposed in backyards to provide retention. The trenches will collect drainage from backyards and roofs. These will serve a dual purpose, helping satisfy both water balance and CLI-ECA volume control criteria. Alternative LID measures may be explored as the development process progresses, provided that infiltration and retention targets are satisfied. More details on the LID plan can be found in the FSSR (**Appendix A.5.2**).

One (1) site plan in the northeast area of the property is proposed. Due to grading constraints, this area cannot be drained to the proposed ponds. As such, quantity controls are not proposed. This has been accounted for in the downstream analysis to demonstrate no negative impacts as a result of this strategy. Quality and erosion control is proposed on-site. The design details shall be finalized during the Draft Plan stage. It is presumed the on-site control will consist of LID measures and a filter unit.

Table 13-1: Post-Development Drainage Areas

Catchment	Area (ha)	Imperviousness (%)	Outlet
East Pond	18.55	72	Humber River Tributary via culvert crossing
West Pond	11.52	81	Humber River Tributary
Northeast Development	0.66	80	Humber River Tributary

Table 13-2: Active Storage Requirements

Catchment	Area (ha)	Required Volume (m^3)	Comments
East Pond	18.55	27,163	Regional Storm Volume
West Pond	11.52	11,000	Regional Storm Attenuation to the greatest extent possible

Table 13-3: Permanent Pool Requirements

Catchment	Area (ha)	Required Volume (m^3)	Target
East Pond	18.55	3,494	80% TSS removal
West Pond	11.52	2,342	80% TSS removal

Table 13-4: Erosion Control Summary

Catchment	Area (ha)	Detention Target	Detention Volume (m^3)
East Pond	18.55	25mm, 48hours	3,246
West Pond	11.52	25mm, 48hours	2,189

13.1.2 Water Balance

A water balance is an accounting of the water resources within a given area. As a concept, the water balance is relatively simple and may be estimated from the following equation:

$$P = S + ET + R + I$$

where:

P	=	precipitation
S	=	change in groundwater storage
ET	=	evapotranspiration/evaporation
R	=	surface water runoff
I	=	infiltration

The subject site is not located within the Well Head Protection Area (WHPA). Due to the tight nature of soils, and high groundwater table, best efforts to match the pre-development annual infiltration volume will be done in post-development conditions.

The TRCA water budget tool was used in the water balance analysis, which provides the annual precipitation rate for the Subject Lands. As the TRCA water budget tool inputs do not equal outputs, the evapotranspiration rate was determined based on prorating the precipitation rate. The infiltration factor for the underlying soil (silty clay) was determined based on Table 3.1 of the Stormwater Management Planning and Design Manual (MOE 2003), and was applied to the water surplus (i.e., the difference between the precipitation and evapotranspiration rates) to determine the infiltration and runoff rates for pre-development conditions and pervious areas in the post-development conditions. The following table summarizes the water balance component values used for existing conditions.

Table 13-5: Water Balance Parameters

Water Balance Component	Value (mm/yr)
Precipitation	860
Evapotranspiration	571
Water Surplus	**289**
Infiltration	130
Runoff	159

The water balance analysis was done for three scenarios. (1) pre-development conditions, (2) post-development conditions with no mitigation and (3) post-development conditions with mitigation. The infiltration component was evaluated for each scenario to determine the infiltration deficit and required infiltration volume to eliminate the deficit.

Based on the water balance assessment, it was determined that the annual infiltration volume for pre-development conditions is approximately 41,590 m^3/year and is expected to drop to 14,091 m^3/year under the post-development conditions without mitigation. Thus, the approximate annual infiltration deficit without mitigation is calculated to be 27,499 m^3/year.

In order to mitigate the estimated infiltration deficit, proposed mitigation methods include 5 mm on-site retention from site plans. For additional mitigation, disconnecting downspouts, topsoil amendments, and infiltration trenches in the rear yard of residential lots are proposed. The post-development conditions with the proposed subject site mitigation methods will produce 153,286 m^3/year of surface runoff, 41,689 m^3/year of infiltration, and 80,053 m^3/year of evapotranspiration. The infiltration volume provided from the site plans and infiltration trenches will satisfy the pre to post infiltration deficit. The following table summarizes the complete water balance analysis for all scenarios. The proponent may also investigate alterative LIDs at the draft plan stage. Detailed water balance calculations are provided in **Appendix A.5.2**.

Table 13-6: Water Balance Summary

Parameter	Pre-Development	Post-Development (w/o Mitigation)	Change (Pre to Post)	Post-Development (w/Mitigation)	Change (Pre to Post)
Inputs (m^3/year)					
Precipitation	275,028	275,028	0	275,028	0
Inputs	275,028	275,028	0	275,028	0
Outputs (m^3/year)					
Precipitation	92,422	194,975	+102,553	194,975	+102,553
Surplus	92,422	194,975	+102,553	194,975	+102,553

Evapotranspiration	182,606	80,053	-102,553	80,053	-102,553
Infiltration	41,590	14,091	-27,499	41,689	+99
Runoff	50,832	180,884	+130,052	153,286	+102,454
Outputs	275,028	275,028	0	275,028	0

13.1.3 CLI-ECA Requirements

The Town of Caledon participates in the MECP's stormwater approvals program referred to as the Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA). For this development, the mandate is to control the 90th percentile rainfall event which is at least 27 mm of runoff for the Town of Caledon. The MECP has established a hierarchy of control methods to accomplish this that begins with retention approaches such as infiltration and reuse. With best efforts to retain, any runoff part of the initial 27mm amount that cannot be retained, shall be treated via LID filtration. Conventional water quality control measures which are third in the hierarchy are permitted only after (1) maximizing retention and (2) LID filtration.

For this development, the site will maximize retention via infiltration trenches and site plan infiltration (method to be established during detailed design of the site plan) which will serve a dual purpose of providing a water balance benefit. The trenches will be placed in backyards where appropriate. The remaining runoff will be treated via filtration through filter beds in both proposed SWM ponds. These two (2) approaches will provide the necessary 27mm volume control as required by CLI-ECA requirements. The summary is provided in the following table.

Table 13-7: CLI-ECA Summary

Overall Volume Control Parameter	Value
Drainage Area	30.70 ha
Imperviousness	77%
Required Volume	6,383 m^3
Infiltration Trenches Volume	893 m^3
Site Plan Infiltration Volume	133 m^3

West Pond Filter Bed Volume	2,519 m^3
East Pond Filter Bed Volume	3,606 m^3
Total Provided Volume	7,151 m^3

13.2 Groundwater

Groundwater recommendations during construction to mitigate impacts to local groundwater resources resulting from dewatering will be provided in the updated Hydrogeological Assessment report once the long-term monitoring is completed and design drawings are available for review.

Recommendations related to developing a post-development Low Impact Development (LID) strategy to mitigate impacts to the water balance caused by decreases in infiltration and increases in runoff are provided in a pre-and post-development water balance assessment. The findings can be reviewed in a report titled *Pre-and Post-development Water Balance Assessment, Northwest Quadrant of Mount Hope Road and Columbia Way, Town of Caledon*", Reference Number: 2309-W138, dated; May 28, 2025, prepared by Soil Engineers Ltd (see **Appendix A.4.2**).

Baseline information, including surface water and depth to the water table as well as subsoil profile, are presented in the report titled *"Hydrogeological Assessment for Proposed Residential Development, Northwest Quadrant of Mount Hope Road and Columbia Way, Town of Caledon", Reference Number: 2309-W138, Rev.2, dated February 26, 2026, prepared by Soil Engineers Ltd (Appendix A.4.1).* Further details will be provided when the long-term monitoring program is completed.

13.3 Construction

Construction (i.e. grading, planting, etc.) on site is subject to applicable wildlife seasonal timing windows, as discussed in Sections 7.5 and 7.6 of this report. These timing windows are summarized below:

- Breeding birds: to avoid contravention of the *Migratory Birds Convention Act*, vegetation removal and earthworks will avoid the breeding bird window of March 30 to August 30.

However, if these activities are proposed within that window, a qualified ecologist should complete a nest sweep survey a maximum of 48 hours before vegetation removal and earthworks; and

- SAR bats: to avoid contravention of the ESA, tree removal will avoid the SAR bat roosting window of March 15 to November 30. However, if tree removals are proposed within that window, a qualified ecologist should complete a bat exit survey a maximum of 24 hours before tree removal.
- In-water work: To avoid impacts on fish during sensitive life stages, in-water works should be avoided between March 15 and July 1, unless otherwise approved by DFO.

It should be noted that construction of the municipal services (external water/sanitary infrastructure) is proposed to be completed in the 2027-2029 timeframe.

14.0 Monitoring Plan

To evaluate the effectiveness of various mitigation and environmental management strategies identified in the LSS, a monitoring plan is needed. Monitoring is typically completed prior to development, during development and following development. The purpose of the monitoring is to evaluate the response of the subwatershed to the proposed land use change such that impacts can be distinguished from natural trends at an early stage. This will provide an ability to focus future monitoring (to be completed by the Town, Region and/or TRCA) to help determine the how/why/frequency of potential impacts and will assess cause-effect relationships between the environment and land use change.

Standardized and approved protocols should be applied and utilized through the program life to ensure that the data collected is robust and useable. The monitoring program should consider a scale and scope of investigation which yield useable and meaningful data. The scope of the program will consider water quality and quantity, including stormwater system performance; terrestrial and aquatic resources; groundwater quality and quantity; stream morphology and slope stability; and feature-based and site water balance and the effectiveness of infiltration measures.

14.1 Natural Heritage Monitoring

The following sections provide the proposed natural heritage monitoring approach based on the conceptual restoration and enhancement strategy outlined in **Section 7.4**. As this plan has been developed based on the conceptual strategy, this monitoring plan is considered preliminary and may be modified as part of the detailed Restoration and Enhancement Design Brief to reflect the finalized restoration and enhancement strategy. This plan defines the ecological performance indicators, the scope and frequency of monitoring, and the reporting requirements to assess restoration success over time. The monitoring strategy has been developed with broad climate change considerations in mind to support long-term ecological resilience under changing environmental conditions.

14.1.1 Ecological Performance Indicators

Ecological monitoring indicators are specific, quantifiable measures of attributes that connect short term and long-term goals (Gann et al., 2019). The proposed monitoring program includes the following indicators:

- Short term (within 5 years):
    - Successful establishment of planted and seeded native vegetation within woodland, wetland, and meadow restoration areas, including achievement of target survival and cover thresholds;
    - Early detection of invasive plant species and implementation of the Adaptive Management Plan, if required, to control highly invasive species (Category 1 in accordance with Urban Forest Associates, 2002); and
    - Verification that constructed wetland and channel features exhibit the intended hydrological conditions, as inferred from vegetation community composition and structural indicators.
- Long-term:
    - Improved diversity and abundance of habitats and microhabitats within the Land Holdings;

- Improved diversity, abundance, and structural complexity of wetland and meadow vegetation communities within the Land Holdings;
- Improved diversity and abundance of breeding bird species within the Land Holdings;
- Improved diversity and quality of aquatic habitat; and
- Improved ecological connectivity between Existing NHS areas, as evidenced by continuity of native vegetation cover.

14.1.2 Monitoring Scope and Timeline

The proposed monitoring program includes baseline, compliance, and performance monitoring. Together, these components support evaluation of the effectiveness of the restoration and enhancement measures over time. The purpose of each monitoring component is as follows:

- Baseline Monitoring – Baseline monitoring is undertaken to characterize the condition, significance, and function of existing NHSs and to establish reference conditions for comparison with post-development conditions. This monitoring is conducted prior to development and was completed by GEI between 2022 and 2025.
- Construction-Phase Compliance Monitoring – Construction-phase compliance monitoring is intended to assess the effectiveness of mitigation measures and construction practices implemented to manage potential impacts during construction. This monitoring is typically driven by permit and approval requirements and focuses on confirming that ESC measures are installed, maintained, and functioning as intended.
- Post-Development Monitoring – Post-development monitoring includes both compliance and performance monitoring components:
  - Compliance Monitoring – Compliance monitoring is undertaken to satisfy permit and approval requirements and to confirm that components of the NHS enhancement areas have been constructed in accordance with approved designs. This includes monitoring of restoration areas and enhanced vegetated buffers.
  - Performance Monitoring – Performance monitoring evaluates the functionality and effectiveness of the NHS as a whole. This form of monitoring is typically conducted

at a broader spatial scale than compliance monitoring and may be comparable in scope to the baseline monitoring to support assessment of longer-term ecological outcomes. This includes monitoring of retained natural features, restoration areas, and enhanced vegetated buffers.

14.1.2.1 Baseline Monitoring

Baseline monitoring is required to characterize and confirm the significance and function of existing NHSs and to establish reference conditions for comparison with future conditions. Baseline monitoring was completed by GEI between 2022 and 2025, as described in **Section 2.3.2**, and included the following components:

- ELC;
- Botanical inventory;
- Breeding bird surveys;
- Calling amphibian surveys;
- Turtle basking surveys;
- Incidental snake surveys;
- Terrestrial crayfish survey;
- Bat habitat assessment;
- AHA; and
- HDFA.

Baseline data will be used to support comparative assessments over time, to identify and interpret ecological changes, and to evaluate the effectiveness of implemented mitigation and restoration measures.

14.1.2.2 Construction-Phase Compliance Monitoring

The purpose of compliance monitoring during construction is to verify that ecological mitigation measures are implemented as required and that construction-related impacts are effectively

managed. Compliance monitoring will also confirm that approved restoration plans are carried out in accordance with design intent. Construction-related monitoring requirements, including ESC measures, tree protection zone requirements, and spill prevention and response measures, will be implemented by the general contractor and/or landscape contractor. Vegetation monitoring of plantings within the restoration areas will be undertaken by a qualified ecologist, botanist, and/or the project Landscape Architect. The specific compliance monitoring components are described further in the subsections below.

14.1.2.2.1 Landscape Architecture Construction Administration

GEI recommends that the project Landscape Architect conduct the following site visits and inspections:

- A pre-construction and mobilization meeting on site with the contractor to review site protocols and confirm material delivery and construction schedules;
- Attendance at construction review meetings, including:
    - Inspection and confirmation of fine grading adjacent to natural areas;
    - Progress reviews to verify that grading conforms to approved designs; and
- A substantial completion site inspection with the Town of Caledon and/or TRCA, as applicable, to confirm that a minimum of 90% of the landscape installation has been completed.

14.1.2.2.2 Vegetation Monitoring of Plantings

During the construction-phase compliance monitoring period, vegetation monitoring of plantings within the restoration areas will include the following review activities by a qualified ecologist, botanist, and/or the project Landscape Architect:

- Any native species substitutions and/or stock size adjustments to confirm suitability for site conditions and consistency with restoration goals;
- Plant materials delivered to the site, or seed tickets where seeding is proposed, to confirm

species composition and suitability prior to installation;

- Planting bed preparation, mulching, and soil amendments, as applicable, to confirm appropriate implementation relative to approved restoration plans and site conditions;
- Planting layouts prior to and following installation to confirm consistency with approved restoration plans and appropriate field fitting in response to site conditions;
- Planting numbers and densities to confirm consistency with approved restoration plans;
- Installation of specialized wildlife habitat features to confirm appropriate placement and configuration; and
- Identification of aggressive invasive species (Category 1) that may affect the successful establishment of native vegetation within restoration areas.

14.1.2.2.3 Tree Protection Zone Monitoring

Monitoring of tree protection zones during construction will be conducted or supervised by the general contractor and/or the landscape contractor to confirm adherence to approved tree protection requirements. Monitoring activities will be carried out in accordance with the Arborist Report (see **Appendix B.1.4**) and will include observation of potential construction-related impacts to trees, including soil compaction, root disturbance, mechanical damage, and required pruning.

14.1.2.2.4 Erosion and Sediment Control Monitoring

ESC measures will be implemented and maintained throughout construction and will remain in place until a minimum of 80% site stability has been achieved. Monitoring of ESC measures during construction will be carried out by the contract administrator, while any maintenance required to maintain effective erosion and sediment control will be undertaken by the general contractor and/or the landscape contractor.

During scheduled site visits, an ecologist will conduct limited monitoring of ESC measures in relation to the protection of adjacent retained natural heritage features and restoration areas,

including woodlands and wetlands. Any observed ESC deficiencies will be documented and communicated to the appropriate responsible party for follow-up and correction.

14.1.2.2.5 Migratory Bird Timing Restrictions

In accordance with the *Migratory Birds Convention Act*, the proponent is responsible for ensuring that no active bird nests are present within the work area prior to the start of construction. To comply with the *Migratory Birds Convention Act*, tree and other vegetation removals as well as earth-moving activities should occur outside the breeding bird timing window (March 30 to August 30). If these activities are planned within the breeding bird timing window, a qualified ecologist should conduct a nest sweep survey no more than 48 hours prior to tree and other vegetation removal as well as ground-disturbing activities. This survey will confirm whether construction can proceed without impacting migratory birds or their nests.

14.1.2.2.6 Species at Risk Bat Timing Restrictions

To comply with the *Endangered Species Act*, tree removal should occur outside the SAR bat roosting timing window (March 15 to November 30). If tree removals outside the significant woodland are planned within the SAR bat roosting timing window, a qualified ecologist should conduct two rounds of bat exit surveys on two consecutive nights, with the second round no more than 24 hours prior to tree removal. This survey will confirm whether tree removal can proceed without impacting SAR bat roosting.

14.1.2.3 Post-Development Monitoring

Post-development monitoring will include both compliance and performance monitoring components. Compliance monitoring will be undertaken to satisfy permit and approval requirements and to confirm that components of the NHS enhancement areas have been constructed in accordance with approved designs. Performance monitoring will evaluate the functionality and effectiveness of the NHS as a whole and will focus on longer-term ecological outcomes. Performance monitoring will be conducted at a broader spatial scale than compliance

monitoring and may include both retained and restoration areas of the NHS. The specific compliance and performance monitoring components are described further in the subsections below.

14.1.2.3.1 Compliance Monitoring

Compliance monitoring of plant survivorship within the restoration areas will be conducted in Years 1 and 2 following planting, commencing in the year following the substantial completion site inspection, which is conducted once a minimum of 90% of the landscape installation has been completed. Compliance monitoring will be coordinated through the project Landscape Architect and will focus on plant establishment, survivorship, coverage, and growth.

A tree survivorship target of 100% and a shrub survivorship target of 80% will be applied. For areas seeded with native groundcover, germination success is not typically quantified due to the inherent variability associated with seed establishment; however, areas exhibiting visibly low herbaceous cover will be identified during monitoring.

Planting installation deficiencies, plant mortality requiring replacement under the applicable warranty period, and seeding deficiencies will be documented and communicated to the appropriate project lead for corrective action. Corrective measures may include replacement planting and re-seeding, as appropriate, to promote consistent vegetation cover across restoration areas and to achieve the restoration design objectives.

14.1.2.3.2 Performance Monitoring

Post-construction performance monitoring will be undertaken to evaluate the functionality of the restored and retained natural areas relative to baseline conditions documented in 2022 and 2024. A five-year monitoring program is recommended, with monitoring conducted in Years 1, 3, and 5, commencing the growing season following implementation of vegetation and other restoration measures. The following ecological performance monitoring surveys will be completed during each monitoring year:

- Vegetation surveys:
    - ELC (summer);
    - Botanical inventory (summer);
    - Invasive species surveys (summer);
- Breeding bird surveys (two rounds);
- Calling amphibian surveys (three rounds);
- Turtle basking surveys (three rounds); and
- Terrestrial crayfish surveys (one round).

Survey methodologies will be consistent with those used for baseline monitoring, as described in **Section 2.3.2**. Survey locations will be refined based on the finalized restoration and compensation plan.

For the realigned watercourse, a targeted fluvial geomorphology monitoring program will be implemented to assess channel stability and function. Monitoring will occur bi-annually (spring and fall) for three years post-construction, with possible biennial monitoring beyond that period if needed. This program includes baseline and follow-up surveys of the longitudinal profile and cross-sections, erosion pin measurements, photo documentation, bed material characterization, and general vegetation assessments. These efforts will help determine whether remedial works are required and support adaptive management of the restored corridor. Further detail on the fluvial monitoring program is provided in **Section 15.2 and 14.2**.

14.1.3 Monitoring Reports

Monitoring reports will be prepared for each performance monitoring year (i.e., Years 1, 3, and 5) to summarize monitoring results, compare pre- and post-development ecological conditions, and assess the NHS relative to the ecological performance indicators outlined in **Section 13.1.1**. Where monitoring results indicate that adaptive management is warranted, consistent with the adaptive management triggers described in **Section 14**, the reports will recommend appropriate measures. Monitoring reports will be submitted to the Town and/or TRCA, as required, by March 1 of the calendar year following each monitoring year.

14.2 Fluvial Geomorphology

14.2.1 Pre-Construction

Pre-construction baseline conditions were established as part of Phase 1 of the Local Subwatershed Study through completion of the following activities:

- Reach–based rapid assessments to document channel stability and overall watercourse health for the central tributary and Reaches THRF-1 and THRF-2
- Detailed geomorphological assessments along Reaches THRF-1 and THRF-2 that included surveys of the longitudinal profiles and eight (8) cross-sections
- Of the surveyed cross-sections, two were monumented to provide a reference condition in comparing surveys completed in subsequent years

It is recommended that monumented cross-sections along Reaches THRF-1 and THRF-2 be re-surveyed within one (1) year of proposed SWM ponds being operational to confirm existing conditions prior to these reaches receiving stormwater discharge.

14.2.2 During Construction

Construction activities will be overseen by the fluvial geomorphologist. Field fitting and adjustments are often required due to the dynamic nature of natural systems, and it is therefore beneficial to have an experienced inspector that can provide proper direction when necessary. Observation is to occur at key times in the construction process (e.g., confirm pre-construction conditions, examine lay-out and initial site channel construction, inspect channel and constructed features before flow activation). Regular observations will ensure that the design is constructed as intended and that any field fitting is completed appropriately.

14.2.3 Post-Construction

The following activities should be completed along the constructed corridor on a seasonal basis (unless otherwise noted below) for a period of three (3) years following the year of construction

to assess performance of the implemented design:

- Collect general observations after construction and after the first large flooding event to identify any potential areas of erosion.
- Compile a detailed, georeferenced photographic record or high resolution orthorectified image of the channel planform using an unmanned aerial vehicle (UAV) in the spring, prior to the onset of vegetation growth.
- Complete a total station survey of the longitudinal profile and 8 to 10 cross-sections following construction that captures an equal mix of geomorphic unit types.
    - Two of the cross-sections should be monumented and georeferenced.
- Re-survey the longitudinal provide and cross-sections in subsequent monitoring years after construction.
- Install and survey erosion pins in both banks at monumented cross-sections and re-measure erosion pins during subsequent monitoring surveys.
- Bed material characterization based on Wolman (1954) pebble counts.
- Annual general vegetation surveys for the duration of the monitoring period.

The monitoring should commence immediately after construction, and the corridor should be reviewed annually to identify the natural variability of the system. Biennial monitoring is recommended should the monitoring period extend beyond three years post-construction as most potential channel adjustments would occur in the first one to two years following construction.

Reporting is to be prepared on an annual basis and will document design implementation and results of the monitoring program. Monitoring activities should be undertaken by a qualified geomorphologist.

Instream Erosion

Geomorphological monitoring should be completed along Reaches THRF-1 and THRF-2 on an annual basis for a period of three (3) years once SWM Ponds are operational:

- Re-survey of monumented cross sections and longitudinal profile established under baseline conditions.
- Channel substrate characterization through a modified Wolman (1954) pebble count or

sampling at each monumented cross-section.

- Collection of monumented photographs.
- Re-measurement of erosion pins.
- Preparation of an annual report documenting results of the monitoring program, with a summary report provided at the end of the monitoring period.

14.3 Surface Water

14.3.1 Pre-Construction

A surface water monitoring program to establish baseline conditions in the vicinity of the site was done under a separate development application by C.F. Crozier and Associates Inc. on behalf of BNHG. It should be noted that this application was in the vicinity of the site as such the findings of this monitoring program will be used to identify the baseline conditions for the site as they relate to surface water. The monitoring results and baseline conditions will be provided in the future when they are made available.

14.3.2 During Construction

Surface water monitoring during construction will be done through four stages - (1) topsoil stripping/rough grading, (2) pre-grading, (3) site servicing, and (4) building construction. Monitoring during construction is intended to monitor the effectiveness of measures and practices designed/implemented to manage impacts due to construction. This form of monitoring most often translates into ensuring that all erosion and sediment control (ESC) measures are in place and functioning; however, other aspects of construction monitoring can relate to stream temperature, turbidity, wetlands or groundwater systems. At a later stage, ESC plans and an ESC report for the development shall be prepared detailing the proposed ESC measures. This could include measures like sediment ponds, sediment traps, among others, designed to provide erosion and sediment control. During construction, the inspector(s) in charge of overseeing ESC measures will ensure the measures are operating as intended. If any deficiencies are noted, they shall be rectified in the appropriate manner.

14.3.3 Post-Construction

Post-construction monitoring would commence once the site is built out and stabilized. The monitoring would include compliance monitoring and may also include performance monitoring. Compliance monitoring is intended to verify that the development is in compliance with the recommendations of the EIR/FSR and/or detailed design, and that any mitigation measures that have been implemented are performing as per their intended function (i.e., sediment and erosion control, naturalization plantings, SWM). Performance monitoring is intended to address functionality of the overall system. It relates to the performance or effectiveness of various works beyond the compliance period. The following monitoring activities are proposed during the post-construction phase.

- Flow Monitoring: Flow measurements shall be taken at designated locations identified as critical to compare with baseline conditions and determine if changes are substantial. This is to ensure the control structure of the ponds are operating as intended.
- Quality Monitoring – General: Surface water samples shall be taken at designated locations and tested for various quality parameters. Such parameters would include turbidity, pH, hardness, TSS, and TP. These would be compared with baseline conditions to determine if there are any substantial changes.
- Quality Monitoring – Temperature: Temperature loggers shall be placed at designated locations to record water temperatures which shall be compared with baseline conditions to determine if there are any substantial changes.

  SWM Pond Monitoring – Flow and quality monitoring as described previously shall also be done in the immediate vicinity of the SWM ponds (inlet and outlet) to determine if the ponds are performing as designed. The same parameters identified previously would be tested at the inlet and outlet locations of the ponds and compared. In addition to this, SWM pond water levels shall also be measured to further determine if the ponds are operating as expected.

15.0 Adaptive Management Plan

As with any sound monitoring plan, adaptive measures and/or responses are needed to ensure adjustments can be made in the event monitoring data yields unexpected results. The adaptive management plan seeks to provide potential measures and/or responses that can be undertaken should the need arise. The following sections describe the adaptive management plan.

15.1 Natural Heritage

Adaptive management provides a structured, responsive process that supports the restoration objectives. It allows for timely corrective action if monitoring identifies unanticipated impacts or deficiencies in restoration success. This adaptive management framework outlines the key triggers that would initiate adaptive management and provides example response actions to guide future decision-making. If required, an adaptive management plan will be included within the performance monitoring reports outlining the site-specific triggers, corresponding management actions, and implementation timelines. Adaptive management measures may include additional vegetation plantings, invasive species control, or strategies to address human encroachment.

15.1.1 Woody Species Survivorship

If the planted woody species survivorship does not meet the targets specified in **13.1.2.3.1**, the causes of planting failure will be investigated and documented. Recommendations for replanting will be provided within the warranty period, and, if appropriate, additional measures will be recommended to remediate site conditions contributing to planting failure.

15.1.2 Invasive Species

Early detection monitoring will focus on the overall percent cover of individual Category 1 invasive plant species. In general, 5% or less overall cover by any single Category 1 invasive plant species is considered acceptable. Greater than 5% cover by any single Category 1 invasive plant species is considered an exceedance and will trigger the preparation of an adaptive management plan to assess the species' extent and risk of further spread, and to determine

appropriate control measures. Where required, management of the species should continue for a specified duration or until further monitoring confirms that it has been adequately controlled.

15.1.3 Human Encroachment

If human encroachment is detected within the restoration area, this will trigger the preparation of an adaptive management plan. Management actions will vary according to the type and extent of encroachment but could include restoration of disturbed areas, establishment of deterrent barriers or plantings, and installation of educational signage. Where required, the effectiveness of the management actions should be assessed through further monitoring, with further adjustments as needed if human encroachment persists.

15.2 Stream Morphology/Natural Corridor Design

With respect to the natural corridor design, the adaptive management plan is summarized in the following table.

Table 15-1: Adaptive Management Plan

Monitoring Item	Trigger	Response
Natural Corridor Design Performance	No action required should the realigned corridor be assessed as within the range of natural variability. Substantive changes in channel cross-section dimensions (i.e., > 10% change of average width and depth) will require further study by fluvial geomorphologist.	Provide insight on channel processes and function; Compile information regarding the response of the channel to a change in land use and configuration. Assess if channel adjustments are due to development and if so, determine if intervention is necessary to limit hazards and maintain functions. Apply findings and results to future development to reduce long-term impacts.
Instream Erosion	No trigger identified as under	Post-construction instream

Downstream of SWM Pond Outlet (East of Mount Hope Rd)	pre-development conditions the channel is in adjustment (evidence of widening).	erosion monitoring to be completed for information purposes.

15.3 Surface Water

With respect to surface water, the adaptive management plan is summarized in the following table.

Table 15-2: Adaptive Management Plan

Monitoring Item	Trigger	Response
Flow Monitoring	Significant changes in flows (compared to baseline).	Adjust SWM as feasible, modify control structure of pond(s). Implement findings on future projects.
Quality Monitoring - General	Significant changes in water chemistry/appearance (compared to baseline).	Adjust SWM as feasible (add additional measures to improve quality). Implement findings on future projects.
Quality Monitoring – Temperature	Significant changes in water temperature (compared to baseline).	Adjust SWM as feasible (add additional measures to control temperature). Implement findings on future projects.
SWM Pond Monitoring	As described above and unexpected water levels.	Adjust SWM as feasible (modify control structure, modify pond).

16.0 Future Study Requirements

The TOR identified multiple studies that would be provided as part of the development process. The following table lists these reports and their respective statuses.

Table 16-1: Supporting Studies

Document	Status
Environmental Impact Study (EIS) incl. establishing the limits of development.	EIS scope covered in this LSS report.
Geotechnical Study (incl. Slope Stability)	Provided as an appendix of this LSS report.
Hydrogeological and Water Balance Study (HWBS)	Provided as an appendix of this LSS report.
Functional Servicing and Stormwater Management Report (FSSR)	Provided as an appendix of this LSS report.
Detailed Erosion Assessment	Provided as an appendix of this LSS report.
Feature-Based Water Balance (FBWB) Assessment	Discussed in this report – Section 6.2.

17.0 Conclusion

The Mount Hope West subject area, referred to as the "Subject Lands", is a proposed New Community Area in Caledon located west of Mount Hope Road and north of Columbia Way, acting as an extension to the existing Bolton community. A Secondary Plan and Draft Plan of Subdivision are being completed concurrently.

The study components are organized into three phases, per the Town's (2024) *Terms of Reference: Local Subwatershed Studies* (LSS TOR). The results of each phase are outlined in this document. In correspondence with the Town of Caledon and the Toronto and Region Conservation Authority (TRCA), it was agreed to conduct a Local subwatershed Study (LSS) for the Subject Lands alone, pertinent to its Draft Plan for subdivision.

The purpose of the LSS is to create a sustainable development plan for the Subject Lands in Caledon by protecting and enhancing the natural and human environments by implementing the direction, targets, criteria and guidance of the Region of Peel's Scoped Subwatershed Study (SSS) (Wood et al. 2022). The LSS has been prepared in such a way that it can be used as a Functional Servicing & Stormwater Management Report (along with associated appendices and studies that provide further details than those mentioned in this report) for the Draft Plan of Subdivision stage.

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