TOWN OF CALEDON
PLANNING
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Comprehensive Environmental Impact Study and Management Plan & Scoped Subwatershed Study

Tullamore Employment Lands

Caledon, Ontario

Submitted to:
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1. Introduction

GEI Consultants Ltd. (GEI) has been contracted by Tullamore Industrial LP to complete a Comprehensive Environmental Impact Study and Management Plan (CEISMP) and Scoped Subwatershed Study (SWS) for the properties located north of Mayfield Road, west of Airport Road and east of Torbram Road, bounded generally in the north by greenfield south of Old School Road (herein referred to as the Subject Lands) (**Figure 1, Appendix A**).

1.1 Study Area

The Subject Lands are in the Town of Caledon and Regional Municipality of Peel, Ontario. The Subject Lands occupy approximately 202 ha and consist primarily of actively managed agricultural fields, with two tributaries of the West Humber River flowing through the site in the south and Salt Creek traversing southerly in the corner of the Subject Lands in the northeast (**Figure 2, Appendix A**). The tributary closest to Torbram Road (West Tributary of the West Humber River) is located within the Greenbelt Planning Area and is designated as part of the Natural Heritage System (NHS) under the Greenbelt Plan (2017a).

The Subject Lands are not included as part of the existing Tullamore Settlement Area Boundary as outlined in the Town of Caledon Official Plan, Schedule N (April 2018). Peel Region (henceforth referred to as the Region) is currently undergoing a Settlement Area Boundary Expansion (SABE) which includes the Subject Lands. As such, the components of a Scoped Subwatershed Study have been incorporated into this CEISMP per Town of Caledon.

The proposed Draft Plan of the development (Weston Consulting, 2023) conforms with the boundary expansion map, which identifies the Subject Lands as future employment area.

1.2 Purpose & Objectives

A CEISMP is required to assess the potential impacts of the proposed development on natural heritage features and their associated functions. This work considers applicable policies of the Province of Ontario's Provincial Policy Statement (PPS; MMAH 2020) and associated provincial implementation guidance contained in the Natural Heritage Reference Manual (NHRM; MNRF 2010) as well as the Town and Region Official Plans, and the Toronto and Region Conservation Authority's (TRCA) regulation and policies.

This CEISMP considers and includes the following information:

- Description of the development proposal;
- Description of the surrounding environment;
- Identification and assessment of the potential impacts of the proposal on the environment and the significant features and functions of the Core Areas (includes

watercourses found on the Subject Lands and features located on adjacent lands; **Figure 2**, **Appendix A**);

- Identification of positive effects of the proposal such as enhancement and/or restoration of significant features;
- Evaluation of the feasibility of alternative mitigation measures or techniques and the ability of such measures to prevent or minimize impacts;
- Outlines recommendations on the advisability of proceeding with the proposal, appropriate mitigation measures, changes to the proposal; and,
- Recommends a monitoring plan and contingency plans should the proposal result in any unexpected impacts, if necessary.

A Scoped Subwatershed Study is required due to the Subject Lands being located outside the Urban Boundary. The purpose of the Local Subwatershed Studies is to assist in developing a sustainable development plan for the subject growth area in Caledon by ensuring protection and benefits to the natural and human environments through the further implementation of the direction, targets, criteria and guidance of the Settlement Area Boundary Expansion Scoped Subwatershed Study (Wood et. al., December 2021). The Local Subwatershed Studies are intended to incorporate a natural heritage systems management approach that will protect, rehabilitate, and enhance the environment within the Secondary Plan Area, and the surrounding lands in the subwatershed. The broader watershed/subwatersheds may have existing downstream constraints beyond the identified Secondary Plan study area and, to the appropriate extent, these will have to be considered in establishing the management strategies based on the overall study objectives and ultimate targets. Where there is an established watershed wide quantity strategy, the established strategy is to be considered a minimum requirement.

The Local Subwatershed Study should:

- Identify the location, extent, present status, significance, and sensitivity of the existing natural environment;
- Identify environmentally sensitive areas and natural hazards, including constraints and opportunities;
- Identify an environmental resource system(s) to protect, rehabilitate, and enhance the ecological function of the system within the Secondary Plan Area and local environs;
- Identify lands where development may be considered, and determine how existing and future land uses can be developed compatibly with natural features;
- Undertake a two-stage, iterative Impact Assessment based on an initial Preliminary Preferred Land Use Plan (This inherently will require establishing an initial land use concept which will need to be tested and assessed, followed by a second refined land use concept developed through the feedback from the initial testing, including input from other technical studies and feedback from stakeholders);
- Provide direction on best management practices (BMPs) to manage impacts from the Secondary Plan (from an environmental and water management perspective), and, where there are established BMPs for infrastructure, these established BMPs are considered a minimum requirement;

- Provide direction on future infrastructure needs (i.e., planning and implementing servicing and transportation infrastructure from an environmental and water management perspective);
- Establish an implementation and management strategy and requirements for environmental systems monitoring;
- Support the Class Environmental Assessment process undertaken as part of the infrastructure planning for the Secondary Plan, specific to natural and water-based systems.

2. Planning Context

An assessment of the quality and extent of natural heritage features found on, and adjacent to, the Subject Lands and the potential impacts to these features from the proposed development applications was undertaken to comply with requirements of the following regulatory agencies, local and regional municipalities and/or legislation:

- Town of Caledon Official Plan (2018 Consolidation);
- Region of Peel Official Plan (2022);
- O. Reg. 483/22, Zoning Order, September 9, 2022;
- Greenbelt Plan (2017a);
- PPS (2020);
- TRCA policies;
- *Migratory Birds Convention Act* (1994);
- *Endangered Species Act* (ESA; 2019 Consolidation of S.O. 2007, c. 6); and
- *Fisheries Act* (R.S.C., 1985, c. F-14).

2.1 Town of Caledon Official Plan

The Subject Lands are affected by the policies and designations defined within the Town of Caledon Official Plan (OP) (2018). The Subject Lands are located in Tullamore, as shown in Schedule A (Land Use Plan) and are designated to contain both a General Agriculture Area and Environmental Policy Area (EPA) surrounding the tributaries of the West Humber River. In addition, on Schedule S (The Greenbelt in Caledon) the West Tributary of the West Humber River located on the Subject Lands is also designated as a Greenbelt Plan NHS.

As discussed within section 5.7 of the Town of Caledon OP, EPAs are all Natural Core Areas and Natural Corridors, including:

- All Woodland Core Areas;
- All Wetland Core Areas;
- All Niagara Escarpment Natural Areas;
- Oak Ridges Moraine Key Natural Heritage Features (as defined by the Oak Ridges Moraine Conservation Plan (ORMCP));
- Oak Ridges Moraine Hydrologically Sensitive Features (as defined by the ORMCP);
- Greenbelt Key Natural Heritage Features (as defined by the Greenbelt Plan);
- Greenbelt Key Hydrologic Features (as defined by the Greenbelt Plan);
- All Environmentally Significant Areas;
- All Life Science Areas of Natural and Scientific Interest (ANSIs);
- All Significant Habitats of Threatened and Endangered Species;
- All Significant Wildlife Habitat (SWH);
- All Core Fishery Resource Areas; and
- All Valley and Stream Corridors.

2.2 The Region of Peel Official Plan

The Region of Peel OP has certain policies and designations that can affect land-uses permitted within the Subject Land boundaries. The West Tributary of the West Humber River is designated as a Core Area of the Greenlands System on Schedule A (Core Areas of the Greenlands System in Peel). The Greenland System consists of Core Areas, Natural Areas and Corridors, and includes the same natural heritage feature types as the Town of Caledon OP EPAs (e.g., ANSIs, Environmentally Significant Areas, fish and wildlife habitat, wetlands, etc.).

The Subject Lands are shown as being part of the Rural System on Schedule D (Regional Structure).

2.3 Zoning Order – O. Reg. 483/22

On September 9, 2022, a Zoning Order was issued for the Subject Lands under the Planning Act for the Zoning By-Law No. 2006-50 of the Town of Caledon.

The Zoning Order describes the uses approved and the zoning requirements for Prestige Industrial Zone and applies to the lands outside of the Greenbelt Plan Area.

2.4 Greenbelt Plan

The Greenbelt Plan works to permanently protect environmentally sensitive areas due to their ecological value within the Golden Horseshoe. It is intended to enhance the natural landscapes by working to facilitate the connection of environmentally significant areas and reduce fragmentation of the landscape. Protection is offered also to permanent agricultural areas ensuring the permanency and sustainability of natural resources. It builds upon the ecological protections provided by the Niagara Escarpment Plan and the ORMCP. As indicated the West Tributary of the West Humber River is located within the Greenbelt Planning Area and is designated as part of the NHS under the Greenbelt Plan (2017a). The NHS includes core areas and linkage areas of the Protected Countryside with the highest concentration of the most sensitive and/or significant natural features and functions. These areas need to be managed as a connected and integrated NHS, given the functional inter-relationships between them and the fact that this system builds upon the natural systems contained in the Niagara Escarpment Plan and the ORMCP. The following policies shall apply for new development or site alteration within the NHS:

i. There will be no negative impacts on key natural heritage features or key hydrologic features or their functions;
ii. Connectivity along the system and between key natural heritage features and key hydrologic features located within 240 metres of each other will be maintained or, where possible, enhanced for the movement of native plants and animals across the landscape;
iii. The removal of other natural features not identified as key natural heritage features and key hydrologic features should be avoided. Such features should

be incorporated into the planning and design of the proposed use wherever possible;

iv. Except for uses described in and governed by the policies of sections 4.1.2 and 4.3.2,
    a. The disturbed area, including any buildings and structures, of the total developable area will not exceed 25 per cent (40 per cent for golf courses); and
    b. The impervious surface of the total developable area will not exceed 10 per cent; and
    c. At least 30 per cent of the total developable area will remain or be returned to natural self-sustaining vegetation, recognizing that section 4.3.2 establishes specific standards for the uses described there.

Other Components of the Greenbelt Plan include “Settlement Areas” and “Agricultural System” however, these are not applicable to these Subject Lands.

2.5 Provincial Policy Statement and Associated Guideline Documents

The PPS provides 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 2.1) with reference to other policies with relevance to Natural Heritage and impact assessment considerations and areas of overlap (e.g., those related to Efficient and Resilient Development and Land Use Patterns, section 1.1; Sewage, Water and Stormwater, section 1.6.6; Water, section 2.2; Natural Hazards, section 3.1).

Eight types of significant natural heritage features are defined in the PPS, as follows:

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

Development and site alteration shall not be permitted in significant wetlands or significant coastal wetlands. Development and site alteration shall not be permitted in significant woodlands, significant valleylands, SWH or significant ANSIs, unless it is demonstrated that there will be no negative impacts on the natural features or their ecological functions.

Development and site alteration shall not be permitted in the habitat of endangered and threatened species or in fish habitat, except in accordance with provincial and federal requirements. Development and site alteration may be permitted on lands adjacent to significant natural heritage features (i.e., within 120 m of the Subject Lands, as identified in the NHRM; MNRF 2010) provided it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

2.6 Toronto Region Conservation Authority

TRCA conducts reviews of planning processes associated with future development of properties within its jurisdictional boundaries. TRCA provides planning and technical advice to planning authorities to assist them in fulfilling their responsibilities regarding natural hazards, natural heritage, and other relevant policy areas pursuant to the Planning Act. In addition to their regulatory responsibilities, TRCA provides advice as both a watershed-based resource management agency and through planning advisory services.
TRCA administers the Development, Interference with Wetlands, Alterations to Shorelines and Watercourses Regulation, (O. Reg.) 166/06, which defines the areas of interest that allow TRCA to:

- Prohibit, regulate, or provide permission for straightening, changing, diverting, or interfering in any way with the existing channel of a river, creek, stream, watercourse or changing or interfering with a wetland; and
- Prohibit, regulate, or provide permission for development if the control of flooding, erosion, dynamic beaches, pollution, or the conservation of land may be affected by the development.

The Regulation Limit delineates hazardous lands, wetlands, shorelines, and areas susceptible to flooding and associated allowances. The Subject Lands include TRCA regulation limits, the flooding hazards surrounding the East and West Tributaries of the West Humber River, Salt Creek, and their meander belts (**Figure 2**).

Pursuant to the Development, Interference with Wetland and Alterations to Shorelines and Watercourse Regulation (TRCA; Ontario Regulation 166/06), any development in or on areas defined in the Regulation (e.g., river or stream valleys, hazardous land) requires permission from the Conservation Authority. The Conservation Authority may grant permission for development in or on these areas if, in its opinion, the control of flooding, erosion, dynamic beaches, pollution or the conservation of land will not be affected by the development. The Regulation also states that it is prohibited to straighten, change, divert or interfere in any way with the existing channel of a river, creek, stream, or watercourse or change or interfere in any way with a wetland without permission from the Conservation Authority.

The TRCA's The Living City Policies (2014) contains the principles, goals, objectives, and policies approved by the TRCA for their planning and development approvals process. This document outlines policies related to the determination of the Natural System and

recommends buffer widths for natural heritage features such as woodlands, wetlands, and valley and stream corridors.

2.7 Endangered Species Act, 2007

The provincial Endangered Species Act, 2007 (Consolidation 2021) was developed to:

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

The ESA protects all threatened, endangered, and extirpated species listed on the Species at Risk in Ontario (SARO) list. These species are legally protected from harm or harassment, and their associated habitats are legally protected from damage or destruction, as defined under the ESA.

2.8 Migratory Birds Convention Act, 1994

This federal legislation protects the nests and offspring of listed migratory bird species from destruction or disturbance. In its application, it requires best management practices to detect and avoid disturbance to active nests during development activities.

2.9 Fisheries Act, 1985

Fisheries and Oceans Canada (DFO) administers the federal Fisheries Act 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” [subsection (2)1]. The Fisheries Act prohibits the death of fish by means other than fishing [subsection 34.4 (1)] and the harmful alteration, disruption, or destruction of fish habitat [HADD; subsection 35. (1)]. 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, e.g., clear-span bridges and bridge maintenance projects where DFO mitigation measures are applied, artificial waterbodies with no hydrological connection to occupied fish habitat, and projects that follow the Standards and Codes of Practice defined by DFO). 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 (1) impact an aquatic SAR, (2) cause the death of fish or (3) 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 as well as the avoidance,

mitigation and offsetting measures that will be implemented as well as any monitoring that is proposed.

3. Study Approach

3.1 Background Information Review

GEI reviewed existing background information to gather data on the existing natural heritage features and records of flora and fauna in the area.

Information sources reviewed include the following:

- Ministry of Northern Development, Mines, Natural Resources and Forestry (MNRF) Land Information Ontario (LIO) Natural Heritage Areas mapping;
- Natural Heritage Information Centre (NHIC) database;
- DFO Aquatic SAR Map;
- Provincial wildlife atlases; and
- Online citizen science databases.

Figure 2 (Attachment A) illustrates the existing natural heritage feature designations for the Subject Lands as described in the following subsections.

3.1.1 Land Information Ontario Natural Heritage Areas

Based on the MNRF LIO (2022a) Natural Heritage Areas geographic database, the primary natural heritage features of interest within the Subject Lands are a series of unevaluated wetland units associated with the East Tributary of the West Humber River. This feature bifurcates the Subject Lands north to south.

3.1.2 Natural Heritage Information Centre

GEI searched the NHIC (MNRF 2021b) database for records of SAR, provincially rare species (S1 to S3) and rare vegetation communities within the Subject Lands. The database provides occurrence data by 1 km x 1 km squares, which include areas outside of the Subject Lands. The following NHIC squares overlap the Subject Lands: 17NJ9748, 17NJ9848, 17NJ9948, 17NJ9849, 17NJ9949, 17NJ9850 and 17NJ9950.

The following species of interest were noted:

- Species listed as Threatened or Endangered on the SARO List:
    - Redside Dace (*Clinostomus elongatus*);
    - Bobolink (*Dolichonyx oryzivorus*); and
    - Eastern Meadowlark (*Sturnella magna*).

- 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*); and
    - Wood Thrush (*Hylocichla mustelina*).

3.1.3 Ontario Breeding Bird Atlas

The Ontario Breeding Bird Atlas Data Summary: 2001–2005 (Bird Studies Canada 2007) contains detailed information on the population and distribution status of birds in Ontario. The database provides occurrence data by 10 km x 10 km squares. The Subject Lands are located within atlas squares 17NJ94 and 17NJ95, which were used to determine a potential bird species list for the area. The Subject Lands are a small component of the overall atlas squares, and therefore all bird species listed for these atlas squares may not be found within the Subject Lands. Habitat type, availability and size are all contributing factors to bird species presence and use.

A total of 129 bird species were recorded in atlas squares 17NJ94 and 17NJ95, with the following species of interest noted:

- Species listed as Threatened or Endangered on the SARO List:
  - Bank Swallow (*Riparia riparia*);
  - Barn Swallow (*Hirundo rustica*);
  - Bobolink;
  - Chimney Swift (*Chaetura pelagica*);
  - Red-headed Woodpecker (*Melanerpes erythrocephalus*);
  - Eastern Meadowlark; and
  - Prothonotary Warbler (*Protonotaria citrea*).

- Species of conservation concern (i.e., listed as Special Concern on the SARO List or identified as an S1–S3 species):
  - American Coot (*Fulica americana*);
  - Barn Swallow (*Hirundo rustica*);
  - Chipping Sparrow (*Spizalla passerina)*;
  - Common Nighthawk (*Chordeiles minor*);
  - Eastern Towhee (*Pipilo erythrophthalmus*);
  - Eastern Wood-Pewee;
  - Field Sparrow (*Spizella pusilla)*;
  - Golden-winged Warbler (*Vermivora chrysoptera*);
  - Grasshopper Sparrow (*Ammodramus savannarum*);
  - Marsh Wren (*Cistothorus palustris)*;
  - Pine Warbler *(Setophaga pinus)*;
  - Ruddy Duck *(Oxyura jamaicensis)*;
  - Turkey Vulture *(Cathartes aura)*;
  - Upland Sandpiper (*Bartramia longicauda*); and
  - Wood Thrush.

3.1.4 Ontario Reptile and Amphibian Atlas

The Ontario Reptile and Amphibian Atlas (Ontario Nature 2019) contains detailed information on the population and distribution status of reptiles and amphibians in Ontario. The database provides occurrence data by 10 km x 10 km squares. The Subject Lands are located within atlas squares 17NJ94 and 17NJ95, which were used to determine a potential reptile and amphibian species list for the area. The Subject Lands are a small component of the overall atlas squares, and therefore all reptile and amphibian species listed for these

atlas squares may not be found within the Subject Lands. Habitat type, availability and size are all contributing factors to reptile and amphibian species presence and use.

A total of 22 reptile and amphibian species were recorded in atlas squares 17NJ94 and 17NJ95, including four turtle species, four snake species, four salamander species and ten frog and toad species. The following species of interest were noted:

- Species listed as Threatened or Endangered on the SARO List:
    - Jefferson Salamander (*Ambystoma jeffersonianum*);

- Species of conservation concern (i.e., listed as Special Concern on the SARO List or identified as an S1–S3 species):
    - Eastern Musk Turtle (*Sternotherus odoratus*);
    - Northern Map Turtle (*Graptemys geographica*); and
    - Snapping Turtle (*Chelydra serpentina*).

3.1.5 Ontario Butterfly and Moth Atlases

The Ontario Butterfly and Moth Atlases (Toronto Entomologists' Association 2020a, 2020b) contain detailed information on the population and distribution status of butterflies and moths in Ontario. The database provides occurrence data by 10 km x 10 km squares. The Subject Lands are located within the atlas squares 17NJ94 and 17NJ95, which were used to determine a potential butterfly and moth species list for the area. The Subject Lands are a small component of the overall atlas squares, and therefore all butterfly and moth species listed for these atlas squares may not be found within the Subject Lands. Habitat type, availability and size are all contributing factors to reptile and amphibian species presence and use.

A total of 53 butterfly species and 25 moth species were recorded in atlas squares 17NJ94 and 17NJ95. Of these reported species, one is a species of conservation concern (i.e., listed as Special Concern on the SARO List or identified as an S1–S3 species): Monarch (*Danaus plexippus*).

3.1.6 Aquatic Species at Risk Distribution Mapping

The DFO Aquatic SAR Map (2021) was reviewed to identify any known occurrences of aquatic SAR, including fish and mussels, in the headwater tributaries of the West Humber River that flow through the Subject Lands. Redside Dace was noted as present or potentially present in the West Tributary of the West Humber River. Habitat for this endangered species was also identified in Salt Creek.

3.1.7 Citizen Science Database: eBird

The eBird (2021) database is a large citizen science-based project that aims to collect, archive and share bird diversity information in the form of checklists in order to inform 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. Species may be filtered out based on habitat and target survey efforts.

No species of interest were identified within the Subject Lands or the adjacent 120 m.

3.1.8 Citizen Science Database: iNaturalist

The iNaturalist (2021) database is a large citizen science-based project that aims to collect, archive and share sightings of flora and fauna species. Users can upload species observations, which must be vetted by at least two other users before they are considered "research grade" (i.e., the species identification is confirmed). This tool is valuable as it is used by many recognized experts and improves species distribution maps for the public and scientific community. However, it must also be recognized that anyone can confirm a species ID, irrespective of their knowledge or skill level; further, SAR distribution data is blocked by the NHIC. Therefore, the results of this data review are used for informative purposes only; observations of rare species documented in iNaturalist are subject to review by GEI through field surveys and/or agency correspondence.

No species of interest were identified within the Subject Lands or the adjacent 120 m.

3.1.9 Region of Peel Settlement Area Boundary Expansion Scoped Subwatershed Study

The Region has initiated a Scoped Subwatershed Study to provide water resources and natural heritage input to support a SABE Study that will determine where new settlement area growth is proposed in the Region. The Initial Study Area includes Agricultural and Rural lands in Caledon excluding lands within the Greenbelt. Within this area, a Focus Study Area (FSA) has been established in the southern portion of Caledon where SABE technical studies were conducted and within which the SABE will be identified. The Subject Lands fall within the FSA. The Scoped Subwatershed Study (SWS) prepared by the Region provides the existing conditions and characterization of the natural and water resources features and systems within the FSA which includes the Subject Lands.

Information provided below is summarized from the Scoped SWS where data was provided for the area that included the Subject Lands.

It should be noted that the findings presented within this CEISMP are also intended to meet the Phase 1 requirements of a Scoped Subwatershed Study. Phase 1 of a Subwatershed study characterizes the resources associated with each subwatershed (and outlet) by study discipline (i.e., hydrology/hydraulics, groundwater, water quality, stream morphology, aquatic, and terrestrial ecology). Background and supplemental field data are to be assessed by each discipline, and then across disciplines, to:

- Establish the form, function and linkages of the environmental resources,
- Identify environmental constraints and opportunities related to terrestrial and aquatic habitat, features, and systems,

- Establish surface water and groundwater constraints and opportunities associated with flooding, erosion, water quality, water budgets, including recharge and discharge areas through new numerical tools (models) suitably calibrated to local conditions.

- Establish criteria and constraints for management opportunities associated with the environmental features and systems.

3.1.9.1 Flora

Within the FSA, flora species were identified through secondary sources (NHIC) and then compared to the associated SWSs in Peel Region from the TRCA and CVC. Since the Subject Lands contain tributaries of the West Humber River, data examined from this Scoped Subwatershed Study will focus on the FSA within the West Humber and the West Humber SWS.

There were 93 species recorded within the West Humber FSA, while 271 species were recorded within the SWS. No SAR were identified.

3.1.9.2 Fauna

Within the FSA, fauna species were identified through secondary sources (NHIC) and then compared to the associated SWSs in Peel Region from the TRCA and CVC. Since the Subject Lands contain tributaries of the West Humber River, data examined from this Scoped SWS will focus on the FSA within the West Humber and the West Humber SWS.

Amphibians

Seven species were recorded within the West Humber FSA while nine species were recorded within the SWS. Species reported in both sources include the American Bullfrog (*Lithobates catesbeianus*), American Toad (*Anaxyrus americanus*), Gray Treefrog (*Hyla versicolor*), Green Frog (*Lithobates clamitans)*, Northern Leopard Frog, Spring Peeper (*Pseudacris crucifer)* and Wood Frog (*Lithobates sylvaticus).* The West Humber SWS also indicated the Eastern Red-backed Salamander (*Plethodon cinereus),* Spotted Salamander (*Ambystoma maculatum)* were present. No SAR were identified.

Birds

Forty-four (44) species of birds were recorded within the West Humber FSA while 106 species were recorded within the SWS.

Significant species reported by both sources included:

- Common Nighthawk (*Chordeiles minor*), and Wood Thrush (*Hylocichla mustelina*) - Threatened species.
- Eastern Wood-Pewee (*Contopus virens*), and Grasshopper Sparrow (*Ammodramus savannarum*) - Special Concern

In contrast, the Chimney Swift, a Threatened species, was only reported within the SWS.

Invertebrates

Only one species was reported in both the West Humber FSA and the SWS: Chimney Crayfish/ Digger Crayfish (*Fallicambarus fodiens*). No SAR were identified.

Mammals

Four species of mammals were reported within the West Humber FSA while 19 species were reported within the SWS. No SAR were identified.

Reptiles

One species of reptile was reported within the West Humber FSA: Midland Painted Turtle, while three species were reported within the SWS: Eastern Gartersnake (*Thamnophis sirtalis sirtalis*), Northern Red-bellied Snake (*Storeria o. occipitomaculata)* and Snapping Turtle. The Snapping Turtle is a species of Special Concern in Ontario.

3.1.9.3 Significant Wildlife Habitat

There are several candidate SWH identified by the SWS as potentially occurring on the Subject Lands surrounding the East Tributary of the West Humber River, including:

- Candidate Amphibian Breeding Habitat (Woodland)
- Candidate Amphibian Breeding Habitat (Wetland)
- Candidate Waterfowl Stopover and Staging Areas (Aquatic)
- Candidate Bat Maternity Colonies
- Candidate Bald Eagle and Osprey Nesting, Foraging and Perching Habitat
- Candidate Shorebird Migratory Stopover Areas
- Candidate Turtle Overwintering Areas
- Candidate Marsh Breeding Bird Habitat
- Candidate Shrub and Early Successional Bid Breeding Habitat
- Candidate Terrestrial Crayfish Habitat
- Candidate Amphibian Movement Corridors

3.1.9.4 Wetlands

ELC polygons accounted for 203.3 ha (2.5%) of the FSA and adjacent 120 m area, with Open Aquatic (OA) communities occurring the most within the West Humber Subwatershed. Among the seven watersheds within the FSA, the West Humber River SWS had the most wetland features and largest coverage of wetland area (based on area coverage).

3.1.9.5 Woodlands

ELC polygons accounted for 417.6 ha (5.2%) of the FSA and adjacent 120 area. Among the seven subwatersheds within the FSA, the West Humber River SWS had the most woodland features and largest coverage of woodland area.

The findings from the Peel Region SABE SWS are for a study area much larger than the Subject Lands, and the data summarized above may not be present on the Subject Lands. This information has been included to provide a greater understanding of the larger landscape setting surrounding the Subject Lands. The studies completed as part of the SABE SWS were primarily desktop-based with some targeted studies on publicly accessible lands and are considered preliminary in nature.

GEI's analysis provided in the following sections evaluate the presence of natural heritage features on the Subject Lands based on 2021 and 2022 field studies.

3.2 Technical Methods and Field Studies

The following ecological field investigations were completed during the 2021 and 2022 (for expanded Study Area) field seasons:

- Amphibian call counts (2021);
- Bat habitat assessment and acoustic survey (2021);
- Botanical inventory and Ecological Land Classification (ELC) (2021 and 2022);
- Breeding bird surveys (2021);
- Fish community sampling (2021);
- Headwater Drainage Feature Assessment (HDFA) (2021); and,
- Turtle basking surveys (2021).

A list of survey types and dates have been provided in **Table 1** (**Appendix B)**.

3.2.1 Botanical Inventory and Ecological Land Classification Methodology

Vegetation communities were first identified on aerial imagery and then verified in the field. Vegetation community types were confirmed, sampled, and revised, if necessary, using the sampling protocol of the ELC for Southern Ontario (Lee at al. 1998). ELC was completed to the finest level of resolution (Vegetation Type) where feasible. Species names generally follow nomenclature from the Database of Vascular Plants of Canada (Brouillet et al. 2010).

The provincial status of all plant species and vegetation communities is based on NHIC (2021b). Identification of potentially sensitive native plant species is based on their assigned coefficient of conservatism (CC) value, as determined by Oldham et al. (1995). This CC value, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters.

GEI also completed a tree inventory, as described within the Arborist Report (GEI, 2022).

3.2.2 Feature Staking

A feature staking exercise was undertaken by GEI, Rice Group and TRCA on July 5, October 22, and December 8, 2021. Feature staking was completed for wetlands, top-of-bank, and natural vegetation communities containing woody species. The limits of wetlands were delineated and surveyed in accordance with the methods outlined in the Ontario Wetland Evaluation System (OWES) Manual for Southern Ontario (MNRF 2022).

3.2.3 Amphibian Call Count Methodology

Survey protocols are based on the 'Marsh Monitoring Program' (Bird Studies Canada [BSC] 2014). Survey station locations were determined through an assessment of orthophotography, existing vegetation communities and ground observations.

The call count surveys were conducted at night within the appropriate timing window from approximately 30 minutes after sunset until midnight. Each station was surveyed three times (once in April, once in May and once in June) during optimal weather conditions (low wind levels, no heavy rain). Minimum night air temperatures at time of survey of 5°C, 10°C and 17°C were applied to each of the respective survey periods. Surveys were conducted at least 15 days apart. All calls heard within a survey station were recorded, as well as any call observations outside of the survey station, including on adjacent lands. The provincial and global statuses of species identified on the Subject Lands were obtained from the NHIC (2021b) and the SARO list.

All three call count surveys have been completed and are summarized within this report.

3.2.4 Turtle Basking Methodology

Survey protocols were developed in consideration of MNRF (2015b) and Toronto Zoo (Caverhill et al. 2011) turtle survey methods.

Survey station locations were identified using orthophotograph interpretation (i.e., ponds, open wetlands) and provincial wetland mapping (LIO 2021a) and verified with a full-site vegetation and habitat reconnaissance survey.

Three surveys were conducted, starting in April, shortly after spring thaw conditions, through May. The surveys were conducted during optimal weather conditions (sunny/partly sunny days between 9 am and 5 pm with low/no wind and air temperatures between 6 to 25°C, or if cloudy with temperatures above 15°C).

Binoculars were used to scan, from a distance, for 30 minutes, the edge and surface of each feature for basking turtles. Once scanning was completed, feature micro-habitat data was collected, which included water and air temperatures, water depth, adjacent vegetation composition, percent slope leading to water edge, percent coverage of basking features (i.e., logs, floating vegetation mats, floating/emergent debris like tires) and percent canopy cover.

All three rounds of turtle basking surveys were completed and are summarized below.

3.2.5 Breeding Bird Survey Methodology

Three rounds of breeding bird surveys were conducted following protocols set forth by the Ontario Breeding Bird Atlas (Cadman et al. 2007), the Ontario Forest Bird Monitoring Program (Cadman et al. 1998).

Surveys were conducted between dawn and five hours after dawn with suitable wind conditions, no thick fog or precipitation (Cadman et al. 2007). Point count stations were surveyed in various habitat types, where present, within the Subject Lands and combined with area searches to help determine the presence, variety, and abundance of bird species. Each point count station was surveyed for ten minutes for birds within 100 m and outside 100 m. All species recorded on a point-count were mapped to provide specific spatial information and were observed for signs of breeding behaviour. Surveys were conducted at least seven days apart.

Open grassland habitats, including pasture, hay fields and fallow areas, were surveyed according to the MNRF (2012) Guidelines for Bobolink and Eastern Meadowlark. Point count stations (discussed above) were located within open grassland habitat. Where this habitat was greater than 250 m wide or long, two-point count stations were completed (point count stations are set up every 250 m in large habitats). Transects or area searches were also conducted in addition to the 10-minute point count stations.

3.2.6 Bat Habitat Survey Methodology

Bat habitat assessments are used to determine whether identified features are to be considered candidate SWH, or if the habitat provides conditions favourable for SAR bats. The presence of snags is considered an indicator of high-quality bat maternity roost habitat, and these surveys are required as the first step in confirming presence of bat maternity colony SWH (as per the PPS). Snags may also indicate the presence of high-quality SAR bat habitat; however, all SAR bat habitat, regardless of quality, is protected under the ESA (2007).

Suitable bat roosting trees in hedgerows were identified across the site, and in all appropriate ELC communities present on the Subject Lands, including any Cultural Woodland (CUW), Deciduous Swamp (SWD) and Deciduous Forest (FOD) communities.

Bat habitat assessments have been completed with preliminary results summarized within this report.

3.2.7 Bat Acoustic Survey Methodology

Survey methods were developed based on guidance from the Ministry of Environment Conservation and Parks (MECP), professional experience and MNRF survey guidelines as outlined in “Bats and Bat Habitats: Guidelines for Wind Power Projects” (MNRF 2011).

Surveys to detect bat species were carried out in June 2021 and were completed using Wildlife Acoustics Song Meter SM4BAT recording devices over a duration of ten consecutive evenings.

Survey stations were selected based on aerial interpretation, bat habitat assessments, and ELC vegetation community types.

Passive acoustic recorders were programmed to begin recording at sunset and to end recording at sunrise. In addition, the SM4BAT passive recorder microphones were elevated approximately 2 m above the ground to reduce background noise and echo.

All ultrasonic recordings were filtered to eliminate recordings with high levels of noise or with no bat calls, and then further analyzed using SonoBat's auto-classification tool. Any calls with a positive identification were manually vetted by a wildlife ecologist with training in bat species identification by sonogram. Calls that were not identifiable to species by SonoBat were manually reviewed by a wildlife ecologist with training in bat species identification by sonogram to identify those calls with characteristics of SAR bats (i.e., calls with frequencies greater than 40kHz). Where recorded, these calls are classified as 'Unknown *Myotis*' calls in accordance with MECP guidance.

3.2.8 Headwater Drainage Feature Assessment (HDFA)

A HDFA was completed to document the existing headwater drainage features (HDFs) on the Subject Lands. The HDFA followed the Credit Valley Conservation (CVC) and TRCA Guidelines for the "Evaluation, Classification, and Management of Headwater Drainage Features" (2014). Three site visits were done to characterize HDFs, depending on the hydrology of each feature. GEI Consultants prepared Arc Hydro mapping of potential drainage features.

Several headwater drainage features (HDFs) were identified within the Subject Lands. GEI has extensively surveyed the downstream segments of these HDFs within the Tullamore Employment Lands and determined that the lower reaches were seasonal in nature. Based on this information and the agricultural nature of the Subject Lands, it is likely that the HDFs on lands to the north within the expanded Study Area are also seasonal in nature and would likely be assigned a management recommendation of Mitigation under the Toronto and Region Conservation Authority (TRCA) and Credit Valley Conservation's Headwater Drainage Feature Assessment Guidelines (2014).

Based on the site reconnaissance, there are no hazards associated with this drainage feature, however it should be further assessed under appropriate seasonal windows. Each HDF present on the Subject Lands was evaluated based on its hydrology, riparian habitat, fish habitat (direct or indirect) and terrestrial habitat contributions. Implementation of the classification system within the TRCA Guidelines will result in one of the following management classifications for each HDF on the Subject Lands:

- Protection – protect or enhance the existing feature in-situ;

- Conservation – maintain, relocate and/or enhance drainage feature and its riparian zone corridor;
- Mitigation – replicate or enhance functions provided by the drainage feature;
- Recharge Protection – maintain overall water balance by providing mitigation to maintain groundwater recharge functions;
- Maintain or Replicate Terrestrial Linkage – maintain the corridor through in-situ protection or replicate and enhance the corridor elsewhere; and
- No management required – feature can be removed without mitigation.

3.2.9 Fish Community Sampling Methodology

One fish community sampling event was completed to identify whether the watercourse feature within the East Tributary on the Subject Lands supports direct fish habitat. Prior to commencing the survey, GEI Consultants obtained a License to Collect Fish for Scientific Purposes from the MNRF. During this sampling event, a Halltech HT-2000 Battery Backpack Electrofisher and two D-frame dip nets with a 500-micron mesh size was used to retrieve fish and semi-aquatic organisms (e.g., frogs) from the channel. Sampling was conducted using the Ontario Stream Assessment Protocol standard single pass survey method (Stanfield 2017).

The survey was completed within a defined stretch through riffles, pools and runs. Fish captured was transferred into aerated buckets for processing. Each fish was identified to species level, enumerated, and weighed before being returned to the channel, downstream from the sampling location. Additional information collected during sampling event included water temperature, conductivity, and pH measurements. Weather conditions and electrofisher shocking parameters (e.g., voltage and frequency) were also recorded.

All data recorded was reported to the MNRF in accordance with the License requirements.

Fish community sampling has been completed and results are presented in the forthcoming sections.

4. Existing Conditions & Vegetation Assessment

4.1 Physical Conditions

The Subject Lands occur within the Lake Simcoe-Rideau Eco-region 6E (specifically, eco-district 6E-7), which extends from Lake Huron to the Ottawa River, and includes most of the Lake Ontario shore and the Ontario portion of 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 of shade tolerant hardwood species including Sugar Maple (*Acer saccharum*), American Beech (*Fagus grandifolia*), and shade intermediate species such as Red Oak (*Quercus rubra*) and Yellow Birch (*Betula alleghaniensis*), as well as associations of White Pine (*Pinus strobus*) and Red Pine (*Pinus resinosa*).

The headwaters of the Humber River Watershed rise on the Niagara Escarpment and Oak Ridges Moraine, and flow over clay plains before entering Lake Ontario (TRCA 2008). The Subject Lands are located on the South Slope physiographic region (Chapman and Putnam 1984), which is characterized by its drumlin till plain that slowly slopes towards the Iroquois Sand Plan physiographic region towards Lake Ontario.

The Subject Lands contain various anthropogenic (cultural) and naturalized vegetation communities including agriculture, hedgerows, ponds, meadow, thickets, and wetland communities. The Subject Lands consist of actively managed agricultural fields and the eastern half of the Study Area contains an old residential building with two larger shed structures. One shed structure was also located on the west side of Salt Creek. Behind the northern shed structure is a dug pond. The property also hosts two barn structures (one located off Mayfield Road and one off Torbram Road).

The Subject Lands have varying topographic relief and contain two tributaries to the West Humber River, and Salt Creek. A total of seven HDFs with associated riparian wetland communities were identified within the Subject Lands. The West Tributary enters the Subject Lands via a large culvert under Torbram Road and flows through the southwestern corner of the Subject Lands before exiting the Subject Lands under a span bridge at Mayfield Road. This well-defined valleyland is largely naturalized and relatively undisturbed. The East Tributary originates within the lower third of the Subject Lands and contains two ponded features (identified as the Upper and Lower ponds), which were established for cattle watering and irrigation as a result of two constructed berms. The East Tributary then exits the Subject Lands under Mayfield Road via a box culvert. Incidental observations of the berms during ecological inventories suggested that these berms may not be stable as water was observed seeping through portions of the lower berm where a culvert may have historically been present, and a perched culvert was observed at the upper berm. It is likely that the berms prevent or limit migration of fish and smaller wildlife between these ponded structures due to the large un-stabilized slopes. Severe evidence of mass-wasting/slumping was observed on the northern berm at the Upper Pond, further illustrating the unstable nature of the berms. Scattered concrete and aggregate were documented along the berms.

The perched height of culvert at the downstream side of the Upper Pond was 34 cm, with a jump height measured at 15 cm during early spring assessments. Two additional man-made ponds were identified within the Subject Lands: the first immediately north of the Upper Pond (referred to as the cattle pond as this pond was constructed to hold water to support the cattle farm) and the second pond is located behind the northern shed structure on the east side of Salt Creek.

Consideration of the larger ecological matrix or landscape contributes to a better understanding of potential interactions between abiotic and biotic flows and exchanges. As depicted on **Figure 2** (**Appendix A**), the landscape surrounding the Subject Lands is a mixture of agricultural and industrial land-uses. The West Tributary of the West Humber River and its valley would act as a primary linkage that provides large patches of habitat for a variety of flora and fauna, and also serves as an important wildlife corridor across the landscape in a north-west to south-east direction. The East Tributary provides a secondary linkage function, primarily where it extends south off the Subject Lands and connects into the West Tributary of the West Humber River downstream of Mayfield Road. Wildlife passage underneath the surrounding road networks appears to be facilitated based on the presence of bridge and box culvert crossings at Torbram and Mayfield Roads.

The Salt Creek valley system provides connectivity across the north of the site connecting large networks of woodland southeasterly under Airport Road to the John Ervine Valley in Brampton. The segment of Salt Creek within the Subject Lands has been disturbed by residential and agricultural uses.

4.2 Assessment of Terrestrial Environment

An assessment of terrestrial resources was undertaken as part of this CEISMP and meets the intent of the requirements of a subwatershed study. The following assessment methods were used, in accordance with methods described in the Terms of Reference for Local Subwatershed Studies presented in the SABE.

Detailed field assessment of terrestrial resources has been used to characterize the terrestrial environment and establish a baseline terrestrial environment for the Secondary Plan Area, including the proximity to, and the degree of linkage with other habitats.

Specific consideration has been given to the location and relationship of features and areas within the NHS and opportunities for enhancement of the terrestrial environment has built upon those identified in the SABE scoped Subwatershed study, including confirmation of enhancement area objectives and targets.

4.3 Vegetation Assessment

4.3.1 Ecological Land Classification

The Subject Lands consist primarily of anthropogenic vegetation cover, such as agricultural fields and old field meadows. The agricultural fields are actively managed (row crop, planted hay or actively browsed pasturelands). Wetlands are present, associated with HDFs and ponds. Forest communities are also present, though restricted to the valleyland corridor in the Greenbelt Plan Area, and immediately north of the site outside the Subject Lands. Six ELC communities were classified to Vegetation Type, while four communities were classified to Ecosite. Overall, these can be broadly quantified as:

- Agricultural = 120.3 ha (79%)
- Cultural = 15.0 ha (10%)
    - Cultural Meadow = 12.5 ha
    - Cultural Thicket = 2.5 ha
- Forest = 3.1 ha (2%)
- Marsh = 5.2 ha (3%)
- Thicket Swamp = 0.2 ha (0.2%)
- Other (e.g., hedgerows, residential, etc.) = 8.2 ha (5%)

ELC mapping of the Subject Lands is shown on **Figure 3 (Appendix A).** A description of each ELC unit is provided in **Table 2** (**Appendix B**). No provincially rare vegetation communities were present on the Subject Lands (NHIC, 2021). Surveys completed by GEI show that wetland is present on the Subject Lands, occupying approximately 4.9 ha overall. The community types observed all have mineral soils and consist of marsh and thicket swamp. These wetlands and associated boundaries were confirmed by GEI staff using the '50/50 rule', where features having over 50% cover of wetland plants were classified as wetland. These boundaries (excluding wetland within the Greenbelt Plan NHS) were later verified by the TRCA on July 5 and October 22, 2021.

The LIO database was accessed to determine if any MNRF-identified wetlands have been mapped on or in the vicinity of the Subject Lands. Such wetlands could include Provincially Significant Wetlands, MNRF evaluated wetlands, or unevaluated wetlands. Results show that eight wetland units (unevaluated) occur on the Subject Lands. Wetland mapping prepared by the MNRF is not always conclusive and is continuously subject to updates and refinements; in many instances, MNRF wetland mapping is developed through imagery analysis without ground verification. The wetland mapping used for analysis in this report was prepared by GEI and is based on ground-truthed observations.

No provincially significant wetlands, as mapped by MNRF, occur on or within 750 m of the Subject Lands.

4.3.2 Botanical

Botanical inventories completed on the Subject Lands identified a total of 183 species of vascular plants. Of that number, 94 (51%) are native and 89 (49%) are exotic. A full species list is included in **Table 3 (Appendix B).**

The majority of the native species (90%) are ranked S5 (common and secure in Ontario). Seven species (7%) are ranked S4 (apparently common secure in Ontario; NHIC, 2021b), while the remaining 3% do not have an assigned rank (e.g., native hybrid species). No federally or provincially protected plants were observed, nor were there observations of provincially rare plants. Overall, none of the species had a co-efficient of conservation value of 9 or 10. Nine regionally rare plants were observed, as per the Peel Region rarity rankings (Varga et al. 2005):

- Old Field Aster (*Symphyotrichum pilosum var. pilosum*); R1
- Common Hornwort (*Ceratophyllum demersum*); R3
- Peach-leaved Willow (*Salix amygdaloides*); R6
- Sandbar Willow (*Salix interior*); R5
- White Spruce (*Picea glauca*); R3
- Northern Watermeal (*Wolffia borealis*); R2
- Columbia Watermeal (*Wolffia columbiana*); R3
- Leafy Pondweed (*Potamogeton foliosus* ssp. *foliosus*); R7
- Small Pondweed (*Potamogeton pusillus*); R3

An NHIC search was conducted for the Subject Lands using the MNRF Biodiversity Explorer. No rare or protected plants have been historically documented on or in the vicinity of the Subject Lands.

Invasive species are those that can become (or presently are) a serious problem within a defined location. These species reproduce and spread aggressively, reducing the local biodiversity, and threatening ecological function. Depending on existing conditions, some invasive species can outcompete all other species.

Urban Forest Associates (2002) provides a categorical ranking system for species known to be invasive in southern Ontario. Of the 183 species observed on the Subject Lands, ten (5.5%) are ranked as Category 1 by Urban Forest Associates.

Category 1 species are deemed to be the most invasive and can dominate a site to exclude all other species, remaining dominant on the site indefinitely. These are a threat to natural areas wherever they occur because they have very effective reproduction and dispersal mechanisms, allowing them to move long distances. These are regarded as a top priority for control, where eradication and follow-up monitoring are often necessary to ensure its effective removal, where sought. The ten Category 1 species observed on the Subject Lands are:

- European Swallowort (*Vincetoxicum rossicum*)

- Canada Thistle (*Cirsium arvense*)
- Dame's Rocket (*Hesperis matronalis*)
- Exotic Honeysuckle (*Lonicera tatarica* and *L.* x *bella*)
- Garlic Mustard (*Alliaria petiolata*)
- Purple Loosestrife (*Lythrum salicaria*)
- European Buckthorn (*Rhamnus cathartica*)
- Manitoba Maple (*Acer negundo*)
- Flowering Rush (*Butomus umbellatus*)
- European Reed (*Phragmites australis ssp. australis*)

4.3.3 Tree Inventory

A tree inventory was completed for the Subject Lands to complete detailed health assessments (biological, structural, and overall). The results of the tree inventory have been included in the Arborist Report (GEI 2022) under separate cover.

4.4 Wildlife

Summaries of targeted wildlife surveys completed within the Subject Lands are provided below. A master list of all wildlife recorded both individually and during field investigations is provided in **Table 4**, **Appendix B**.

4.4.1 Amphibian Call Count

A total of ten amphibian call count stations were surveyed within the Subject Lands. Stations were located within swamps, marshes, and ponds (**Figure 4**, **Appendix A**).

A total of three amphibian species were documented during the targeted amphibian call count surveys, and one amphibian species (Northern Leopard Frog; *Lithobates pipiens*) was recorded incidentally during turtle basking surveys. All four species were provincially ranked S5. A table documenting the results of the Amphibian Call Count Surveys is provided in **Table 5**, **Appendix B**).

4.4.2 Turtle Basking Survey

A total of three turtle basking stations were established to survey five features within the Subject Lands (**Figure 5**, **Appendix A**).

Two turtle species were recorded within the Subject Lands in the anthropogenic ponds associated with the East Tributary to the West Humber River. Midland Painted Turtles (*Chrysemys picta*) are provincially ranked S4. The Snapping Turtle is provincially ranked as Special Concern. A table documenting the results of the Turtle Basking Surveys is provided in **Table 6**, **Appendix B**)

4.4.3 Birds

A total of 11 point count stations were surveyed within the Subject Lands and are illustrated on **Figure 6** (**Appendix A**).

Forty-two (42) bird species were observed within the Subject Lands during Breeding Bird Surveys (BBS). Of this total, nine species are confirmed, 14 are probable and 16 are possible breeders on the Subject Lands. The remaining three bird species are considered non-breeders, flyovers, or migrants. No additional species were observed on the surrounding lands within 120 m. The observed breeding bird species are discussed in the sections below. All species observed on the Subject Lands are listed in **Table 7** (**Appendix B**)**.** One additional species, Common Raven (*Corax corax*; S4B, G5) was observed nesting on a barn silo during amphibian surveys in April, but the nest had fledged and the young had departed the lands before the BBS was conducted.

A total of 39 (100%) of the confirmed, probable, or possible breeders are provincially ranked S5, S4 or SNA (species not native to Ontario). No bird species are considered provincially rare (S1-S3; NHIC 2021b).

The following SAR birds were observed on the Subject Lands:

Bobolink: Threatened in Ontario

Bobolink were detected on eight point count stations. An estimate of population size was determined by the spatial distribution of males detected, due to their conspicuous plumage and behavior. Females are easily overlooked due to their secretive behavior and dull plumage and present a more difficult method to estimate how many birds are present. As such, a minimum of 37 male Bobolink were observed on the subject lands. Breeding was confirmed on multiple occasions, throughout the site where suitable habitat, mainly hay and pasture, was found during surveys completed in 2021.

Eastern Meadowlark: Threatened in Ontario

Meadowlarks were observed at four point count stations during round one and five stations during round two during surveys completed in 2021. Population size was determined to consist of two male territories during round one and 3 male territories in round two. Meadowlark is polygamous and therefore a male may have several females in one territory.

4.4.4 Bats

4.4.4.1 Bat Habitat

All trees that overlap with the proposed development plan were assessed for suitability for roosting bats. While only woodland communities can be considered candidate habitat for SWH Bat Maternity Colonies, any tree can be considered roosting habitat under the ESA for SAR bat species.

One woodland exists on the Subject Lands, in the Greenbelt NHS. This forest community was considered candidate SWH for Bat Maternity Colonies and will be protected.

All hedgerow trees and trees identified elsewhere on the Subject Lands were assessed for suitability for roosting by SAR bats and are presented on **Figure 7** (**Appendix A**).

4.4.4.2 Bat Acoustic Surveys

Two acoustic monitoring stations set up on the Subject Lands associated with suitable roosting trees for bats, as shown on **Figure 7** (**Appendix A**). A total of 4 passes of an 'Unknown *Myotis'* species were recorded at the monitoring station TULL2. No bat SAR were recorded at monitoring station TULL1. A summary of all bats recorded is provided in **Table 4**, **Appendix B**.

Acoustic monitoring station TULL2 was located in a hedgerow near a large pond (refer to **Figure 7**, **Appendix A**). Therefore, based on the low number of 'Unknown *Myotis*' species passes recorded (i.e., four passes over 11 nights) and the presence of a large pond near the recording site, it is assumed that the species was foraging in the area, and not using the area for roosting or breeding.

Furthermore, we assume that the species may be roosting offsite or in the higher quality forests associated with the West Tributary of the West Humber River, or the woodland north of the Subject Lands associated with Salt Creek.

4.5 Aquatic Ecology

Aquatic ecology studies have been completed in accordance with assessment criteria for Phase 1 of the a subwatershed study for the purpose of assessing the potential impacts of future land uses.

Recommendations have been identified for improvement of aquatic habitat, including removal of barriers and on-line ponds, and retrofitting existing altered habitats. The assessment relates physical characteristics and processes of the aquatic environment to biological communities.

Detailed assessment has focused on the significant areas identified and areas immediately downstream of the Subject Lands.

Three regulated watercourses were identified through the TRCA online mapper (as shown on **Figure 2**, **Appendix A**). Two features (East and West Tributaries) were associated with the West Humber River. The third feature is Salt Creek in the northwest portion of the Subject Lands.

A constraint ranking has been assigned to each watercourse to identify potential management approaches. Specifically, two constraint rankings have been considered including Medium Constraint and High Constraint. Those features not warranting a Medium or High Constraint ranking were further considered as HDFs.

High Constraint watercourses meet TRCA's criteria to be considered a regulated watercourse. No realignment/relocation or large-scale alterations of these watercourses would typically be permitted as a result of the significance and sensitivity of the feature. Typically, High Constraint watercourses are permanently flowing, with well-defined channel morphology with a range of substrates, established riparian vegetation communities that provide important riparian function and a diverse resident fish community. The recommended management approach for High Constraint watercourses would be to protect them in place with appropriate ecological buffers and hazard setbacks. Small scale alterations may be permitted for restoration or localized SWM infrastructure (e.g., SWM pond outfalls), but realignment/relocation would not be permitted.

Medium Constraint watercourses meet TRCA's criteria to be considered a regulated watercourse but lack important characteristics that would warrant protection in place. As a result, Medium Constraint watercourses can be realigned/relocated, provided appropriate designs (using natural channel design; NCD) and appropriate buffers/setbacks are included in the corridor. Medium Constraint watercourses are typically intermittently flowing and lack well-defined natural morphology and riparian vegetation. They may provide seasonal fish habitat when wet in the spring and/or may provide indirect fish habitat functions (e.g., flow conveyance, water quality regulation, organic and inorganic materials) to support downstream direct habitat. Typically, Medium Constraint watercourses have been altered as a result of local land use (e.g., channelization and alterations to natural riparian vegetation due to agriculture).

4.5.1 Watercourse Characterization and Constraint Rankings

A general characterization of each of the watercourses (East and West Tributaries, and Salt Creek) within the Subject Lands is discussed below. No targeted aquatic habitat assessments were completed within these features. Watercourses and associated constraint rankings for each feature is shown on **Figure 8** (**Appendix A**).

4.5.1.1 West Tributary

The West Tributary of the West Humber River enters the site under Torbram Road via a large Corrugated Steel Pipe culvert. The watercourse flows south-east across the south-eastern corner of the property before exiting the site under Mayfield Road. The Mayfield Road crossing is a large bridge structure.

This watercourse is a permanently flowing feature that is classified as a coolwater system and supports various fisheries, including being identified as Redside Dace habitat (as discussed above within **Section 3.1.6** of this report). The West Tributary is located within a well-defined valleyland, which is generally well vegetated along both banks. This feature is largely naturalized and relatively undisturbed. Various channel morphologies were recorded including riffles, pools and run habitats.

As a result of these characteristics, it was confirmed that this feature meets the criteria to be considered a regulated watercourse and was assigned a High Constraint ranking as a result

of the degree of naturalness, prominence on the landscape and designated habitat for SAR (i.e., Redside Dace).

4.5.1.2 East Tributary

The East Tributary of the West Humber River originates within the lower third of the Subject Lands. This feature receives inputs from HDFs upstream of the Upper Pond; however, it does not begin to become a defined watercourse feature within the Subject Lands until downstream of the Upper Pond. While TRCA's mapping illustrates that the East Tributary contains two regulated watercourses (formerly associated with HDFs H6 and H7) these drainage features have been identified as Watercourses 1 and 2 (as discussed further below). The East Tributary exits the Subject Lands under Mayfield Road via a box culvert that was recently upgraded as a result of the Mayfield Road Municipal Class EA (Stantec Consulting Ltd. 2004).

The East Tributary contains two ponded features (identified as the Upper and Lower Ponds) with constructed earthen berms. Incidental observations of the berms during ecological inventories suggested that these berms were not stable. Moreover, a perched culvert was observed at the upper berm that would act as a permanent barrier to fish migration. The perched height of culvert at the downstream side of the Upper Pond was 34 cm, with a jump height measured at 15 cm during early spring assessments. Moreover, severe evidence of mass wasting/slumping was recorded at the downstream end of the Upper Pond, further illustrating the unstable nature of the berms. The Lower Pond appeared to drain through the berm (either through an eroded culvert or seeping through the berm) before outletting into a wetland unit, which ultimately flowed under Mayfield Road. The Lower Pond berm also appeared to act as a migratory barrier for fish movement. A SWM pond outlet from the adjacent (eastern) property was identified immediately south of the Lower Pond. The East Tributary has been assessed as contributing Redside Dace habitat (as discussed further within **Section 5.1.7**); however, it should be noted that the East Tributary is highly altered and degraded as a result of historic land-management within the Subject Lands. Both ponds likely contribute significant warming to downstream fisheries. As a result, this branch is assumed to support warmwater fish habitat. The two constructed berms act as permanent barriers to fish migration within the East Tributary.

As a result of these characteristics, it was confirmed that the East Tributary meets the criteria to be considered a regulated watercourse immediately downstream (south) of the Upper Pond and was assigned a Medium Constraint ranking.

Under the proposed changes to the Conservation Authorities Act, a "watercourse" is considered as a defined channel having a bed, and banks or sides, rather than it being previously defined as an identifiable depression. While this definition is not yet in force, it is under consideration and may affect the assessment of features described herein.

Within the East Tributary, two drainage features flow into the Upper Pond. During consultation with TRCA, it was noted that several reaches previously identified as HDFs,

including H6S1, H6S2, H7S1 and H7S2, should be considered regulated watercourses instead of HDFs.

GEI and Croziers completed an analysis of the drainage areas of these features and confirmed that they are generally greater than 50 ha. Accordingly, these reaches are being treated as regulated watercourses, and labeled as Watercourse 1 (west arm) and Watercourse 2 (east arm) as shown on **Figure 8** (**Appendix A**). Characterizations of these watercourses are provided below and may change with proposed upcoming changes to policies guiding management of aquatic resources.

Watercourse 1 (formerly identified as HDF H6)

This watercourse is an approximately 920 m long, 16 to 40 m wide linear meadow marsh, originating in the middle of the property and terminating at the Upper Pond. The reach was flowing in early spring, but was reduced to periodic, isolated standing pockets of water by late spring. The reach was fully dry upon summer assessment. Some portions of the wetland contain a defined channel, while others have no or limited channel definition. No fish were captured in the reach during the fish community assessment, and it does not generally appear capable of providing direct fish habitat. The watercourse was determined to not provide suitable amphibian breeding habitat.

Watercourse 1 was assigned a Medium Constraint ranking given ongoing impacts from adjacent agricultural practices and the presence of several tractor crossings.

Watercourse 2 (formerly identified as HDF H7)-

This watercourse originates at the northern property line and flows in a southerly direction towards the Upper Pond. The upstream portions of this watercourse generally consist of undefined features or swales that run through cattle pasture and cropped agricultural lands. These upstream reaches were either flowing or standing in early spring but were dry by late spring. The downstream most portion is a wetland associated with the Upper Pond. That section of the watercourse contained flowing water in early spring but was reduced to isolated pockets of standing water within defined depressions by late spring. The reach was dry upon summer assessment.

Watercourse 2 was assigned a Medium Constraint ranking given impacts from adjacent agricultural practices including warming inputs from the cattle pond (discussed further in **Section 4.4.2**). Rehabilitation of this reach is recommended to restore natural channel functions and fisheries connectivity.

If the proposed changes to the Conservation Authorities act comes into force, this feature would no longer be considered a watercourse and would have the former designation of an HDF.

4.5.1.3 Salt Creek

A portion of Salt Creek traverses the study area, as an intermittently defined channel within a confined valley setting. This reach of Salt Creek was identified by DFO mapping as

occupied Redside Dace habitat. As such, the meander belt has been used to delineate the limits of habitat (i.e., 30 m from the meander belt). The meander belt was used to delineate habitat limits for Redside Dace, defined as the meander belt width, plus vegetated areas or agricultural lands within 30 metres of the meander belt.

The Geomorphic Assessment completed for this purpose can be found in **Appendix C**.

Salt Creek flows southeaserly through the northwest corner of the site. The channel geometry varies within the reach assessed due to the presence of flow obstructions like wood debris. Occasionally, multiple flow paths were present, as well as cut-off channels.

4.5.1.4 Headwater Drainage Feature Classification & Management Recommendations

As shown on **Figure 8** (**Appendix A**) a total of seven HDFs, comprised of 19 distinct reaches, were observed and evaluated on the Subject Lands. The physical and biological characteristics of each reach are briefly described in the following sections.

4.5.1.4.1 HDF H1

This feature, which consists of a single reach (H1S1), originates on the eastern side of Torbram Road, and flows into the West Humber River just upstream from the Mayfield Road bridge. There is no culvert at Torbram Road, so this feature only receives surface water runoff from the road and surrounding lands. The feature primarily consists of a wetland within a defined corridor through an agricultural field. The downstream end of the feature has been highly altered because of Mayfield Road construction. The reach contained flowing water in early spring and had pockets of flowing and standing water in late spring but was dry at the downstream end. The reach was dry upon summer assessment.

4.5.1.4.2 HDF H2

This HDF, which consists of a single reach (H2S1), originates from agricultural field runoff north of the West Humber River valley. The reach consists of an approximately 220 m long, 10 to 15 m wide, linear tableland wetland running along the top of the valley. As per the HDFA Guideline (CVC/TRCA 2014), the HDF was only delineated to the top of the valley slope. The HDF was flowing in early spring, although flow was observed to be dissipating into the valley slope and riparian area with no discharge to the West Humber River occurring. The HDF was dry in late spring.

4.5.1.4.3 HDF H3

This HDF, which consists of a single reach (H3S1), originates from agricultural field drainage west of Torbram Road and enters the Subject Lands via a culvert. From the culvert outlet, it runs within a swale for approximately 130 m before entering a pipe at the border with the adjacent residential property, which generally coincides with the vegetated valleylands of the West Humber River. Although the outlet of the pipe was not located, it is expected to discharge to the river. The feature was flowing in early spring, although by late spring it was generally dry at the upstream end with pockets of standing water in the lower reaches. However, there was minimal flow leaving the reach through the culvert at the downstream

end. The downstream portions of this reach are somewhat entrenched due to erosion. The reach was dry upon summer assessment.

4.5.1.4.4 HDF H4

This swale, which consists of two reaches (H4S1 and H4S2), originates in an active agricultural field, and flows towards the East Tributary of the West Humber River. The swale contained flowing water in early spring and was dry in late spring. Reach H4S2 is located within the active agricultural field and reach H4S1 is located within a meadow where it flows down the slope toward the receiving watercourse. The downstream end of the reach has been highly altered by the Mayfield Road widening.

4.5.1.4.5 HDF H5

This HDF consists of two main reaches (H5S1 and H5S2) and one tributary HDF reach (H5S2a) flowing into the East Tributary of the West Humber River. The downstream reach (a swale) was flowing, and the upstream reaches (identified as undefined) contained standing water in early spring, while all reaches were dry in late spring. During the late spring assessment, soil addition to the agricultural field as part of normal agricultural practices on the property, had eliminated portions of the upstream reach of this HDF.

4.5.1.4.6 HDF H6

This HDF consists of several tributary HDFs that flow into Watercourse 1 (formerly HDFs H6S1 and H6S2). The HDFs generally consist of poorly defined swales or undefined features. These HDFs, which run through agricultural crop land, were each flowing in early spring, but were dry by late spring.

4.5.1.4.7 HDF H7

This HDF consists of one main branch (H7S3) and four tributary HDFs off Watercourse 2 (formerly HDFs H7S1 and H7S2).

One HDF consisted primarily of an anthropogenic pond (also referred to as the cattle pond) on the tablelands east of Watercourse 2. The pond was constructed to supply water to a downstream cattle watering structure (via underground piping from the pond). Although the pond itself is expected to hold water throughout the year, limited hydrologic connection was documented during the spring freshet period where the pond overtopped its banks and flowed down a steep hill via an ill-defined, swale.

Other areas on the tablelands east of this pond were also investigated during the Round 1 assessment, given that they appeared to contain water on aerial images from spring 2019. This tableland cattle pasture does contain undulating topography with numerous depressions that do hold water during and following precipitation events. However, no outflow was observed from any of these areas, and as a result, they were not classified as HDFs.

4.5.1.5 Headwater Drainage Feature Classifications and Management Recommendations

Part 2 of the HDFA Guidelines (CVC/TRCA 2014) provides an approach to classify HDFs by providing a step-by-step characterization of specific functions that may be associated with the features assessed, including hydrology, riparian function and provision of fish or terrestrial habitat. **Table 8** (**Appendix B**) highlights the key components of this analysis based on the three rounds of HDFA completed in 2021, as well as the supporting fish community and amphibian surveys.

Part 3 of the HDFA Guidelines (CVC/TRCA 2014) provides guidance on linking the characteristics and functions of features to specific management recommendations that may be applied to those features. To assist, the HDFA Guidelines include Figure 2: "Flowing Chart Providing Direction on Management Options." The flow chart depicts various decision points associated with hydrology, fish habitat, riparian vegetation, and terrestrial habitat, and ultimately leads the user to an appropriate management recommendation for each HDF segment. Management recommendations can include the following:

- Protection;
- Conservation;
- Mitigation;
- Maintain Recharge;
- Maintain/Replicate Terrestrial Linkage; or
- No Management Required.

The flow chart was used to determine the management recommendation for the HDFs on the Subject Lands based on the CVC/TRCA (2014) guidelines; this is provided in the second to last column of **Table 8** (**Appendix B**). As noted in the final column of **Table 8** (**Appendix B**), some feature or reach management recommendations were adjusted from the management recommendation based on the HDFA Guideline flow chart, to better reflect their ecological and hydrological importance on the landscape, based on site specific observations and proposed management approaches.

The resulting GEI management recommendations for each reach are depicted in **Figure 8** (**Appendix A**) and discussed in the following sections.

Only one HDF reach (H1S1) was identified for Protection. This reach consists of a wetland located within a defined valley corridor that provides contributing habitat for the downstream Redside Dace population. The majority of this HDF is located with the Greenbelt Plan area. As shown on **Figure 12** (**Appendix A**), no alterations to this HDF are proposed in the Site Plan.

Two HDF reaches (H2S1, H3S1) are recommended for Conservation, generally on the basis that they are wetlands and/or provide contributing habitat for the downstream (off-site) Redside Dace population. As per the HDFA Guideline (CVC/TRCA 2014) these reaches must generally remain on the landscape but can be realigned and/or relocated, provided that the important ecological and biophysical headwater functions they are provide are maintained.

The majority of the remaining reaches have been identified for Mitigation on the basis of early spring hydrological function (i.e., conveyance of ephemeral flows to downstream watercourses). These reaches are generally dry by late spring and therefore only provide seasonal HDF functions, as well as flow conveyance during and following precipitation events. These reaches can be removed from the landscape, but the hydrological functions they provide must be addressed through conventional stormwater management (SWM) and/or Low Impact Development (LID) practices to maintain seasonal flow conveyance to downstream HDFs and watercourses.

Six reaches have been identified as No Management Required (per the terminology in the HDFA guideline). These HDFs were only identified to contain standing water in the early spring but were providing no downstream flow conveyance. These features typically consisted of undefined or swale features within active agricultural crop land or cattle pastureland. The anthropogenic cattle watering pond (HDF H7S2B) was also included in this category as, even though it contains water on a year-round basis (to support cattle watering), it provides no headwater functions. The HDFs in this category can be removed from the landscape with no negative impact on headwater functions.

4.5.2 Fish Community Sampling Results

Watercourse 1 and on-site ponds were electrofished and/or minnow trapped on May 7, 2021. Initially, MNRF issued a Scientific Collectors Permit to conduct fish community sampling within the ponds and associated HDFs for a July sampling date. GEI requested an amendment to the permitted collection date to sample the seasonal features within the Subject Lands. Ultimately, the MNRF approved an earlier sampling date within Watercourse 1 as well as Upper and Lower ponds and the cattle pond.

Fish community sampling was conducted within the above noted features. No fish were collected within Upper Pond, cattle pond or Watercourse 1; however, three juvenile Green Sunfish (*Lepois cyanellus*) were captured within minnow traps in Lower Pond. While no fish were collected within Upper Pond and the cattle pond, these ponds were known to have been historically stocked to support recreational fishing.

A Fish Collectors Report will be submitted to MNRF Aurora District summarizing survey results to satisfy permitting requirements.

5. Analysis of Natural Heritage Features

5.1 Provincial Policy Statement

Eight types of natural features are identified in the PPS (MMAH 2020):

- Significant wetlands;
- Significant coastal wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat;
- Fish habitat;
- Habitat of endangered and threatened species; and
- Significant ANSIs.

The presence/absence of these natural features on the Subject Lands are discussed in the subsequent sections of this CEISMP. The NHRM (MNRF 2010), Peel Region Official Plan (2018 Consolidation), Town of Caledon Official Plan (2018 Consolidation) and TRCA Ontario Regulations 166/06 were referenced to assess the potential significance of other natural features, and their associated forms and functions on the landscape.

Where natural features are present on the Subject Lands, their sensitivities are discussed.

5.1.1 Significant Wetlands

There are no Provincially Significant Wetlands identified in LIO mapping on or adjacent to the Subject Lands.

The MNRF no longer reviews or approves OWES files. The evaluation of a wetland is considered final after the evaluator deems it to be final per OWES requirements.
Final evaluations are submitted to the appropriate planning authority for filing purposes, and final boundaries are to be submitted to MNRF to update LIO database. All existing Provincially Significant Wetlands (PSW's) will retain the PSW status until a re-evaluation is completed.

5.1.1.1 Other Wetland Units

The following wetland communities were identified within the Subject Lands (**Figure 3, Appendix A**):

- Mineral Meadow Marsh (MAM2);
- Reed-canary Grass Mineral Meadow Marsh (MAM2-2);
- Pondweed Mixed Shallow Aquatic (SAM1-4)

- Shallow Aquatic (SA);
- Mineral Shallow Marsh (MAS2); and
- Willow Mineral Thicket Swamp (SWT2-2).

These vegetation communities were identified by GEI, and the outer boundaries were confirmed by TRCA. Each of these wetland communities are riparian, under 2 ha in size, and are associated with HDFs, watercourses and/or online ponds.

5.1.2 Significant Coastal Wetlands

Similar to significant wetlands, the MNRF or their designates identify significant coastal wetlands present on the landscape. Coastal wetlands are defined in the NHRM (MNRF 2010) as:

"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

Any 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 two km upstream of the 1:100-year floodplain (plus wave run-up) of the large water body to which the tributary is connected."

No significant coastal wetlands are identified on the Subject Lands.

5.1.3 Significant Woodlands

Significant woodlands are identified by the planning authority in consideration of criteria established by the MNRF. Under the NHRM (2010), woodlands are defined 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."

In accordance with this definition, natural treed communities (FOC, FOD, FOM, SWC, SWD, mixed swamp) and cultural forest/plantation communities (CUW, CUP) are considered woodlands (i.e., meet the Forestry Act woodland density requirements).

As per the PPS, significant woodlands are to be defined using criteria established by the Province (i.e., NHRM, Recommended criteria). The general guidelines for determining significance of these features are presented in the NHRM for Policy 2.1 of the PPS and have been considered as guidance for assessment in this report. The criteria suggested by the NHRM for designating significant woodlands include size, shape, proximity to other woodlands or natural features, linkages, species diversity, uncommon characteristics, and economic and social values.

One woodland unit is present at the west side of the Subject Lands along the West Tributary valley corridor in the Greenbelt NHS. This woodland is treated as significant.

Along the northeastern property boundary is a woodland community, herein referred to as the Salt Creek Valley woodlands. This feature is considered a significant woodland based on the size of the feature and it being identified as a Core Feature under the Regional OP.

5.1.4 Significant Valleylands

Significant valleylands are defined and designated by the planning authority. General guidelines for determining significance of these features are presented in the NHRM (MNRF 2010) for Policy 2.1 of the PPS. Recommended criteria for designating significant valleylands includes prominence as distinctive landform, degree of naturalness, and importance of its ecological functions, restoration potential and historical and cultural values.

Table 8-1 of the NHRM provides recommended evaluation criteria for determining significant valleylands.

The West Tributary has been identified as a significant valleyland based on its landform-related functions and attributes, as well as its ecological features and functions.

The East Tributary has not been identified as significant due to the significant anthropogenic alteration that has occurred within the feature effecting the prominence and continuity of the landform within the greater landscape. Moreover, the East Tributary currently has poor linkage function due to the two man-made berm structures and created ponds (Upper and Lower Ponds).

The valleyland associated with Salt Creek could be considered provincially significant based on the presence of the following criteria identified within Table 8-1 of the NHRM (2010):

- Surface Water Functions (presence of riparian wetlands, Salt Creek is considered an intermittent feature);
- Landform Prominence;
- Degree of Naturalness (natural vegetation associated with feature);
- Habitat Value (Salt Creek identified as Redside Dace occupied habitat);
- Linkage Function (wildlife corridor generally north-south within the landscape);
- Restoration and Potential Value (restoration efforts could improve ecological benefits).

Several criteria are unknown and require additional studies to understand whether they are met (e.g., presence of groundwater, erosion/deposition features, catchment area of Salt Creek). Additional ecological, engineering and fluvial geomorphological investigations are required to determine whether this valleyland is considered significant.

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 (MNRF 2010), the Significant Wildlife Habitat Technical Guide (MNRF 2000), and the SWH Eco-Region Criterion Schedule (MNRF 2015a). The Subject Lands are located in Eco-Region 6E and were therefore assessed using the 6E Criterion Schedule (MNRF 2015a).

There are four general types of SWH:

- Seasonal concentration areas;
- Rare or specialized habitats;
- Habitat for species of conservation concern; and
- Animal movement corridors.

General descriptions of these types of SWH are provided in the following sections.

5.1.5.1 Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather together 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 usually designated as SWH.

5.1.5.2 Rare or Specialized Habitats

Rare and specialized habitat are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. SRANKS are rarity rankings applied to species at the ‘state’, or in Canada, at the provincial level, and are part of a system developed under the auspices of the Nature Conservancy (Arlington, VA). Generally, community types with SRANKS of S1 to S3 (extremely rare to rare-uncommon in Ontario), as defined by the NHIC (2021b), could qualify. It is to be assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant. 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.

5.1.5.3 Habitats for Species of Conservation Concern

Species of conservation concern include those that are provincially rare (S1 to S3), provincially historic records (SH) and Special Concern species. Several specialized wildlife habitats are also included in this SWH category, including 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 ESA (2019 Consolidation). Endangered and threatened species are discussed in **Section 5.1.7** (below).

5.1.5.4 Animal Movement Corridors

Animal movement corridors are areas that are traditionally used by wildlife to move from one habitat to another. This is usually in response to different seasonal habitat requirements, including areas used by amphibians between breeding and summer/over-wintering habitats, called amphibian movement corridors.

Table 9 (Appendix B) discusses SWH types present within the Subject Lands. Candidate and confirmed SWH types are illustrated on **Figure 9 (Appendix A)**.

5.1.6 Fish Habitat

Fish habitat, as defined in the federal *Fisheries Act,* c. F-14, means “spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes.” Fish, as defined in S.2 of the *Fisheries Act*, c. F-14, includes “parts of fish, shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals.”

The West Tributary and Salt Creek are identified as permanent, direct fish habitat as both support fish year-round. As previously discussed, it is known that fish were historically anthropogenically stocked within the Upper and Lower ponds to attract locals to recreationally fish. Fish were collected using minnow traps during targeted sampling efforts within the Lower Pond. While no fish were collected or observed within the Upper Pond during targeted surveys, it is possible that fish may be present within the feature from historical stocking activities. The Upper Pond is identified as candidate, permanent direct fish habitat while the Lower Pond is identified as (confirmed) permanent, direct fish habitat. It should, however, be recognized that fish would not have been able to naturally migrate into these ponded features due to the fish barriers (perched culverts) at the Lower and Upper Ponds. The cattle pond (HDF H7S2B) is an anthropogenic pond that is weakly connected following large storm events and/or spring freshet where the pond overtops it banks and flows down a steep gradient into receiving Watercourse 2. This pond has been identified as not providing fish habitat.

One anthropogenic pond appears to be located behind the northern shed structure. During site investigations, it was observed to have limited connectivity to Salt Creek, though it could support amphibian and reptile species. Detailed assessments during spring freshet period should be conducted to understand whether this pond is (seasonally) hydrologically connected to Salt Creek and to determine its value for amphibian and turtle habitat.

All reaches assigned a conservation and/or mitigation management recommendation and that did not have fish captured within them provide indirect fish habitat to downstream fisheries. Features designated as providing indirect fish habitat contribute allochthonous

materials and flows to downstream habitats. Reaches assigned no management recommendation provided no fish habitat.

Figure 10 (Appendix A) illustrates direct, indirect and no fish habitat within the Subject Lands.

5.1.7 Significant Habitat of Endangered and Threatened Species

SAR and their habitats are considered provincially sensitive information. The survey methods, results and potential impacts to SAR species and their habitats will be submitted to the MECP through the Information Gathering Form (IGF), or similar processes. Due to the sensitive nature of this information, all correspondence and outcomes will remain with the MECP and its jurisdiction.

The following SAR and their habitat have been confirmed or are assumed present within or adjacent to the Subject Lands:

5.1.7.1 Bat SAR

All bats in the genus *Myotis* have been designated at Endangered on the SARO list and are afforded protection under the ESA (2007). As described in **Section 4.3.4**, surveys to assess potential bat SAR habitat and acoustic monitoring to identify bats have been undertaken within the Subject Lands. Bat habitat is assumed present within the deciduous forest communities in the Greenbelt NHS and associated with the West Tributary of the West Humber River. The remainder of the Subject Lands are not considered habitat for bat SAR.

Acoustic monitoring identified a total of 4 passes of 'Unknown *Myotis*' species was recorded at the monitoring station TULL2 (Refer to **Figure 7**, **Appendix A**). This acoustic monitoring station was located in a hedgerow near a large pond. Therefore, based on the low number of 'Unknown *Myotis*' species passes recorded (i.e., four passes over 11 nights) and the presence of a large pond near the recording site; it is assumed that the species was using the pond as foraging and/or drinking habitat.

5.1.7.2 Bobolink and Eastern Meadowlark

Both Bobolink and Eastern Meadowlark are designated as Threatened on the SARO list and receive protection under the ESA (2007). As described in **Section 4.3.3**, through breeding bird surveys conducted within the Subject Lands, both species were confirmed breeding in suitable habitats within the Subject Lands. Suitable habitats include agricultural fields with hay, and pasture used to support the farm cattle.

Bobolink were detected eight-point count stations (Stations: 2, 3, 5, 6, 7, 8, 9 and 11) during the first round of surveys and at six point count stations (Stations: 3, 5, 6, 7, 8 and 9) during the second round. Both adult males and females were observed.

Eastern Meadowlark were observed at four-point count stations during round one (BBS Stations: 3, 6, 7, and 8) and five stations during round two (BBS Stations: 3, 4, 5, 6 and 7).

Population size was determined to consist of two male territories during round one and three male territories in round two.

Since the time of surveys in 2021, the agricultural use on-site has transitioned from cattle to row crop agriculture. As a results, the hay or pasture lands formerly used by these species is no longer present. Suitable habitat continues to exist in the Humber River valley within the Greenbelt.

Locations of the point count stations are provided on **Figure 6**, **Appendix A**.

5.1.7.3 Redside Dace

One watercourse, Salt Creek, was identified within the eastern portion of the Study Area to contain Occupied Habitat for Redside Dace. The watercourse was dry during the first site visit, which suggests that this feature is seasonally (intermittently) wet. Salt Creek is assumed to support seasonal, direct cool-water fish habitat.

The portion of the main branch of the West Tributary of the West Humber River flowing through the southwest portion of the Subject Lands is also identified by DFO and MECP as "occupied habitat" for Redside Dace. Regulated habitat in this area would consist of all naturally vegetated and agricultural lands within 30 m of the meander belt on each side of the watercourse. No other watercourses or HDFs on the Subject Lands are considered to be "occupied" or recovery habitat for Redside Dace (i.e., they don't provide direct habitat, nor have the potential to provide direct habitat for the species at any point in the future).

In addition to occupied or recovery habitats, Section 29.1(1)(v) of O. Reg. 242/08 under the ESA (2007) indicates that within the Regional Municipality of Peel, the following areas are also prescribed as the habitat of Redside Dace:

"*a stream, permanent or intermittent headwater drainage feature, groundwater discharge area or wetland that augments or maintains the baseflow, coarse sediment supply or surface water quality of a part of a stream or other watercourse described in subparagraph i or ii, provided the part of the stream or watercourse has an average bankfull width of 7.5 m or less".*

This type of habitat prescribed in the regulation is considered to be "contributing" habitat for Redside Dace, since it helps maintain flow, sediment, and water quality conditions within occupied habitat.

Therefore, an assessment was completed to confirm if the East Tributary and any of the HDFs present on the Subject Lands were considered to be contributing habitat.

The watercourse on the east side of the Subject Lands (i.e., downstream from the Upper Pond) flows into the West Humber River approximately 800 m downstream from Mayfield Road. Based on aerial photo interpretation, the West Humber River appears to have a bankfull width <7.5 m where the tributary discharges and therefore, this watercourse could be contributing if it meets the other criteria. This watercourse provides hydrological contributions (it was flowing beneath the Mayfield Road bridge in May 2021) and, therefore,

appears to support baseflows in the downstream occupied Humber River watercourse. Based on this, the portion of the watercourse on the Subject Lands is considered to provide contributing Redside Dace habitat. However, the value of that contributing habitat is relatively limited based on the presence of the Upper and Lower Ponds. Both ponds are expected to cause elevated water temperatures in the East Tributary given the relatively large pond surface area and surface outlets. Therefore, the presence of these ponds may actually be impairing the suitability of downstream Redside Dace habitat. Further, the ponds are expected to be a sink for any coarse sediment that could potentially be flowing in from upstream HDFs.

The HDFs on the Subject Lands were also evaluated to determine if they provided contributing habitat for the downstream Redside Dace population. Factors in this assessment included:

- All headwater wetlands (with the exception of H2S1, which did not have an observed hydrological connection with the West Humber River) and Watercourses 1 and 2 were considered to be contributing habitat on the basis that they were conveying flows on a seasonal basis and likely assist in maintaining downstream water quality to some degree.
- H3S1 was assessed as contributing habitat. Although it was not identified as a wetland, it flowed through meadow habitat on the Subject Lands and was providing downstream flow contributions in early and late spring, directly to occupied habitat in the West Humber River.
- HDFs that provided early spring flow but that were located within active agricultural fields were not identified as contributing habitat for Redside Dace. These HDFs typically consist of flow through row crops or cattle pasture lands, both of which are land uses that are expected to degrade water quality and impact hydrology and as a result, these reaches do not warrant status as contributing habitat. Hydrology of these areas will be addressed through conventional SWM and LID practices. Proposed restoration associated with the development may result in improved contributing habitat conditions relative to the existing agricultural land use associated with these HDFs.
- HDFs that were only identified as containing standing water were not considered to be contributing habitat as they do not augment downstream baseflows.

Contributing habitat status for each HDF reach is identified in the “Step 3. Fish Habitat” column of **Table 4** (**Appendix B**) along with the supporting rationale, based on the above-noted criteria. Contributing habitat designations will need to be confirmed with MECP.

5.1.8 Significant Areas of Natural and Scientific Interest

No ANSIs were identified on or within the general vicinity of the Subject Lands.

5.1.9 Summary of Key Natural Heritage Features under the PPS

The following confirmed and candidate significant natural heritage features were identified within the Subject Lands:

- Significant Woodlands
- Significant Valleylands
- Fish Habitat
- Habitat for Endangered and Threatened Species
- Candidate and Confirmed SWH

5.2 TRCA Regulated Features

Pursuant of Ontario Regulation 166/06, the TRCA has the authority to regulate development within its regulated areas. The TRCA regulates the following features:

- "*Lands adjacent to or close to the shoreline of the Great Lakes-St. Lawrence River System that may be affected by flooding, erosion or dynamic beaches;*
- *River or stream valleys that have depressional features associated with a river or stream, whether or not they contain a watercourse;*
- *Hazardous lands;*
- *Wetlands; and*
- *Other areas where development could interfere with the hydrologic function of a wetland, including areas up to 120 m of all PSWs and wetlands greater than 2 ha in size, and areas within 30 m of wetlands less than 2 ha in size.*"

When the amendments come into force, which we anticipate may occur at some point in 2023, the tests of "pollution" and "conservation of land" for the issuance of a permit will be replaced with "unstable soil or bedrock". Those new tests have already come into force for permits related to Minister's Zoning Orders (MZOs) and Community Infrastructure and Housing Accelerator Orders (CIHAOs), as have new provisions enabling the Minister by regulation to limit conditions to be applied to permits for MZO and CIHAO development projects. Conservation authority permits remain applicable law in respect of building permit applications, and municipal building officials should continue to refer applicants for development proposals within CA Act regulated areas to TRCA.

The East and West Tributaries and Salt Creek would be considered regulated features under the TRCA as they are watercourse features with defined beds and banks. As discussed above within **Section 4.4.1**, following discussions with the TRCA, two regulated watercourses (Watercourses 1 and 2) were identified upstream of the Upper Pond associated with the East Tributary. All wetland communities (MAM2, MAM2-2, MAS, SA, SWT2-2) present within the Subject Lands are also regulated features; no wetland features exceed 2 ha in size. If the proposed changes to the Conservation Authorities act comes into force, the feature currently named watercourse 2 feature would no longer be considered a watercourse and would have the former designation of an HDF.

5.3 Key Natural Heritage and Hydrologic Features per Region of Peel Official Plan

The Region of Peel Official Plan (2022 Consolidation) identifies the following key natural heritage and hydrologic features as part of the NHS of the Greenbelt Plan:

- Key Natural Heritage Features (KNHF)
    - Significant habitat of endangered, threatened and special concern species;
    - Fish habitat;
    - Wetlands;
    - Life Science ANSIs;
    - Significant valleylands;
    - Significant woodlands;
    - SWH;
    - Sand barrens, savannahs, and tallgrass prairies; and
    - Alvars.
- Key Hydrologic Features (KHF)
    - Permanent and intermittent streams;
    - Lakes (and their littoral zones);
    - Seepage areas and springs; and
    - Wetlands.

As previously discussed, the following KNHF and KHF may be present within the Subject Lands:

- Significant habitat of endangered, threatened and special concern species (Redside Dace - contributing and occupied habitat);
- Fish habitat;
- Unevaluated wetlands (MAM2, MAM2-2, SWT2-2, MAS);
- Significant valleylands (West Tributary to West Humber River);
- SWH (candidate Bat Maternity Colonies and confirmed Habitat of Species of Conservation Concern – Snapping Turtle); and
- Permanent (West Tributary to West Humber River and Salt Creek) and intermittent (East Tributary to West Humber River) streams.

5.4 Existing Ecological Constraints Analysis

As described in **Section 5.3**, KNHF and KHF are present within the Subject Lands. In accordance with Section 7.3.1.4 of the TRCA's Living City Policies (2014) and Section 3.2.5 of the Greenbelt Plan (2017a), the following setbacks were considered to both protect natural features where possible and inform development of the site plan.

- 30 m and 15 m setback from significant valleylands (West Tributary and Salt Creek);
- 10 m setback from non-significant valleylands (East Tributary);

- 10 m setback from non-significant wetlands or 30 m setback from provincially significant wetlands;
- 30 m setback from the staked Significant Woodland Limit (FOD);
- 10 m setback from meander belt (West Tributary);
- 10 m setback from the Regulatory Floodplain;
- 30 m setback from meander belt to inform Regulated Redside Dace habitat (West Humber River and Salt Creek); and
- 10 m setback from HDFs that do not already have an associated setback (e.g., wetlands) that support contributing Redside Dace habitat.

These features and associated setbacks are illustrated on **Figure 11**, **Appendix A**.

While the limit of contiguous vegetation was staked with TRCA, the limits of individual wetland units were not captured. ELC linework ground-truthed to submetre accuracy has been used to supplement field staking survey linework, and was confirmed acceptable to TRCA, as discussed with TRCA staff in the field in December 2021 and via email in January 2023.

6. Development Proposal

6.1 Development Plan Overview

The proposed development, as outlined in the Draft Plan (Weston Consulting, 2023), includes eight (8) development blocks, three 26 m right-of-ways (ROWs), and two (2) stormwater management (SWM) blocks (including a sediment drying area). The Draft Plan proposes no development within the Greenbelt Plan Area of the site.

The first ROW (Street A) runs east-west through the Subject Lands and connects to Airport Road on the east. The second ROW (Street B) runs north-south through the Subject Lands connecting to Mayfield Road at the south limit of the site and extending to the north property limit where it ends with a cul-de-sac. The third ROW (Street C) runs east-west through the Subject Lands and connects to Torbram Road on the west. Similar to the previous submission, the development plan identifies three large blocks to be protected: Greenbelt Plan Area and two EPA areas (East Tributary and Salt Creek). Wetland compensation to account for portions of the proposed wetland removals on site is proposed adjacent to the realigned low flow channel tie-in locations in the EPA block north of Mayfield Road.

Both Upper and Lower ponds continue to be recommended for removal due to embankment stability concerns (and associated potential ecological and public safety impacts) and their negative impacts to downstream fisheries habitats (including occupied Redside Dace habitat). Additional discussions with reviewing agencies (including the TRCA, and MECP) are warranted; however, it is GEI's recommendation that these berms are removed, and the ponds are taken offline with a new channel and wetlands designed within Block 13. The low flow channel will be designed using NCD principles and will incorporate native plant materials. Various specialized wildlife habitat structures will also be installed throughout the corridor to create new functional habitats.

Within the first submission of the CEISMP, the SWM pond was mistakenly shown as part of the NHS. The SWM pond is not shown as part of the NHS, however the SWM Pond block contains landscaped features compatible with natural heritage and is considered Landscape per the Ministerial Zoning Order.

6.2 Engineering Design Updates

The changes made to the Draft Plan, as described above were made in response to comments received from TRCA and Town of Caledon. The updated version of the Draft Plan is designed such that the Stormwater Management Ponds no longer require retaining walls.

Hydraulic modeling has been completed that demonstrates that the regional flood event will be contained under post-development conditions. Regional flood evaluations have also been established with updated hydrology. The modeling also confirms that the existing culvert under Mayfield Road will continue to provide the same level of service (flow conveyance) as the Subject Lands are fully developed. The impacts of the proposed

development on the conveyance capacity of the culvert under Mayfield Road have now been analyzed. The east tributary has now been added to the engineered hydraulic model. This includes the east and west branches of the eastern tributary, as the estimated model only included the western branch of the eastern tributary. The hydraulic model has been included in the FSR under separate cover.

The SWM block was increased in size to accommodate a sediment drying area and to allow for a more efficient space for the layout of the pond. The SWM block has also been relocated to be outside of the existing NHS system. A consistent grading of 4:1 will be provided from the top of both wetlands/access road to the bottom of the environmental protection area/NHS. Hydrologic modeling has been completed for the pond, which included a detailed outlet structure design (which will outlet into the natural channel via a headwall and riprap spill way near Airport Road). This modeling and the requested calculations will be included in the resubmission and were included in the Plan of Subdivision submission made in December 2021. Additionally, the pond has been designed as per MNRF Guidance for Development Activities in Redside Dace Protected Habitat (2016). These features include a planting shelf, bottom drawing outlet and a 3 m deep permanent pool to provide thermal mitigation and total suspended solids (TSS) removal.

The requested water balance assessment for the property has been completed and has been included in the revised FSR completed by Crozier under separate cover. The water balance will mandate a certain volume of clean water that will need to be infiltrated on each of the blocks to match the pre-development water balance conditions. To mitigate the infiltration deficit for the blocks, it was determined that a combination of rooftop and surface parking drainage from each of the private development blocks could be directed to Low Impact Development (LID) measures designed to promote infiltration. The depth of rainfall to be infiltrated shall be reviewed at the site plan stage based on the landscape design and total area available for surface ponding. Water balance for feeding new wetland block is also needed.

An Erosion and Sediment Control (ESC) plan and spill action plan will be prepared and submitted as part of the detailed design package.

6.3 Stormwater Management

C.F. Crozier & Associates Inc. (Crozier) has prepared a Functional Servicing and Stormwater Management Report (FSSR) (January 2023) that describes the recommended servicing and SWM strategy for the Subject Lands. A summary is provided below, but it is recommended the FSSR be reviewed in conjunction with this CEISMP for further detail.

Overall, both quantity and quality control for the proposed development will be provided by two (2) stormwater management facilities in the form of wetlands and a Natural Heritage System (NHS) / Environmental Protection Area (EPA). The proposed SWM facilities are located near the southeast corner of the site. Flows will enter the proposed stormwater management wetlands primarily through the proposed internal storm sewer system and by overland flow. It is important to note that the ponds will be designed in accordance with the Guidance for Development Activities in Redside Dace Protected Habitat Version 1.2 (MNRF,

2016) due to the proposed outlet to the East Tributary, which has been identified as contributing habitat for Redside Dace. The following design concepts will be carried forward to the detail design of the stormwater management wetlands on the Subject Lands:

- The Wetlands will be graded with a maximum of 5:1 side slope for 3.0m above and below the permanent pool and maximum of 3:1 everywhere else within the wetland perimeter as per MECP guidelines.
- Design with bottom draw outlets, cooling trenches, floating islands and minimum average depth of 3 m within the pond to mitigate thermal impact.
- Design the facilities as hybrid extended detention wetlands/wet ponds to maximize the absorption of nutrients and contaminants to prevent them from entering the stream.
- Help shade the pond to minimize temperature by planting in the shoreline fringe and flood fringe of wet ponds.

Sediment drying areas are provided within the SWM blocks, adjacent to the forebay of Wetland 1 and adjacent to the main cell and Street B for Wetland 2 to facilitate maintenance of the facilities. This area, only used temporarily during maintenance of the SWM wetlands, will otherwise be landscaped with naturalized features compatible with the wetland restoration block.

The proposed development will not alter the external drainage catchments, and conveyance for all external catchments will be maintained post-development. Drainage from external lands located immediately west and north of the site will continue to drain through the site and will be captured by the proposed storm sewer systems within the industrial blocks and conveyed through the site to the proposed SWM facilities. It is noted that these external catchments are routed through the SWM facilities uncontrolled.

Further detail regarding SWM and servicing is provided in the FSSR (Crozier, 2023), included under separate cover.

6.3.1 Thermal Mitigation

The West Tributary of the Humber River, the East Tributary, and Salt Creek flowing through the Subject Lands have been identified as habitat or contributing area for Redside Dace. As such, the Guidance for Development Activities in Redside Dace Protected Habitat Version 1.2 (MNRF, March 2016) needs to be followed. Per their standard, the MECP requires thermal mitigation for effluent from SWM facilities directed to Redside Dace habitats to be reduced to a temperature of 24ºC.

Thermal mitigation of runoff from the proposed development will be provided by the SWM facilities, which have been designed as wetlands. The wetlands are designed with a bottom draw outlet which will capture the cooler water found below the water surface to reduce the temperature loading to the channel. The wetlands will also have ample vegetation, providing shade over the facilities, which reduces heating of sitting water.

6.4 Hydrogeology

The hydrogeology analysis examines the impact of future development and land use changes on groundwater systems. An impact analysis was completed to evaluate the sensitivity of the groundwater flow system to changes in land use resulting from a potential reduction in recharge. Impacts are expected to include a decrease in the water table elevation, changes to stream flow (e.g., baseflow/groundwater discharge) and the potential degradation of groundwater quality. The hydrogeological studies completed for this CEISMP also considered components of subwatershed study requirements:

- Ensuring the groundwater sensitive areas are recognized and protected from future urbanizing and disturbances.

- Within the water balance assessment, updates to the overall groundwater budget model along with the surface water components will be made for both existing and future scenarios; The water budget for the study area estimates precipitation, evapo-transpiration, runoff and infiltration, in addition to the groundwater recharge and discharge.

- Where reasonable, any relevant needs are considered within the Source Water Protection Plan.

Detailed geotechnical and hydrogeological investigations were completed by Toronto Inspections (TI), dated June 24, 2021, and June 30, 2021, respectively and are described under separate cover (Toronto Inspections, 2023). A summary of the findings is provided herein; however, this summary should be read in combination with the full report for better detail.

The geotechnical investigation involved drilling of thirty-eight (38) boreholes extending to depths of 2.4 to 6.6 m below existing grade. Sixteen (16) of the boreholes were completed as monitoring wells to determine static groundwater conditions and aid in the hydrogeological investigation. The geotechnical investigation revealed the soils underlying the site generally consisted of clayey silt, clayey / sandy silt till of the Halton Till aquitard with isolated deposits of silty sand and sand and gravel (encountered at two of the 38 boreholes, 21BH-6 and 21BH-26). The hydrogeological report by TI noted that the sandy silt was encountered in an area slightly removed from the tributary on site, however, sandy silt deposits were not encountered in any other boreholes in the vicinity of the tributary. The hydrogeological report also concluded that the sand and gravel deposits encountered and like deposits of the Oak Ridges Moraine Aquifer Complex (ORMAC) may be more prevalent in areas north of the Site where deposits of the ORMAC may be expected at shallower elevations and in greater thickness.

The hydrogeological investigation included monitoring of the 16 on-site monitoring wells established as part of the geotechnical investigation weekly between June 7 and June 22, 2021. The most complete monitoring dataset was obtained during the June 22, 2021, monitoring event, when groundwater levels ranged from 0.90 - 5.87 m below ground surface (mbgs), or, 227.63 - 246.50 m above sea level (masl). 21BH-3 (MW) was dry throughout the

monitoring period, to a depth of 6.10 mbgs or 229.42 masl. The hydrogeological report noted that a long-term groundwater level monitoring program is to be completed at the site for a period of 12 months; the results of this monitoring were not available to GEI at the time of writing this report. Based on the preliminary monitoring results, local groundwater flow is anticipated to be influenced by the existing West Tributary and East Tributary and flow towards the southeast.

Hydraulic conductivity on site was found to exhibit a large range of values, ranging from 10^{-6} to 10^{-9} in the clayey silt / sandy silt. In general, the subsurface soils exhibited low permeability with isolated zones of high permeability. Based on the hydrogeological report by TI, the groundwater dewatering effort during construction will likely not be significant for the construction of underground servicing or the stormwater management pond. The Zone of Influence (ZOI) of dewatering activities is not likely to expand more than 10 m from any excavation. Based on the anticipated areas of dewatering, impacts from water takings, including to land stability and sensitive receptors are not expected. The hydrogeological report notes that Redside Dace habitat has been identified in the West Tributary and Salt Creek, and that the East Tributary is contributing habitat to Redside Dace. Details regarding mitigation of potential impacts to Redside Dace habitat and contributing habitat are discussed in **Section 6.3** above.

This investigation will help inform the groundwater characterization of the Subject Lands and its influence on natural features. This study will also support the potential for LID implementation as part of the proposed development at Site Plan application on an individual block basis. Once the investigation is complete, Crozier will review the results and evaluate LID applications as part of the SWM detailed design for the development.

GEI will work with Crozier and Toronto Inspections to identify where LID implementation would provide the most benefit to natural features to maintain hydrologic function and water balance. LID locations will be determined as part of the detailed design stage.

6.5 Water Balance

6.5.1 Site Water Balance

Water balance criteria according to TRCA requirements are determined with respect to recharge and protection of natural features. TRCA has undertaken modeling to understand water budget parameters throughout their jurisdiction. The results distinguish between four types of recharge areas within the TRCA's watershed, each with corresponding recharge criteria. According to the modeling results, the Subject Lands are not located within a significant recharge area (Crozier, 2023).

For developments proposed near identified natural features, additional investigation is required to understand water balance impact. The Subject Lands contain wetlands, watercourses and HDFs where water balance impact must be understood. The overall objective is to manage water balance to maintain the quantity of surface water and groundwater contributions to these features. Baseline ecological conditions have been

established to assess the water balance target for the Subject Lands. GEI will work with Crozier and Toronto Inspections to determine water balance targets for these features.

In addition to maintaining the water balance for the natural features on site, an overall site water balance is also required. Per TRCA's criteria, a water balance analysis is required using the average and more frequent precipitation events that comprise the bulk volume of annual precipitation to ensure maintenance of pre-development water balance following development. The target is to match pre-development proportions of infiltration, runoff and evapotranspiration.

Water balance calculations were completed by Crozier (2023) using the Thornthwaite and Mather Method (1957). The results indicate the proposed development as a whole will create an infiltration deficit of 170,128 m^3/year (a 64% decrease from pre-development conditions). Runoff is expected to increase by 554,346 m^3/year, or 135%.

6.5.2 LID Measures

To achieve the overall infiltration water balance, the infiltration deficit will be mitigated through measures within each of the industrial blocks. To mitigate the infiltration deficit for the blocks, it was determined that a combination of rooftop and surface parking drainage from each of the private development blocks could be directed to LID measures designed to promote infiltration. Direct rooftop and surface parking drainage from each of the private development blocks to underground infiltration facilities sized to capture and infiltrate 4.3 mm of rainfall is required to achieve the infiltration for each respective block. It is noted that pre-treatment will be required for any surface runoff directed to the infiltration facilities.

Detailed infiltration facility sizing, including in-situ percolation tests and drawdown calculations for each facility will be completed as part of the detailed design for each Site Plan, however, to maintain existing infiltration levels, it is recommended that LIDs be included in the stormwater management design to promote infiltration. A complete list of LID options considered is presented in the FSSR (Crozier, 2023) included under separate cover, however options considered feasible are summarized below:

- **Green Roof:** retains stormwater to reduce runoff; does not recharge groundwater. Commercial/industrial development such as proposed in the Draft Plan will include large buildings with flat roof areas conducive to green roof installations.
- **Infiltration galleries**: improves groundwater recharge. High groundwater and tight soils may limit feasible locations for infiltration galleries, feasibility to be confirmed at site plan stage. It is preferred to direct 'clean' rooftop runoff into infiltration galleries; if parking/asphalt areas will be directed to infiltration galleries, quality treatment of runoff will be required.
- **Rainwater harvesting:** retains stormwater to reduce runoff and allows infiltration when used for irrigation of landscaped areas. Runoff from commercial/industrial rooftops could feasibly be directed to a rainwater cistern and used for irrigation of landscaped areas on site. Feasibility to be confirmed at Site Plan.

- **Permeable pavement:** reduces stormwater runoff, improves groundwater recharge. Parking lots and drive aisles could be feasibly converted to permeable pavement to reduce runoff and promote infiltration, however consideration on use of road salt alternatives is needed. Feasibility to be confirmed at Site Plan.

6.5.3 Wetland Feature-based Water Balance Risk Assessment

A feature-based water balance risk assessment was completed for retained wetland communities along the Greenbelt Plan Area in accordance with TRCA's Wetland Water Balance Risk Evaluation guidelines (2017b).

A review of the retained wetlands along the West Tributary of the West Humber River was completed. As shown on **Figure 12** (**Appendix A**), two wetlands (MAM2-2) will be retained within the Greenbelt Area. Based on the proposed site plan, the change in catchment size for both MAM communities was determined to have a low magnitude of hydrologic change. Based on the vegetation community type (both communities were MAM2-2), sensitivity of fauna species (both communities had low sensitivity), sensitivity of flora species (the western MAM2-2 community had low sensitivity and the eastern MAM2-2 community had a medium sensitivity) and SWH criteria (both communities had low sensitivity), it was determined that the western MAM2-2 had a low sensitivity, and the eastern MAM2-2 had a medium sensitivity. Based on the magnitude of hydrological change and sensitivity of the wetland, the risk assessment confirmed both wetlands are considered low risk. As discussed within Figure 3 (Wetland Risk Evaluation Decision Tree) of TRCA's Wetland Water Balance Risk Evaluation Guidelines, no monitoring is required for these retained features.

In detailed design, a non-continuous hydrological model (e.g., Thornthwaite Mather) will be run to ensure that the monthly hydroperiod requirements for each wetland will be maintained. This hydrological model will consider inputs from LIDs and other stormwater infrastructure, which will be further defined in detailed design.

Based on the final restoration plan within the retained Salt Creek corridor and associated wetlands, a wetland feature-based water balance will be completed at Site Plan application to ensure that the hydroperiods of the features will be maintained and no long-term impacts to their functions will occur as a result of the proposed development.

6.6 Phasing

It is understood that the proposed development will be phased and will not be constructed at the same time. Phasing of the Site has not been considered as part of this CEISMP. Phasing will be accounted for in forthcoming Site Plan submissions.

7. Impact Assessment and Mitigation

7.1 General Approach

This section provides an iterative assessment of the potential impacts of future land use changes on the natural environment and water systems within the Subject Lands. The intent is to assess the impacts of the draft plan of subdivision and to inform the preliminary establishment of initial management strategies which:

- Protect the critical elements and systems of the subwatershed and local drainage system;
- Prevent environmental degradation;
- Provide adequate flexibility for integration with adjacent development and redevelopment areas;
- Assist in the establishment of open space linkages;
- Identify opportunities and constraints to development;
- Provide a strategy to manage existing land uses;
- Detail preliminary locations and areas for stormwater management (LID BMPs and end-of-pipe facilities); and
- Identify restoration and enhancement opportunities.

A summary of the potential impacts on KNHF and KHF, identifies proposed avoidance and mitigation measures to avoid or minimize impacts and identifies proposed enhancement measures associated with the implementation of the development plan and associated restoration of the East Tributary and Salt Creek natural heritage systems (additional detail on enhancements is provided in **Section 8**).

Potential effects to the natural heritage features and environmental functions that exist within, and adjacent to, the site have been evaluated over the short and long term, with consideration given to measures to avoid and/or mitigate negative impacts, where appropriate and provide a net benefit.

The range of potential impacts from the proposed project can generally be divided into two categories:

- Direct impacts are normally associated with the physical removal or alteration of natural features that could occur based upon a land use application; and
- Indirect impacts may be changes or impacts (these could be minor or major) to less visible functions or pathways that could cause negative impacts to natural heritage features over time.

This evaluation was formulated based on the expected permanent footprint of the development, anticipated temporary construction impacts and the proposed long-term post-restoration scenario. The key potential direct and indirect effects of the project, and a summary of recommended avoidance, mitigation and restoration strategies are provided below.

7.2 Key Natural Heritage Features

7.2.1 Wetlands

The proposed project footprint has been designed to avoid all features found within the Greenbelt NHS associated with the West Tributary to the West Humber River, and the Salt Creek corridor. Wetlands identified on the Subject Lands were reviewed in accordance with the OWES Guidelines (December 2022), and due to their individual sizes (<2ha) do not warrant evaluation.

A total of 7.272 ha of wetland and 10m buffer are proposed for removal and 3.34 ha of restoration area is proposed for on-site compensation/enhancement agreements within the Subject Lands. All wetlands proposed for removal are riparian wetlands. A conceptual restoration plan overview identifying environmental protection blocks to be restored is provided within **Section 8.0.**

Unevaluated wetlands, each under 2 ha in size, are presently associated with the East Tributary will be replicated as part of the development and restoration project. The proposed development plan will directly impact the meadow marsh, shallow marsh, shallow aquatic, and thicket swamp communities that are associated with the man-made ponds and HDFs (East Tributary, north of Mayfield Road). The specific vegetation community types are MAM2, MAM2-2, MAS2, SAM1-4, and SWT2-2.

7.2.1.1 Wetland Compensation Plan

TRCA's Guidelines for Determining Ecosystem Compensation (2018) require both ecosystem structure compensation (to ensure that removed habitats are replaced with the same or similar ecosystem structure and habitat type) and land base compensation (to ensure that the removal of any natural systems is replaced with an equal amount of land for natural systems). TRCA requires that both ecosystem structure and land base compensation requirements be met. Ecosystem structure and land base compensation can be combined into the same areas (i.e., a single compensation area can meet both ecosystem structure and land base compensation requirements).

TRCA's compensation guidelines require land-base (natural system) compensation at a 1:1 ratio. Where natural features are removed from the land in support of the proposed development, additional lands are to be added into the NHS. Where lands are not available for land-base compensation, cash-in-lieu options will be explored in agreement with TRCA. A preliminary cash-in-lieu calculation has been prepared under separate cover for

agreement with the Town and TRCA. A total of 7.272 ha of wetland including buffers is proposed for removal as per the updated Conceptual Plan.

A total of 3.34 ha of restoration habitat will be created within designated wetland compensation areas, in addition to the stormwater management wetlands. A 10 m vegetated wetland buffer will be incorporated into the design. In addition to this wetland compensation block, wetland creation will also occur within the Salt Creek Environmental Protection block. Wetland compensation areas are illustrated conceptually on **Figure 13** (**Appendix A**).

During the detailed design phase, a Wetland Implementation Plan will be prepared. This plan will follow TRCA's guiding documents including:

- Erosion and Sediment Control Guideline for Urban Construction, TRCA, 2019;
- Guideline for Determining Ecosystem Compensation, TRCA, June 2018;
- Post-Construction Restoration Guidelines, TRCA, July 2004;
- Preserving and Restoring Healthy Soil: Best Practices for Urban Construction, TRCA, June 2012; and
- Seed Mix Guidelines, TRCA, January 2022.

The components of the Wetland Implementation Plan will include:

- Description of wetland habitats to be removed;
- Description and rationale for compensation locations;
- Compensation area existing site conditions (aspect, soils, drainage, etc.);
- Principles and objectives for wetland creation;
- Broad habitat types (e.g., mineral marsh, shallow marsh, thicket swamp, shallow aquatic) and areas proposed for land base wetland compensation areas;
- Planting plan concepts, including species composition, tree and shrub planting stock type, plant densities, types of seed mixes, soil amendments, planting windows, wildlife habitat features, opportunities for plant/soil salvage and transplantation/placement. The planting plan concepts will be submitted to TRCA for review and approval ahead of preparing Landscape Restoration plans for wetland compensation areas;
- Detailed design drawings (grading, ESC, landscape restoration plans); and
- Construction Phasing Plan, including timing of feature removal relative to feature creation.

Overall, implementation of the proposed restoration project on the East Tributary is predicted to result in an improved system for fish habitat, provide sustained flows through the site in an open channel and provide functional, connected wetland habitat for amphibians and reptiles. The wetlands proposed to be removed are a result of (or at least influenced by) present and historical anthropogenic land use (e.g., construction of berms, agricultural land practices that affect the extent and condition of wetlands, etc.). MAM2-2 occupied the majority of the wetland types proposed for removal, the dominant species of which is an aggressive plant that can establish quickly in recently disturbed soil. The MAS

communities were dominated by Flowering Rush, which is an exotic invasive plant known to outcompete other species. Loss of some low functioning wetland areas may be considered to be reasonable for the expected overall ecological benefits for the headwater stream system and downstream sensitive Redside Dace habitat in the West Humber River.

A wetland water balance risk assessment has been prepared for retained wetland units (as previously discussed within **Section 6.5**).

Seven regionally rare plants were documented in these wetlands, five of which occurred exclusively in the two ponds (mapped as MAS2/SA and SAM1-4; discussed in **Section 4.2.2**). Each of these species are considered common in Ontario. Of the species within the ponds, these plants are regionally rare in Peel, likely in part due to the limited availability of habitat, as they require permanent water. Opportunities for flora salvage and transplant of these regionally rare species will be considered as part of restoration plans for the Salt Creek corridor, as appropriate, noting that shallow aquatic species are not suitable for flora salvage.

7.2.2 Habitat of Endangered or Threatened Species

As per the *ESA*, all threatened, endangered and extirpated species itemized on the SARO list are legally protected from harm or harassment and their associated habitats are legally protected from damage or destruction. Four species listed as Threatened or Endangered on the SARO list were identified on the Subject Lands: Bat SAR ('Unconfirmed *Myotis*' sp.), Bobolink, Eastern Meadowlark and Redside Dace.

Potential impacts to each species and/or their habitat are provided below along with suitable mitigation measures.

7.2.2.1 Bats

Suitable maternity roosting habitat for bat SAR may occur within the significant woodland community within the Greenbelt Area. This woodland will be retained in place and further enhanced through the establishment of a 30 m buffer. No impacts to SAR bat habitat are expected as a result of the proposed development. Proposed restoration activities are expected to provide an overall benefit to local SAR bat populations. Enhanced foraging habitat on the Subject Lands (e.g., wetlands, pond habitats) will attract a greater abundance and diversity of preferred aerial insects including flies, bugs, butterflies, moths, bees, wasps, beetles, grasshoppers, crickets, stoneflies, and mayflies. Seed mixes applied throughout restoration areas will include nectaring species to attract local insect populations. Increasing the availability of flowering plant species will subsequently increase the availability of habitat for bat foraging. Therefore, given the extent of both foraging and maternity roosting habitat in the Greenbelt NHS and the Salt Creek corridor woodlands to be retained; the proposed development is not anticipated to have a measurable impact on the availability of foraging or roosting habitat for these species.

7.2.2.2 Bobolink and Eastern Meadowlark

Since the time of surveys in 2021, the agricultural use on-site has transitioned from cattle to row crop agriculture. As a result, the hay or pasture lands formerly used by Bobolink and Eastern Meadowlark is no longer present within the development footprint. Suitable habitat continues to exist in the Humber River valley within the Greenbelt.

As described in Section 5.1.7, habitat for grassland birds continues to persist only within the Greenbelt Plan Area associated with the Humber River valley. This area continues to be protected as Environmental Protection area in the Draft Plan of Subdivision.

7.2.2.3 Redside Dace

As previously noted, the West Tributary of the West Humber River and Salt Creek are designated as occupied habitat for Redside Dace. The proposed development will avoid the West Tributary of the West Humber River and Salt Creek, though construction activities within the Subject Lands could affect the West Tributary due to erosion and sedimentation. To avoid impacts to the occupied habitat, an ESC plan has been developed. As well, the West Tributary will receive buffer plantings which will provide natural buffering functions.

The proposed development will impact contributing Redside Dace habitat associated with the East Tributary of the West Humber River, Watercourses 1 and 2 and associated HDFs. Realignment of the East Tributary and Watercourses 1 and 2, as well as the removal of HDFs will occur in accordance with MNRF's Guidelines for Development Activities in Redside Dace Protected Habitat (2016). Moreover, the SWM facilities will be designed in accordance with these guidelines to minimize impacts to Redside Dace (e.g., consideration of installation of bottom draw outlets).

The restoration area and removal of man-made berms will remove barriers to fish passage and create more complex habitat structures for Redside Dace and other fish. The removal of online Upper and Lower Ponds will result in improved thermal conditions in downstream reaches and restore fish passage in the East Tributary of West Humber River. Additional discussion regarding benefits to fish and fish habitat are discussed below within **Section 7.3**.

For all the aforementioned species, consultation with the MECP will be completed to ensure that all requirements under the *ESA* are addressed prior to commencement of implementation of the proposed project.

7.3 Fish Habitat

As discussed in **Section 5.1.6**, Fish Habitat is present on the Subject Lands. Fish Habitat associated with the West Tributary will be protected within the Greenbelt Area. Fish Habitat will be disturbed and altered as a result of the proposed restoration concept for the East Tributary. Overall, proposed removal of instream berms and the restoration of the East

Tributary will benefit downstream Redside Dace fish populations in the West Humber River. Removing the anthropogenic ponds created by the berms is expected to result in reductions in the temperature of water being discharged from this headwater environment. This is expected to improve downstream (off-site) habitat conditions in the West Humber River watershed. It is noted that final determination of whether or not the berms will be removed will be made in consultation with reviewing agencies; however, it is GEI's continued recommendation that these berms are removed as it will result in increased ecological connectivity and address safety concerns.

The existing HDFs and Watercourses 1 and 2 on the Subject Lands do not provide direct fish habitat; however, they do provide important indirect fish habitat functions including: (i) flow conveyance, (ii) surface and potentially groundwater contributions to baseflow, and (iii) input of allochthonous organic materials and, to a lesser degree, sediments that provide forage material for fish and benthic invertebrates and assist in maintaining habitat-forming biophysical processes (e.g., a reduced ability for sediment transport due to the existence of the berms). The importance of indirect fish habitat on the Subject Lands is augmented by connections to downstream Redside Dace habitat in the West Humber River. Upstream movement of fish onto the Subject Lands north of the Lower Pond is limited given the low flows within the watercourses and the presence of barriers created by the two berms.

Salt Creek is documented by DFO as supporting Redside Dace, therefore, this feature is assumed to support seasonal, direct cool-water fish habitat.

As previously noted, several HDFs may be present within the Study Area. Depending on the final management recommendation (from the TRCA/CVC 2014 Headwater Drainage Feature Assessment Guidelines), features identified as Protection, Conservation or Mitigation management recommendations could be either seasonal, direct fish habitat or indirect fish habitat. HDFs assigned a No Management Required management recommendation are classified as having no direct fish habitat. Additional studies are underway in spring 2023 to confirm the nature of HDFs on the northernmost parcel of land upstream of H6 and H7.

The existing native fish community within the anthropogenic ponds is limited and comprised of introduced fish species from historic pond stocking activities from residents on the farm. Direct impacts to fish habitat for these species will result from the proposed restoration of the East Tributary and the removal of the Upper Pond and Lower Pond berms.

HDFs assigned a Mitigation management recommendation can have their functions replicated through targeted mitigation actions (e.g., wetland creation, LID solutions). HDFs assigned a Conservation management recommendation can maintain or replace on-site flows using mitigation measures and/or wetland creation. HDFs assigned a Protection management recommendation will be retained in place on the site.

The West Tributary and Salt Creek were assigned a High Constraint ranking and will be retained in place on the landscape and setback from any associated site alteration and/or development. The East Tributary as well as Watercourses 1 and 2 were assigned a Medium Constraint ranking and will be enhanced/restored using NCD principles (as discussed further within **Section 8**).

A restoration area is proposed within Block 13 where the Lower Pond and berms will be removed, and fisheries connectivity within the East Tributary will be re-established (through the removal of barriers such as constructed berms and perched culverts).

The Block 13 Restoration Area will include a meandering low flow channel, designed using NCD principles. The low flow channel will incorporate riffle-pool morphology with a range of grain sizes and hydraulic conditions to increase habitat complexity and biophysical functioning of the channel, relative to current, relatively homogenous habitat conditions. Riffles, which are not generally present in the existing watercourse, will assist with aeration and provide habitat for specialized benthic invertebrate species, and potentially fish. Furthermore, the riffles are designed to force critical velocity at their crests and will be 'hardened' with larger sized and more massive materials to resist movement. This forcing of critical velocity has the added benefit of reducing kinetic energy available in the system for erosion, thereby ensuring that the channel cross-sections and full profile will remain stable and graded. The channel will be designed with deepened pool centres (approximately 0.5 m below mean channel elevation) and Large Woody Debris (LWD) that are expected to provide shading, and more complex refuge habitat for fish as well as bank stabilization via bioengineered hardening and eco-hydraulics optimization. The portions of the corridor outside the low flow channel will be planted with a range of wetland vegetation species and forms to provide functioning riparian wetland habitat, designed to stabilize watercourse banks and the floodplain, provide long-term shading of the channel, and enhance allochthonous inputs (e.g., twigs, leaves) to provide a source of forage and habitat within and downstream from the realigned reach.

The proposed restoration plan involves the removal of the two online ponds (Upper and Lower Ponds) as both an ecological enhancement and an ecological/public safety measure. From an aquatic habitat perspective, removal of the online ponds is expected to provide a significant ecological benefit. Although they may be providing direct fish habitat, the presence of the ponds is expected to have a negative impact on the overall functioning of the watercourse and in turn, could be impacting downstream habitats and aquatic biota. Fish found within these ponds are likely associated with historical stocking efforts or from natural vectors (e.g., bird transfer), as it is unlikely that they were able to naturally migrate into these ponds due to downstream barriers (e.g., perched and collapsed culverts). First, the presence of the ponds is expected to be causing thermal loading in the watercourse, which would significantly degrade its function as contributing habitat for Redside Dace. Removal of the online ponds will eliminate this source of thermal loading and assist in maintaining cooler temperatures in the watercourse, which may have substantial benefits for the downstream

Redside Dace population. Secondly, the existing ponds are expected to have an impact on existing erosion and sediment transport processes. It is likely that eroded sediments from the upstream portion of the watercourse are being deposited within the ponds, effectively interrupting natural sediment movements. This may be resulting in sediment-starved downstream reaches and possibly causing increased erosion and/or lack of coarse habitat-building sediments via the well-documented clear water effect that channel barriers are known to promote. Re-establishment of a more natural sediment transport regime is expected to have substantial benefits for the overall biophysical function of the watercourse and associated habitat for fish and benthic invertebrates.

The existing embankments downstream of each of the ponds are thought to be functioning as a barrier to upstream fish movement. Removal of the online ponds and construction of a low flow channel is expected to significantly enhance the ability of fish to move upstream into this system. This may result in increased productivity both upstream and downstream from the existing obstructions, with the existing fish community downstream potentially able to exploit seasonal habitat functions upstream, while also enhancing the longitudinal connectivity in a downstream direction, which may facilitate downstream transport of forage for benthos and fish.

In addition to the proposed direct enhancements within the channel and corridor, additional wetland replication is proposed adjacent to the channel to ensure that on-site wetlands impacted by the development plan are replicated. Existing wetlands likely provide contributing aquatic habitat functions, including water quality maintenance and hydrology functions and provide contributing habitat for Redside Dace. Replication of wetlands will ensure that these important aquatic functions are maintained in the watercourse system. Further discussion on wetland replication was discussed within **Section 7.2.1**.

Drainage from the entirety of the site will be maintained. Specifically, where drainage flows through Watercourses 1 and 2, these input locations will be maintained where they meet the Block 13 Restoration Area and have been incorporated into the low flow channel. The realigned channel will continue to replicate existing drainage conveyance functions. Ecological functions will be replicated within the Restoration Area where appropriate (e.g., created wetlands) and will be augmented by restoration of degraded features in the Salt Creek NHS in Block 9.

Potential indirect impacts to direct and indirect fish habitat during construction include direct disturbance of fish in the Upper and Lower Ponds, erosion and sedimentation due to construction activities on the Subject Lands, accidental spills during construction, and alterations in flow in the downstream watercourse during construction. Mitigation measures to address potential indirect effects are discussed in the following sections.

7.3.1 Direct Disturbance of Fish due to In-water Work

In-water work, including pond water level lowering, berm removal and installation of localized erosion protection materials could potentially result in disturbance of fish in the Upper and Lower Ponds. In order to avoid disturbance during critical reproductive periods for the warm-water spring spawning fish species known to be present in the ponds, in-water works should avoid the period between March 15 and July 15 of any given year. Removal of the ponds and/or realignment of the watercourse should occur during minimal flow periods or in the dry to reduce impact.

Water level reductions in the Upper and Lower Ponds could potentially have negative impacts on fish if individual fish were to become dewatered (i.e., they did not move out of the area being dewatered) or if they were to be trapped in isolated pools within the dewatered area. To avoid associated injury or mortality of fish, monitoring will be completed as pond water levels are reduced and any fish trapped or dewatered will be salvaged and moved to a predetermined location. Fish salvage will be completed under the authority of a License to Collect Fish for Scientific Purposes from the MNRF. Based on the baseline fish surveys, only green sunfish are expected to be located in this area; however, these ponds are known to be historically stocked so it is likely that other warmwater fish (e.g., Bass) may be present within the features. Opportunities for phasing of fish and wildlife salvages will be explored.

7.3.2 Erosion and Sedimentation During Construction

Erosion and sedimentation from the disturbed work area associated with the proposed development could potentially result in adverse effects to water quality (e.g., increased turbidity) or sedimentation and associated effects on fish (e.g., injury or mortality due to suspended sediments or altered habitat use) or fish habitat (e.g., loss of interstitial spaces in rocky areas, smothering of aquatic vegetation and/or incubating eggs) in downstream areas.

An ESC Plan has been prepared and will be implemented during construction to minimize the potential for erosion and sedimentation from the construction site. The ESC Plan has been developed based on the guidance provided in the Erosion and Sediment Control Guidelines for Urban Construction (TRCA 2019). Basic elements of the plan include consideration of:

1. Construction phasing to minimize the amount of time soils are barren and therefore, more susceptible to erosion;
2. Requirements and timing for rehabilitation of disturbed areas;
3. SWM strategies during construction;
4. Erosion prevention measures (e.g., erosion control matting);
5. Sedimentation control measures (e.g., silt fences); and
6. Inspection and performance monitoring requirements and adaptive management considerations.

Implementation of an effective ESC Plan, incorporating both erosion and sedimentation controls, coupled with regular inspection and performance monitoring and implementation of any remedial actions necessary to ensure effective performance, is anticipated to be largely effective in preventing the movement of eroded soil particles off-site towards downstream direct fish habitat in portions of the East Tributary south of Mayfield Road.

Overall, no adverse effects to direct fish and fish habitat are predicted to occur as a result of erosion and sedimentation during construction, provided an effective ESC Plan, including monitoring and adaptive management, is implemented.

7.3.3 Accidental Spills During Restoration Project Implementation

Accidental spills of potentially hazardous materials (e.g., fuel and oil from heavy equipment), if transported to the headwater streams on the Subject Lands and eventually to downstream reaches of the West Humber River, could cause stress or injury to fish and other aquatic biota (e.g., benthic invertebrates).

In order to mitigate the potential for adverse effects on downstream fish and fish habitat due to accidental spills during implementation of the restoration project, spill prevention and response measures will be implemented, including, but not limited to appropriate material handling and storage protocols (e.g., refueling in locations at least 30 m from watercourses), maintenance of spill kits on-site, monitoring measures and spill response plans (i.e., emergency contact procedures, including the Spills Action Centre, and response measures including containment and clean-up). Implementation of an effective spill prevention and response plan is expected to be largely effective in preventing adverse effects on fish and fish habitat.

7.3.4 Impacts on Downstream Flows During Restoration Project Implementation

Temporary alterations to the flow regime of the headwater streams on the Subject Lands during implementation of the restoration and development project could potentially result in downstream flow or water level reductions that could cause negative impacts on direct off-site fish and fish habitat. Temporary alterations to the flow regime could occur as a result of worksite isolation and associated pumping and pond dewatering.

Active pumping is expected to be required in several locations during implementation of the restoration and berm removal project. Worksite isolation and flow bypass plans will be developed to ensure that there is no disruption to downstream flows outside of the in-water work areas. Pumping will continue as long as work-site isolation is required, and contingency measures and monitoring protocols will be place.

Impacts to fish and fish habitat will be addressed with DFO to ensure that all requirements under the *Fisheries Act* are met.

Following construction of the site and Block 13 Restoration Area, the increased contributions of road salts during the winter months is expected as a result of site development. At this time, there is no appropriate mitigative measure for increased salt contributions into natural systems, however, it will be communicated to the end user that road salts should be stored away from Environmental Protection blocks, including the West Tributary and Salt Creek, to limit the amount of input of road salts into the system.

A conceptual restoration plan for the Block 13 Restoration Area is described below within **Section 8** of this report. The low flow channel will be designed using NCD principles. Wetland creation within Restoration Area corridor will help restore wetland functions (e.g., soil stabilization, increase flood storage capacity, increase water quality and clarity, reduce erosion potential).

Overall, when combined with other mitigative measures, the proposed wetland restoration area with low flow channel, pond and barrier removal and restoration plan is expected to have substantial aquatic ecological benefits both within the realigned reach on the Subject Lands, but also in downstream reaches. The primary benefits are expected to be realized through removal of the existing online ponds (e.g., elimination of thermal loading and restoration of fish passage and more natural sediment transport). Secondary benefits are expected through the proposed low flow channel and riparian wetlands, which will increase habitat complexity relative to existing conditions in the channel, which is expected to provide improved direct habitat for fish and benthos, while also enhancing contributing functions that would benefit downstream habitats.

7.4 Significant Valleylands

7.4.1 West Tributary and Salt Creek

The proposed development will avoid the West Tributary valleyland located in the Greenbelt NHS, and the Salt Creek valleyland located in the northeast portion of the Subject Lands. No impacts are anticipated to these significant valleyland features.

SWH and other non-significant habitats associated with the West Tributary and Salt Creek will be retained in-place and enhanced through buffer plantings. The vegetated buffer will enhance primary linkage functions within the Subject Lands and within the larger landscape offsite to allow for increased abiotic and biotic movement. Buffers provide a physical separation of natural heritage features from the proposed development. The NHRM suggests that buffers “contribute substantially to the protection of wetlands, woodlands, valleylands and other natural heritage features” (MNRF 2010). The existing West Tributary and Salt Creek are already biodiverse as they host a variety of locally, regionally, and provincially significant species, as well as common and secure species. To further enhance the existing biodiversity, the vegetated buffers will focus on increasing the availability of habitat throughout the corridor (e.g., increasing thicket habitat near Mayfield Road or increasing wetland habitat near Torbram Road; removal of invasive species near Airport

Road). The establishment of these vegetated buffers can prevent erosion and sedimentation into existing natural heritage features, provide habitat for terrestrial species such as birds and small to medium sized mammals, enhance linkage and connectivity functions and protect existing features from the proposed development.

Table 13-1 within the NHRM (MNRF 2010) suggests buffers provide the following ecological benefits to existing natural heritage features:

- "*Reduction of encroachment;*
- *Reduction of light and noise;*
- *Space for tree-fall;*
- *Protection of root zones;*
- *Enhancement of woodland interior;*
- *Allowance for hunting habits of cats and dogs;*
- *Location of trails; and*
- *Attenuation of runoff*".

The proposed industrial land-use will not increase the introduction of pets into the West Tributary or Salt Creek. The vegetative buffers will extend the functional edge of the woodlands, protect existing plants, and enhance long-term tree health. Specifically, vegetative buffers will shelter existing trees from any disturbance caused within the developable area, protect the root zones of existing trees, maintain moisture conditions, and prevent soil erosion. No negative impacts to the significant valleylands are expected as a result of the proposed development.

7.4.2 East Tributary

Some short-term disturbance within the valleylands of the East Tributary may occur (e.g., removal of berms and Upper and Lower Ponds) during construction. These necessary disturbances would result in increased ecological connectivity while addressing stability concerns associated with the failing berms. Any alterations within the valleylands will be restored using ecological restoration principles. No long-term impacts are predicted as a result of disturbance within the valleylands.

7.5 Significant Woodlands

Two forested ELC community types (Dry-Fresh Sugar Maple Deciduous Forest; FOD5 and Fresh-Moist Willow Lowland Deciduous Forest; FOD7-3) were identified within the Subject Lands. These forested units are located within the Greenbelt NHS and are considered Significant. The significant woodland will be retained and enhanced through the establishment of the 30 m vegetated buffers.

Along the northern property boundary is a woodland community. This feature is considered a significant woodland based on the size of the feature and it being identified as a Core Feature under the Regional OP. It is located outside of the Subject Lands and has been afforded a 10m setback to protect the woodland.

Provided that the mitigation and restoration measures defined herein are implemented, no negative impacts to significant woodlands are predicted.

7.6 Significant Wildlife Habitat

As discussed in **Section 5.1.5**, various confirmed and candidate SWH types were identified on the Subject Lands. An assessment of potential impacts and recommended mitigation strategies for each of these habitat types is provided below.

7.6.1 Seasonal Concentration Areas

Seasonal concentration areas identified on the Subject Lands include candidate bat maternity colonies, located in the Greenbelt. No tree removal is proposed in woodland communities that have potential to support bat maternity colonies, therefore no impact is expected to this candidate SWH type.

However, bats may roost in single trees that have suitable characteristics outside of the woodland. To prevent potential impacts to bat species, the removal of trees (>10 cm DBH) should not occur between April 1 and September 30 to prevent disruption to bats during critical reproductive and juvenile growth periods. If tree removal is required during this period due to unexpected circumstances, bat surveys will be completed by a qualified biologist. If no bats are observed within trees proposed for removal, the tree(s) can be removed within 24 hours.

7.6.2 Rare Vegetation Communities

No rare vegetation communities were identified on the Subject Lands.

7.6.3 Specialized Wildlife Habitat

The ponds associated with East Tributary are not considered suitable as turtle overwintering area SWH, as the features are manmade/dug ponds. Though it should be noted that both Midland Painted Turtle and Snapping Turtle were observed during 2021 field investigations within the features. To mitigate direct impacts on turtles in the ponds during pond dewatering and restoration activities, a biologist should periodically inspect the dewatered area for the presence of turtles and if any are observed, they should be removed and relocated to an area outside of the work zone. A Scientific Wildlife Collectors Authorization will be applied for from the MNRF to facilitate active capture and relocation of turtles if this is deemed necessary to ensure their protection during implementation of the project.

7.6.4 Habitat for Species of Conservation Concern

Confirmed SWH for Species of Conservation Concern (i.e., Barn Swallow and Snapping Turtle) was identified on the Subject Lands.

Barn Swallows are Special Concern on the SARO List**.** As described in Section 4.3.3, through breeding bird surveys conducted within the Subject Lands, two sets of farm buildings have been confirmed to support a total of 18 Barn Swallow nests. The farm buildings were found north of point count stations 9 and 11 (Refer to Figure 6, Appendix A)

Farm buildings which currently provide nesting habitat are proposed to be removed which will result in loss of breeding habitat for the species. Habitat removals will occur outside of the Barn Swallow active season (beginning of May to end of August) to avoid adverse impacts.

Confirmed SWH for Species of Conservation Concern (i.e., Snapping Turtle) was identified on the Subject Lands.Permanent reconfiguration of pond and nesting habitat associated with the East Tributary will temporarily remove habitat for Snapping Turtle. Although opportunities to retain the ponds associated with the East Tributary were considered, the required removal of the failing manmade berms is required due to safety, and thus they cannot be maintained on the landscape while simultaneously meeting project objectives to improve downstream water quality and enhance long-term safety and stability of the East Tributary system. The restored NHS, including Salt Creek and West Tributary systems, will aim to continue to provide all critical habitat components, including overwintering habitat and existing ecological functions for this species where feasible.

Creation of new habitats within the East Tributary and Salt Creek will allow for increased connectivity and linkage opportunities that are not currently present within this tributary due to the constructed berms. Currently, the Upper and Lower Ponds are acting as a permanent barrier to wildlife movement due to the steep berm walls and depth of the constructed valleyland. GEI continues to recommend that removal of these berms be completed to provide a significant ecological contribution to the system. By restoring the connection to habitats north of Mayfield Road through removing the constructed berms, it will encourage wildlife movement freely into the system. The East Tributary ultimately connects into the West Humber Tributary approximately 650 m downstream of the Subject Lands. Maintaining secondary corridors within a system, like the East Tributary, helps to maintain population connectivity and biodiversity while creating a more functional, natural landscape.

Wildlife enhancement structures will also be installed throughout the East Tributary and Salt Creek to provide habitat diversity that is not currently present and/or to compensate for those that are proposed for removal. While the specific abundance, location and type of habitat structure will be defined within the detailed design stage of this project, wildlife enhancement structures will attract and protect a variety of wildlife. Additional discussion on wildlife enhancement structures is presented within **Section 8.**

Where habitat removals are proposed, fish and wildlife salvages will occur prior to dewatering and/or removal to rescue any wildlife from these features. Opportunities for phasing of fish and wildlife salvages will be explored during the detailed design process depending on the proposed site development phasing. Depending on the phasing of the watercourse decommissioning, the removal of habitat may occur prior to the establishment of the final/ultimate wetland restoration area. Should the habitats be removed prior to the establishment of the wetland restoration area, wildlife will likely be relocated downstream (offsite) along the East Tributary, into Salt Creek system, or within the West Tributary. Exact locations will be determined in consultation with the MNRF as part of the fish and wildlife salvage permitting process. Through the above-noted proposed phasing opportunity and the creation of compensation habitats within the created East Tributary restoration area, and Salt Creek, no negative impacts to SWH and non-significant habitats are expected.

Overall, the updated Draft Plan of Subdivision will allow for increased movement, connectivity, and habitat diversity within the downstream reaches of the East Tributary, while working to protect and enhance existing wildlife functions along the West Tributary and Salt Creek. No impacts to SWH are expected as a result of the proposed mitigative and restoration measures.

7.7 Key Hydrologic Features

7.7.1 Permanent Streams

Portions of the East Tributary are considered permanent streams and are assessed as part of **Section 7.3** and **Section 7.6** above.

Various phasing opportunities and mitigation measures (e.g., ESC plan, spill action plan) will be explored in detailed design to minimize short-term impacts during construction.

Restoration and enhancement activities along the East and West Tributaries will work to create, protect and/or enhance hydrologic functions.

Overall, the updated Draft Plan of Subdivision will allow for increased movement, connectivity, and habitat diversity within the downstream reaches of the East Tributary, while working to protect and enhance existing wildlife functions along the West Tributary and Salt Creek. A benefit to aquatic water quality and fish passage are expected should removal of migratory obstructions (e.g., berms, perched culverts) occur.

7.7.2 Seepage Areas and Springs

No seepage areas or springs were identified within the Subject Lands; therefore, no impacts to seepage areas or springs are anticipated.

7.7.3 Wetlands

Potential impacts to wetlands and the proposed avoidance and mitigation measures have previously been addressed in **Section 7.2.1**.

8. Restoration and Enhancement

8.1 Conceptual Restoration

8.1.1 Background

Ecological offsetting is a mitigation strategy that is often considered in an effort to achieve a net ecological benefit to projects, subject to the approval of the planning authority. This compensation strategy quantifies the proposed loss of natural features in order to provide compensation through habitat recreation or alternative consultation process. Ecological offsetting approaches are typically applied as a last resort (after avoidance and mitigation have been considered) where minor negative impacts will result from encroachment.

The TRCA released their Guideline for Determining Ecosystem Compensation (After the Decision to Compensate Has Been Made*;* 2018), which recognizes that "ecosystem compensation becomes an important tool to help ensure that critical ecosystem functions and services lost through development and infrastructure are restored back on the landscape for the betterment of communities" (TRCA 2018).

As illustrated within **Section 7** (above), the proposed development plan will require the alteration and/or removal of the following features:

- Realignment of regulated watercourse (East Tributary)/HDFs and alteration of fish habitat;
- Removal of online Upper and Lower Ponds, and the cattle pond;
- Removal of wetlands;
- Removal of candidate SWH habitat; and
- Removal of contributing habitat for Redside Dace (SAR)

The proposed development plan will protect and enhance the existing significant valleylands and significant woodlands associated with the West Tributary of the West Humber River, and the Salt Creek corridor. Ecological constraint linework was based off of the existing features constraint analysis presented within **Section 5.4.**

Restoration and enhancement areas are proposed within Block 13 Restoration Area, Block 9 Salt Creek NHS and adjacent to the West Tributary valleyland. The restoration and enhancement areas are envisioned to function as a healthy and diverse ecosystem where ecological functions will be augmented and replicated (as described further below). The vegetated buffers applied to the boundary of the key natural heritage and key hydrologic features provide mitigation for potential negative impacts to the NHS. The proposed restoration and enhancement areas will contain resilient, self-sustaining vegetation communities that will contribute to a robust NHS over the long-term. Where feasible, onsite ecosystem compensation will occur. Should onsite compensation not be feasible due to the proposed development plan, offsite compensation and/or cash in-lieu opportunities will be discussed with the TRCA and the Town of Caledon (as described within section 2 of TRCA's

Ecosystem Compensation Guidelines). It is understood that on-site compensation is the preferred compensation option.

At the detailed design stage, Landscape Plans, including planting plans, will be developed along with a corresponding Natural Heritage Design Brief that will provide specific details for each restoration area, including plant species lists, proposed plant stock type and sizing, and planting timing considerations. Wetland water balance information will also be available at the detailed design stage so that plant species lists are developed that suit the restoration area hydrological conditions (i.e., within the Block 13 wetland replication area). Plantings will be selected to establish a suitable restoration trajectory towards the intended target vegetation community, as defined within the Natural Heritage Design Brief. The Natural Heritage Design Brief will be prepared by one of GEI's Certified Ecological Restoration Practitioners.

8.1.2 Guiding Documents

The following documents will inform the proposed restoration and enhancement plan as outlined within the Natural Heritage Design Brief:

- Region of Peel SWS Parts A, B and C (2022);
- Town-Wide Design Guidelines (Town of Caledon 2017);
- TRCA's Crossings Guideline for Valley and Stream Corridors (2015);
- TRCA's Guideline for Determining Ecosystem Compensation (After the Decision to Compensate Has Been Made; June 2018);
- TRCA's Erosion and Sediment Control Guide for Urban Construction (2019);
- TRCA's Post-Construction Restoration Guidelines (2004);
- TRCA's Preserving and Restoring Healthy Soil: Best Practices for Urban Construction Guidelines (Version 1.0; 2012);
- TRCA's Seed Mix Guidelines (2022);
- TRCA's Valley and Stream Corridor Management Program (1994);
- Society for Ecological Restoration's International Principles and Standards for the Practice of Ecological Restoration (2nd Edition; 2019); and
- Society for Ecological Restoration's International Primer on Ecological Restoration (2004).

8.2 Restoration Goal and Objectives

Through the establishment of designated restoration and enhancement areas, a variety of ecosystem benefits will be provided including increased habitat connectivity and linkage across the site, invasive species management and increased biodiversity of native species on site. The restoration effort will enhance the ecological form and function of the Subject Lands by contributing biologically diverse habitats. The restoration goal is to establish a healthy and diverse NHS that complements and enhances the ecological functions of existing habitats within the Subject Lands and the surrounding landscape.

The restoration design reflects a combination of aquatic, wetland, and terrestrial habitat elements. Overall, the restoration effort has been designed to enhance the ecological form and function of the NHS by contributing biologically and structurally diverse aquatic, riparian, tableland wetland, and upland features to the existing mosaic of vegetation communities.

The replicated wetland, low flow channel and surrounding upland vegetation communities are expected to promote improved wildlife habitat functions, compared to existing conditions, to ensure that self-sustaining habitat persists on the landscape over the long term. Ecological restoration objectives for the Subject Lands include:

1. Provide riparian wetland replication on the Subject Lands as compensation for proposed removal of the existing SWT2-2, MAM2-2 and MAS vegetation communities on the Subject Lands;
2. Deter establishment of non-native / invasive plant species by establishing native tree, shrub and groundcover plantings;
3. Inclusion of meandering low flow channels, incorporate riffle-pool morphology with a range of grain sizes and hydraulic conditions, increased habitat complexity and increased biophysical complexity;
4. Remove migratory fish barriers (perched culverts and two man-made berms) to facilitate free movement of fish within the East Tributary;
5. Reduce thermal loading within East Tributary to downstream occupied Redside Dace habitats;
6. Include nectaring plants and Milkweed species within groundcover planting areas to attract / support local insect populations (e.g., Monarch and food source for aerial insectivores (swallows and bats);
7. Stabilize soils through the application of an annual cover crop seed mix applied in conjunction with native perennial seed mixes;
8. Create vegetatively diverse vegetation communities that will be self-organizing and resilient over the long-term;
9. Develop diverse plant species lists that will improve structural diversity, floral diversity, and support a variety of native fauna species;
10. Include diverse vegetation plantings within the Restoration Areas to create shade and contribute allochthonous material input to downstream watercourses;
11. Manage any Category 1 invasive species within the retained NHS, as appropriate; and
12. Derive planting stock from locally propagated species (Seed Zone 33/34), where available.
13. Establishment of wildlife habitat structures, where feasible and appropriate, including amphibian breeding pools, turtle nesting areas and basking logs.
14. Removal of instream concrete abutments in Salt Creek.

Figure 13 (**Appendix A**) illustrates the Proposed NHS, which includes the restoration and enhancement areas.

As previously discussed within **Section 7.2.1**, wetland compensation will occur on site. A total of 2.202 ha of wetland habitat is proposed for removal and 2.3 ha of wetland habitat will be created outside of the realigned channel.

8.2.1 Region of Peel Scoped Subwatershed Study Management Recommendations

The Scoped SWS completed for the Region included goals for the NHS in order to provide guidance for future studies and land use planning within the FSA of the SWS. Goals include developing an NHS that will:

- Balance policy direction, emerging science and natural heritage planning best practices.
- Become an ecologically resilient and robust system for the long-term benefit of environmental and public health, well-being, and safety.
- Allow for enhancement to establish a sustainable system in a changing landscape matrix and that supports climate change resilience.

In addition, aligned with the goals presented in the Conservation Authority NHS for the Region of Peel (CVC, 2019), another long-term goal and opportunity of local area municipalities is to provide outdoor appreciation and recreational opportunities and to promote healthy communities.

General targets were set for the FSA NHS to inform management approaches. They include no net loss of natural cover and increasing natural cover by 30%. Specific habitat targets are described below.

- Wetland Habitat- ensure ‘no net loss’ of wetland area, increase and maintain total wetland cover through NHS enhancements based on historic reference conditions.
- Forest Habitat- ensure ‘no net loss’ of woodland cover. 30% forest cover is the minimum forest cover threshold for a high-risk development approach with anticipated substantial reductions in biodiversity and aquatic system health. 40% forest cover and 50% forest cover represent moderate and low risk development approaches. Increase total woodland cover through NHS enhancement with a focus on creation of table land features.
- Riparian Habitat- 75% of stream length should be naturally vegetated through protection of existing, enhancement or restoration.
- Valley and Stream Corridor- ensure ‘no net loss’ of ecological and hydrological functions. Increase natural cover within valley and stream corridors through NHS enhancement.
- Successional / Open Habitats- Maintain important existing successional / open habitats. 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 5ha.

- Sand Barrens, Savannahs, Grassland Habitats- Protect these habitats where they occur.

8.3 Restoration Plan and System Targets

8.3.1 Removal of Online Ponds

The proposed restoration plan involves the removal of the two online ponds (Upper and Lower Ponds) as both an ecological enhancement and an ecological/public safety measure. From an aquatic habitat perspective, removal of the online ponds is expected to provide a significant ecological benefit. Although they may be providing direct fish habitat, the presence of the ponds is expected to be having a negative impact on the overall functioning of the watercourse and in turn, could be impacting downstream habitats and aquatic biota.

First, the presence of the ponds is expected to be causing thermal loading in the watercourse, which would significantly degrade its function as contributing habitat for Redside Dace. Removal of the online ponds will eliminate this source of thermal loading and assist in maintaining cooler temperatures in the watercourse, which may have substantial benefits for the downstream Redside Dace population.

Secondly, the existing ponds are expected to be having an impact on existing erosion and sediment transport processes. It is expected that eroded sediments from the upstream portion of the watercourse are being deposited with the ponds, effectively interrupting natural sediment movements. This may be resulting in sediment starved downstream reaches and possibly causing increased erosion and/or lack of coarse, habitat-building sediments. Re-establishment of a more natural sediment transport regime is expected to have substantial benefits for the overall biophysical function of the watercourse and associated habitat for fish and benthic invertebrates.

Finally, the existing embankments downstream from the each of the ponds are thought to be functioning as a barrier to upstream fish movement. Removal of the online ponds and construction of a natural channel is expected to significantly enhance the ability of fish to move further upstream through this watercourse system. This may result in increased productivity both upstream and downstream from the existing obstructions, with the existing fish community downstream potentially able to exploit seasonal habitat functions further upstream, while also enhancing the longitudinal connectivity in a downstream direction, which may facilitate downstream transport of forage for benthos and fish.

8.3.2 Wetland Replication

In addition to the proposed direct enhancements within the channel and corridor, wetland replication will be completed in part adjacent to the realigned low flow channel. Existing wetlands likely provide contributing aquatic habitat functions, including water quality maintenance and hydrology functions and provide contributing habitat for Redside Dace. Replication of wetlands will ensure that these important aquatic functions are maintained in the watercourse system.

8.3.3 Wildlife Habitat and Linkage Creation

Furthermore, the new habitats created within the East Tributary will allow for increased connectivity and linkage opportunities that currently are not present within this tributary due to the constructed berms. Currently, the Upper and Lower Ponds are acting as a permanent barrier to wildlife movement due to the steep berm walls and depth of the constructed valleyland. By restoring the connection to habitats north of Mayfield Road through removing the constructed berms, wildlife movement will be encouraged throughout the corridor. The East Tributary ultimately connects into the West Humber Tributary approximately 650 m downstream of the Subject Lands. Maintaining secondary corridors within a landscape, like the East Tributary, helps to maintain population connectivity and biodiversity while creating a more functional, natural landscape.

Wildlife enhancement structures will also be installed throughout the East Tributary to provide habitat diversity that is not currently present and/or compensate for those that are proposed for removal. While the specific abundance, location and type of habitat structure will be defined within the detailed design stage of this project, wildlife enhancement structures will attract and protect a variety of wildlife. The following wildlife enhancement structures will be considered:

- Amphibian breeding and overwintering habitat;
- Turtle basking, nesting and overwintering habitat;
- Snake hibernacula;
- Brush and rock piles;
- Pollinator habitat;
- Snags; and
- Bat rocket boxes.

These types of structures will provide wildlife with habitat for resting, feeding, escaping predators, sheltering from bad weather, raising young and breeding/roosting. While these habitat types may be present within the West Tributary or within the East Tributary on the southside of Mayfield Road, creation of these habitats within Salt Creek and the wetland enhancement area on the Subject Lands will encourage amphibians, reptiles, small to medium sized mammals and birds to use this corridor.

Currently, there is limited bat maternity roosting habitat present along the East Tributary. By installing bat rocket boxes within the watercourse corridor, it will encourage bats to roost within this portion of the NHS. Additionally, there is limited pollinator habitat within the existing East Tributary corridor due to the presence of invasive species (e.g., Flowering Rush) and monocultural wetland communities. The inclusion of a variety of nectaring species that flower from mid-spring to mid-fall will increase the availability of pollinator habitat within the watercourse corridor and increase foraging habitat for aerial insectivores. Moreover, no snake hibernacula were identified within the Subject Lands; therefore, the creation of naturalized habitats may be warranted to enhance and increase the availability of snake overwintering habitat on the landscape. The creation of these features in close proximity to summer foraging habitat (i.e., meadow, wetland) may allow snakes to

concentrate home ranges and activity centres within the East Tributary corridor. Finally, the creation of amphibian and turtle breeding and/or overwintering habitat will be explored within constructed floodplain pools and/or realigned channel pools (depending on hydrological modelling) within the East Tributary corridor. These habitats are currently present within the constructed ponds and will need to be replicated within the landscape.

In summary, the Restoration and Landscape Plan when combined with other mitigation measures will provide benefit to both the aquatic and terrestrial ecosystems through the following:

- Elimination of thermal loading;
- Restoration of fish passage;
- Naturalized sediment transport;
- Increased contributing functions that benefit the downstream occupied Redside Dace habitat;
- Increased quality of wildlife habitat;
- Increased diversity of wildlife habitat; and,
- Increased linkage and connectivity between natural features that improved wildlife movement.

8.3.4 Planting Guidelines

The proposed restoration and enhancement design will enhance existing NHS features and long-term functions within the West Tributary and Salt Creek, including corridor and linkage functions, while creating new, functional habitats that will provide additional flood control measures within the East Tributary. Plantings will be focused within the stormwater management wetland edges, wetland replication and low flow channel area in Block 13, which will contain wetland and upland plant species, as well as the West Tributary and Salt Creek buffer and wetland plantings.

Buffer plantings will provide natural buffering functions (i.e., attenuation functions, protection from edge effects, noise, and light pollution) and allow natural successional processes to occur. The NHS buffer (and other restoration areas between the NHS boundary and the development limit) will serve to further protect features within NHS, increase the biodiversity of native flora and fauna, and provide breeding, rearing and foraging habitat for woodland species over the long term. Strategic plantings within the East Tributary (Block 13) will be explored to mitigate thermal loading to downstream Redside Dace habitats.

The proposed native plant assemblages will be tailored to suit targeted vegetation communities based on available light, soil, slope, and growing conditions. Plants will be selected to provide a diverse assemblage of species and include fast-growing and pioneer species more tolerant of harsher/variable growing conditions. Native plant materials should be sourced from appropriate Native Plant Nurseries and Seed Suppliers within 100 km of the Subject Lands, as available, to reduce transplant shock. Bareroot plant materials can be used in early spring or late fall planting, otherwise potted material is required. None of the proposed plant species will be regionally or locally rare. A cover crop will be applied along

with the native perennial seed mix to stabilize soils and to aid in the establishment of native vegetation. The exact cover crop selection depends on the timing of planting. Several appropriate options will be provided in the Natural Heritage Design Brief.

Given the nature of the Subject Lands (actively managed agricultural fields), soil amendments may be required to ensure that the soils located within the proposed restoration and enhancement areas can support planted materials. The quality of the soil should be tested by a credited soil scientist to ensure that it will promote healthy vegetation growth, per the TRCA's Preserving and Restoring Healthy Soil Guideline.

8.3.5 Invasive Species Management

There are four basic approaches to invasive plant management that are widely accepted by the scientific community:

- Prevention – limit vector pathways;
- Eradication – complete removal including reproductive propagules;
- Containment – prevent establishment or to control a plant species beyond a predefined area known as a containment unit; and
- Asset-based protection – limiting invasive plant control to portions of an infestation that directly threaten high value conservation targets.

Should Category 1 invasive species be identified in the retained vegetation communities within NHS, invasive species management opportunities will be considered. Best Management Practices (BMPs) for invasive species management (e.g., Ontario Invasive Plant Council's BMPs) will be reviewed to determine the appropriate management approach. Management techniques can be classified into three broad categories:

1. Mechanical control (e.g., cutting, mowing, burning)
2. Chemical control (e.g., herbicides, insecticides)
3. Biological control (introduction of organisms that feed on or infect the target species)

Management opportunities will be further explored and discussed within the Natural Heritage Design Brief at the detailed design stage.

8.4 Wildlife Enhancement Opportunities

As previously identified within **Section 5**, several wildlife functions are present within the Subject Lands including:

- Permanent, direct fish habitat for warmwater fish;
- Foraging habitat for aerial insectivores (birds and bats);
- Breeding habitat for amphibians and turtles;
- SAR habitat for Redside Dace (contributing and occupied habitat); and
- Potential habitat for marsh breeding birds and colonial nesting birds.

Opportunities for wildlife enhancement functions (e.g., artificial bark or rocket boxes to support bat maternity roosting, amphibian breeding and overwintering, turtle basking and nesting, etc.) will be reviewed during the detailed design stage. If hydrology can be supported, the opportunity to create habitat for amphibian and reptile breeding/overwintering within the wetland restoration block will be explored.

Moreover, the existing East Tributary has two permanent barriers to fish movement (perched culverts) identified during aquatic surveys (as discussed above within **Section 7.3**). Removal of those barriers will allow for movement of fish species upstream. The low flow channel and lower reaches of the East Tributary will be designed/enhanced using NCD principles and will incorporate various fish habitat structures (e.g., riffle-pool morphology, strategic placement of LWD) to enhance fish habitat within the East Tributary. The proposed removal of online ponds (1, 2 and cattle) will help reduce thermal loading to occupied Redside Dace habitats downstream of Mayfield Road.

9. Monitoring and Adaptive Management Plan

A Monitoring Plan will be developed for review and approval at the time of detailed design. The monitoring locations, frequency and type of monitoring will be established based on the final design and restoration targets.

Considerations for terrestrial and wetland monitoring for areas within the Peel Region SABE study area are outlined in the Region of Peel SWS. Monitoring will address and confirm predicted effects and the early outcomes of any proposed NHS restoration, including:

- Pre-construction monitoring: establishment of monitoring stations/locations, baseline inventories, etc.
- Construction monitoring: environmental protection and mitigation measures effectiveness monitoring, which may include buffer/setback integrity monitoring.
- Post-construction monitoring: assessment of early NHS restoration success, including addressing restoration planting establishment.

The duration of the monitoring program will be determined based upon the timeframe for implementation. Generally monitoring will be conducted at least 2 years prior to construction and should continue until at least 80 % build-out of the area.

The proposed ecological monitoring program is intended to insure that:

- Protective mitigation strategies and actions (**Section 7**) are effectively implemented during construction;
- Ecological restoration measures (**Section 8**) are effectively implemented; and,
- Created features and associated functions are developing along projected trajectories.

Construction monitoring 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 ESC measures are in place and functioning; however, other aspects of construction monitoring can relate to Redside Dace turbidity monitoring, and installation of restoration plant materials, or other parameters of concern. ESC guidance is provided in **Section 7.3**. Regular inspection and maintenance are required and also outlined within the ESC plan.

The post-construction ecological monitoring program described below is intended to assess the change in retained and constructed ecological features between pre- and post-construction periods. The terrestrial and aquatic data collected by GEI within the Subject Lands will serve as a baseline for ecological monitoring.

Post-construction compliance monitoring is also driven by the need to comply with permits or other approvals. It is intended to demonstrate that the constructed NHS is functioning as designed. This monitoring is relatively local in scale and associated with specific works. For

the Subject Lands, it would apply to restoration areas, habitat compensation measures, and any plant materials (e.g., landscape warranty).

Annual monitoring reports will be submitted to reviewing agencies summarizing monitoring results. Adaptive management plans will be prepared for post-construction monitoring.

The Management, Implementation, and Monitoring Plan shall also recommend the phasing of development, and address climate change considerations, particularly demonstrating compliance with Peel Region's Climate Change Master Plan. This will permit changes to recommend mitigation measures and management strategies for future phases of the development, in the case results of monitoring from the initial phases suggest that changes are warranted.

Proposed monitoring protocols and methods will consider the following:

9.1 Vegetation

The objectives of the vegetation monitoring include assessing the long-term condition and function of the vegetation communities while updating the boundary of the vegetation features. This will be accomplished by:

1) Establishing long term monitoring plots following the standards associated with the Ecological Monitoring and Assessment Network Protocols (Roberts-Pichette and Gillespie 1999)
2) Periodically updating the ELC (Lee et al. 1998) of the NHS in order to maintain up-to date coverage of vegetation communities.

9.2 Breeding Birds

The objective of breeding bird monitoring is to assess changes in bird communities and/or individual species within and outside of the SABE related to development. The monitoring program should be based on the protocols established by the Ontario Breeding Bird Atlas (Cadman et al. 2007), Forest Bird Monitoring Program (Cadman 1998), and the standard methods for monitoring songbird populations in the Great Lakes Region (Howe et al. 1997). Monitoring stations should be established in habitats found in both the development area as well as the undeveloped area for comparison.

9.3 Amphibians

The objective of amphibian monitoring is to assess changes in the occurrence and abundance of calling amphibian species that occur within and outside of the SABE related to development. monitoring protocols should follow standard approaches identified in Marsh Monitoring Program protocol (BSC 2009). Monitoring stations should be established in habitats found in both the development area as well as the undeveloped area for comparison.

9.4 Other Terrestrial Monitoring

Based on site-specific conditions, monitoring for other plant and wildlife groups may also be required. This may include invasive species and targeted species surveys for bats, and reptiles. Under the ESA permitting process, SAR monitoring could be completed with this monitoring program. Where applicable, monitoring protocols should follow existing standards.

9.5 Monitoring Requirements for Redside Dace

The West Humber Subwatershed and Salt Creek contain Redside Dace habitat. As such, and in addition to the foregoing, continuous monitoring for instream dissolved oxygen, turbidity, and conductivity should be conducted where land use changes and site alteration are proposed on adjacent lands. The TSS and turbidity results from the wet weather and dry weather grab sampling should be used to generate a mathematical relationship between the two parameters for each monitoring site; this relationship would be used to generate a continuous TSS dataset based on mathematical relationships between TSS and turbidity.

10. Conclusions

This CEISMP addresses the natural heritage features and associated functions found on and immediately adjacent to the Subject Lands. Presently, the Subject Lands are dominated by agricultural land-use and are traversed by two tributaries to the West Humber River in the southwest, and a portion of Salt Creek in the northeast. Portions of the Greenbelt Planning Area are identified within the southeast corner of the Subject Lands.

Based on the ecological findings, the following natural heritage features were identified within the Subject Lands:

- Significant habitat of endangered, threatened and special concern species (Redside Dace contributing and occupied habitat, Candidate SAR bats);
- Fish habitat;
- Unevaluated wetlands (MAM2, MAM2-2, SWT2-2, MAS);
- Significant valleylands (West Tributary to West Humber River, Salt Creek);
- SWH (candidate Bat Maternity Colonies; and confirmed Habitat of Species of Conservation Concern – Snapping Turtle, Barn Swallow); and
- Permanent (West Tributary to West Humber River; Salt Creek) and intermittent (East Tributary to West Humber River) streams.

Feature staking was completed on site over 3 site visits and included top of bank, contiguous vegetation and wetlands. Natural features that were not included in the previous site visits, such as the northern woodlot and that were added to the site plan upon receipt of the Ministerial Zoning Order, were not subject to confirmation of feature limit by TRCA. These areas have been shown as ground-truthed by GEI.

The proposed development plan respects the Greenbelt Planning Area and the West Tributary, with a 30 m vegetated buffer being recommended to enhance and protect natural heritage features' form and function.

The removal of the anthropogenic berms associated with the East Tributary is required as they have been determined to be unstable and could cause negative human and environmental impacts should they fail. In its place, a realigned low flow channel is proposed within a wetland block downstream of the stormwater management blocks which will be designed using NCD principles. Moreover, a total of 7.272 ha of wetland habitat, including its 10m buffers, is proposed for removal to accommodate the proposed site plan. To compensate for the wetland removals, a combination of on-site wetland replication and cash-in-lieu is proposed. Wetland habitat will be created in the vicinity of the Lower Pond, which will be restored upon removal of the manmade berm. A Natural Heritage Design Brief and Wetland Implementation Plan will be prepared during detailed design outlining the restoration and monitoring requirements for this component of the overall development project, including proposed phasing for the removal of the manmade berms and decommissioning of the Upper and Lower Ponds.

The conclusions and recommendations in this CEISMP are based upon the Draft Plan as presented in this report. As development discussions proceed and as site plans are developed for each block in more detail, predicted effects, and detailed mitigation measures should be reassessed and confirmed.

The implementation of mitigation measures and appropriate construction monitoring will contribute to the maintenance of important local features and functions over time, as well as enhancing and protecting natural heritage features. Predicted ecological outcomes of proposed ecological restoration/mitigation measures include retaining, restoring, and enhancing biodiversity and promoting long-term ecological sustainability and functions of natural heritage features.

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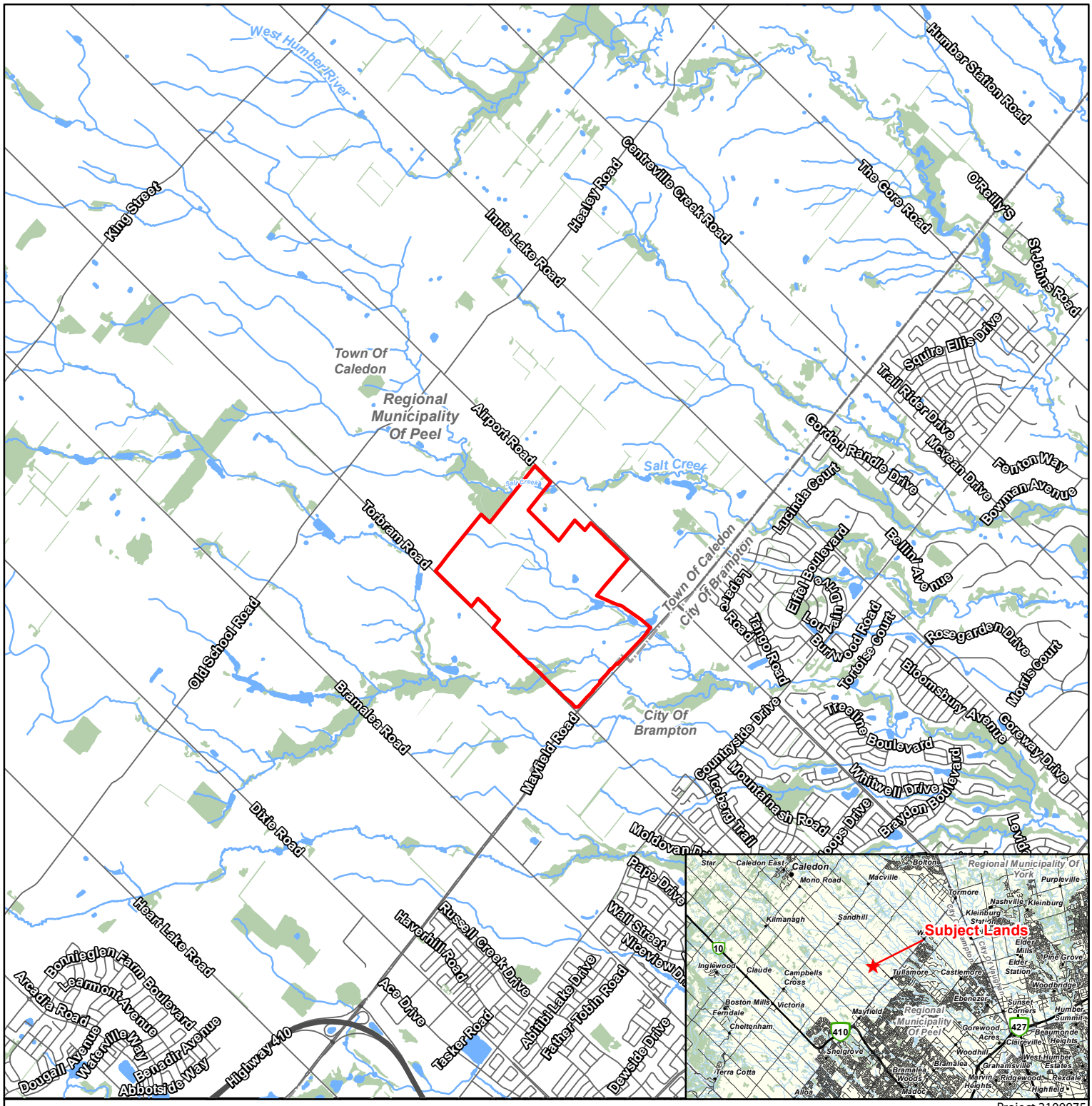
Appendix A

Figures

Appendix B

Tables

Appendix A – Figures



NOTES:
1. Coordinate System: NAD 1983 UTM Zone 17N.
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023.

Legend

Subject Lands
- Subject Lands
- Railway
- Highway
- Road
- Municipal Boundary, Lower/Single Tier
- Municipal Boundary, Upper Tier
- Watercourse (LIO)
- Waterbody (LIO)
- Wooded Area (LIO)

Project 2100975

Comprehensive Environmental Impact Study and Management Plan, Tullamore Employment Lands
Tullamore Industrial LP

Figure 1
Location of Subject Lands

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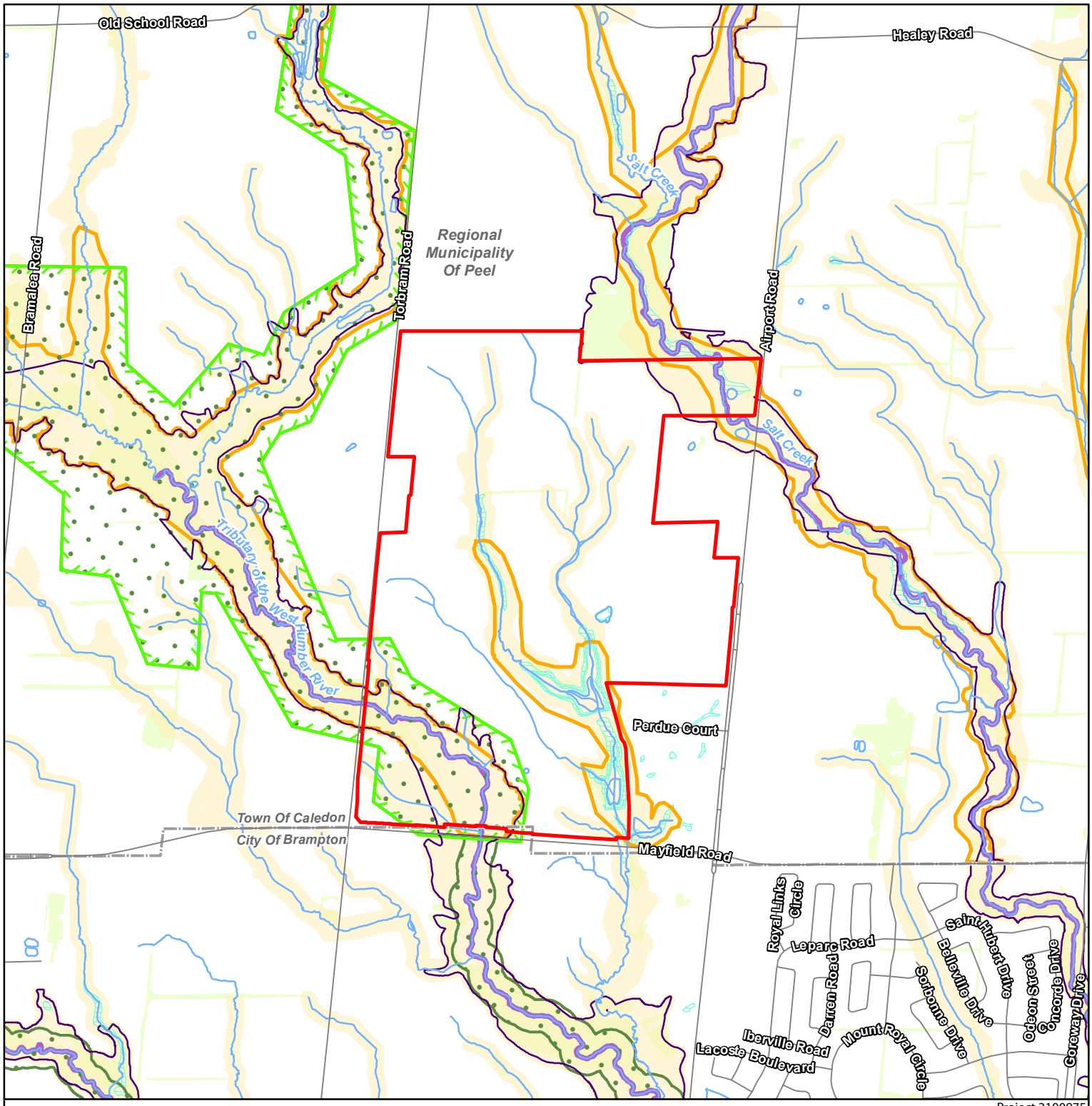

NOTES:
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3. Orthoimagery © First Base Solutions, 2021. Imagery taken in 2019.

Legend

- Subject Lands
- Watercourse (TRCA)
- Waterbody (LIO)
- Municipal Boundary, Lower/Single Tier
- Wooded Area
- Wetland - Not evaluated per OWES
- Aquatic Species at Risk - Fish
- Greenbelt Boundary
- Greenbelt NHS
- Core Areas of the Greenlands System (Region of Peel)
- Environmental Policy Area (Town of Caledon)
- TRCA Regulation Limits

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Comprehensive Environmental Impact Study and Management Plan, Tullamore Employment Lands
Tullamore Industrial LP

Figure 2
Landscape Setting

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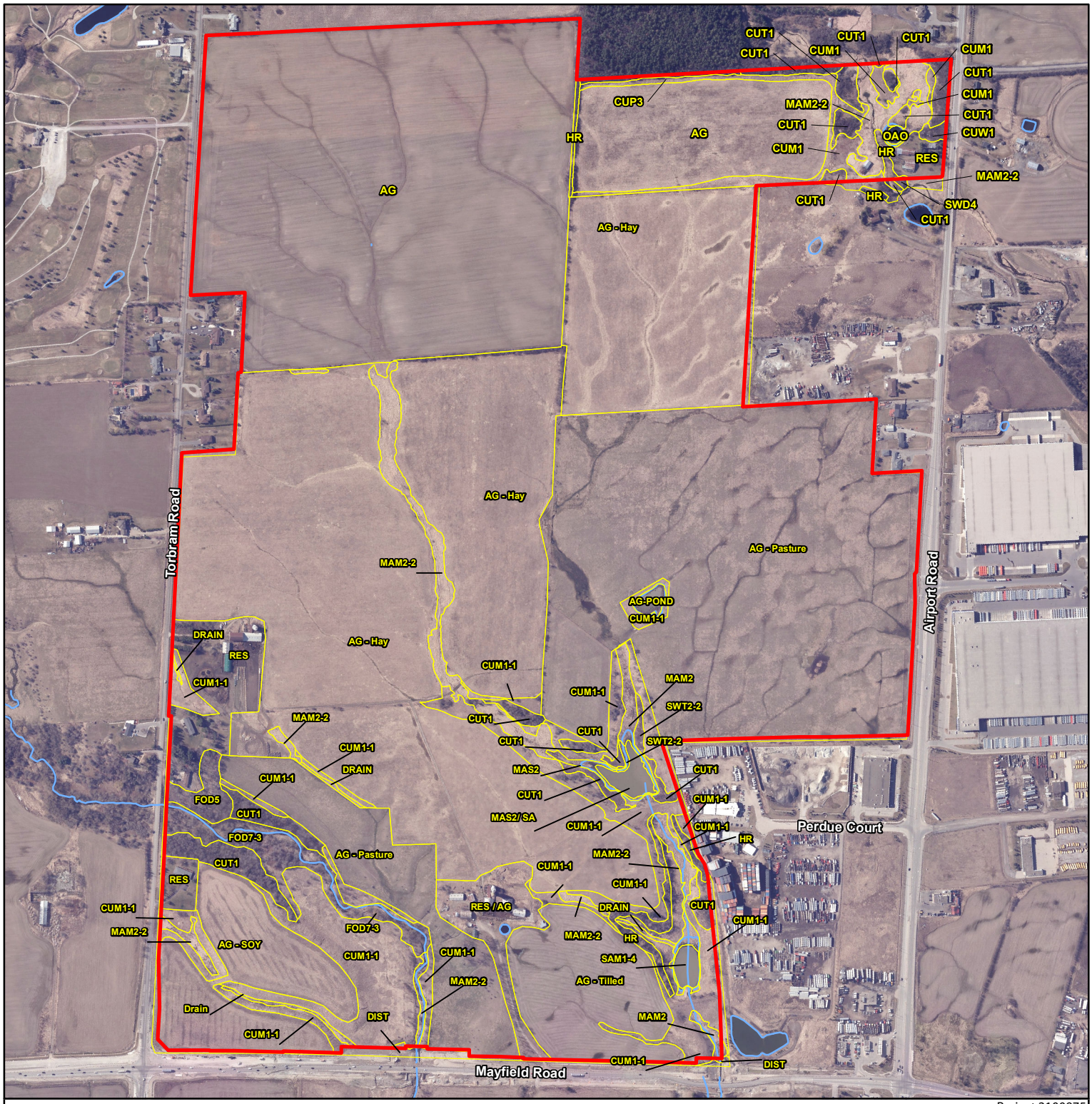

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Comprehensive Environmental Impact Study and Management Plan, Tullamore Employment Lands
Tullamore Industrial LP

Figure 3
Ecological Land Classification

NOTES:

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Legend

- Subject Lands (approximate)
- Watercourse (TRCA)
- Waterbody (LIO)
- Ecological Land Classification

ELC Legend

ELC Code, ELC Description

AG, Agricultural
CUM1, Mineral Cultural Meadow
CUM1-1, Dry - Moist Old Field Meadow
CUP3, Coniferous Plantation
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST, Disturbed
FOD5, Dry – Fresh Sugar Maple Deciduous Forest
FOD7-3, Fresh – Moist Willow Lowland Deciduous Forest
HR, Hedgerow
MAM2, Mineral Meadow Marsh
MAM2-2, Reed-canary Grass Mineral Meadow Marsh
MAS2 / SA, Mineral Shallow Marsh / Shallow Aquatic
MAS2, Mineral Shallow Marsh
OAO, Open Aquatic
RES, Residential
SAM1-4, Pondweed Mixed Shallow Aquatic
SWD4, Willow Mineral Deciduous Swamp
SWT2-2, Willow Mineral Thicket Swamp

0 100 m

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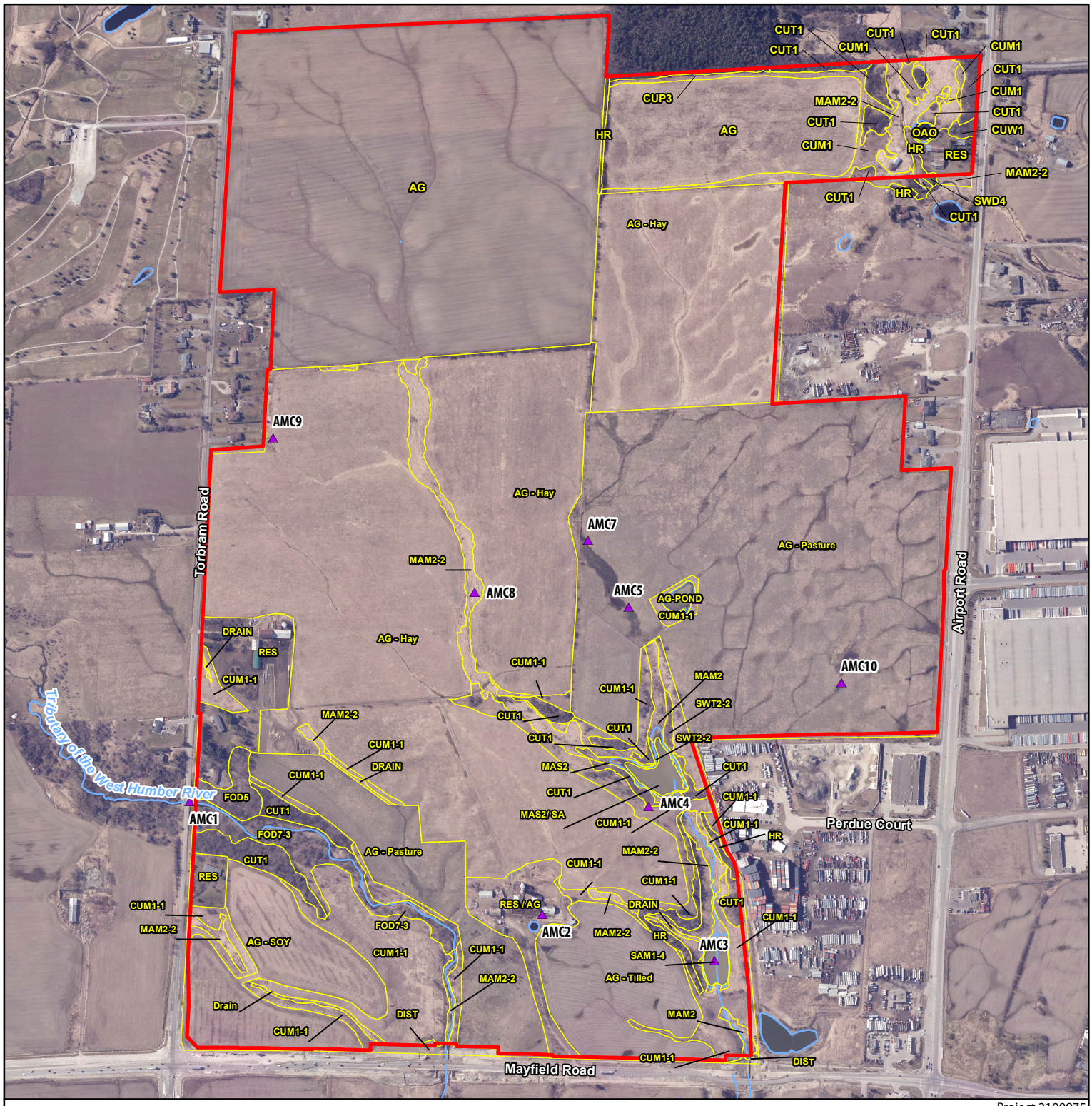

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Legend

- Subject Lands (approximate)
- Watercourse (TRCA)
- Waterbody (LIO)
- Amphibian Call Count Survey Station
- Ecological Land Classification

ELC Legend

ELC Code, ELC Description

AG, Agricultural
CUM1, Mineral Cultural Meadow
CUM1-1, Dry - Moist Old Field Meadow
CUP3, Coniferous Plantation
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST, Disturbed
FOD5, Dry – Fresh Sugar Maple Deciduous Forest
FOD7-3, Fresh – Moist Willow Lowland Deciduous Forest
HR, Hedgerow
MAM2, Mineral Meadow Marsh
MAM2-2, Reed-canary Grass Mineral Meadow Marsh
MAS2 / SA, Mineral Shallow Marsh / Shallow Aquatic
MAS2, Mineral Shallow Marsh
OAO, Open Aquatic
RES, Residential
SAM1-4, Pondweed Mixed Shallow Aquatic
SWD4, Willow Mineral Deciduous Swamp
SWT2-2, Willow Mineral Thicket Swamp

Comprehensive Environmental Impact Study and Management Plan, Tullamore Employment Lands
Tullamore Industrial LP

Figure 4
Amphibian Call Count Survey Locations

0 100 m

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GEI Consultants

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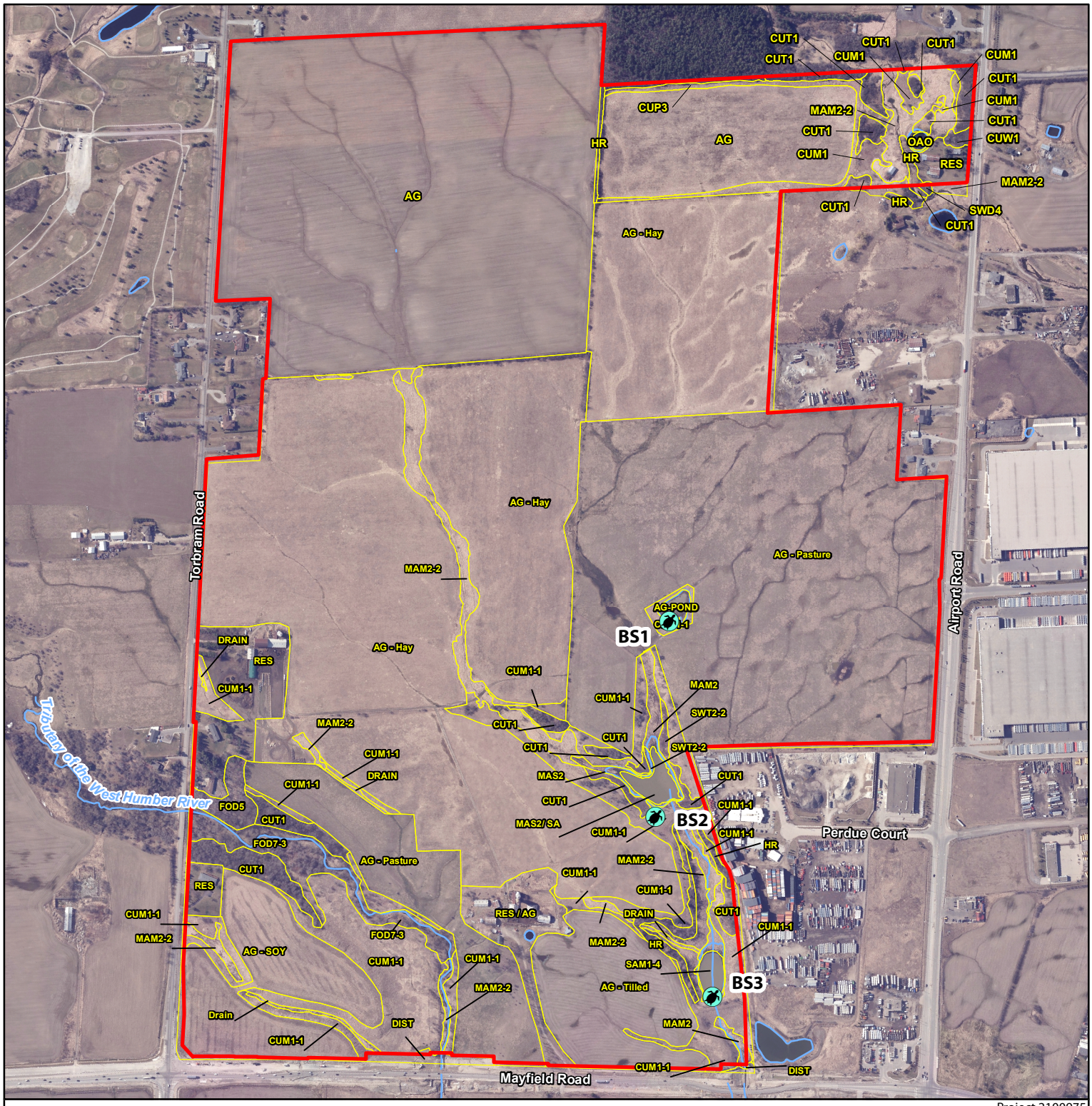

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Legend

- Subject Lands (approximate)
- Watercourse (TRCA)
- Waterbody (LIO)
- Turtle Basking Survey Stations
- Ecological Land Classification

ELC Legend

ELC Code, ELC Description

AG, Agricultural
CUM1, Mineral Cultural Meadow
CUM1-1, Dry - Moist Old Field Meadow
CUP3, Coniferous Plantation
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST, Disturbed
FOD5, Dry – Fresh Sugar Maple Deciduous Forest
FOD7-3, Fresh – Moist Willow Lowland Deciduous Forest
MAM2, Mineral Meadow Marsh
MAM2-2, Reed-canary Grass Mineral Meadow Marsh
MAS2, Mineral Shallow Marsh
OAO, Open Aquatic
RES, Residential
SAM1-4, Pondweed Mixed Shallow Aquatic
SWD4, Willow Mineral Deciduous Swamp
SWT2-2, Willow Mineral Thicket Swamp

Comprehensive Environmental Impact Study and Management Plan, Tullamore Employment Lands
Tullamore Industrial LP

Figure 5
Turtle Basking Survey Locations

0 100 m
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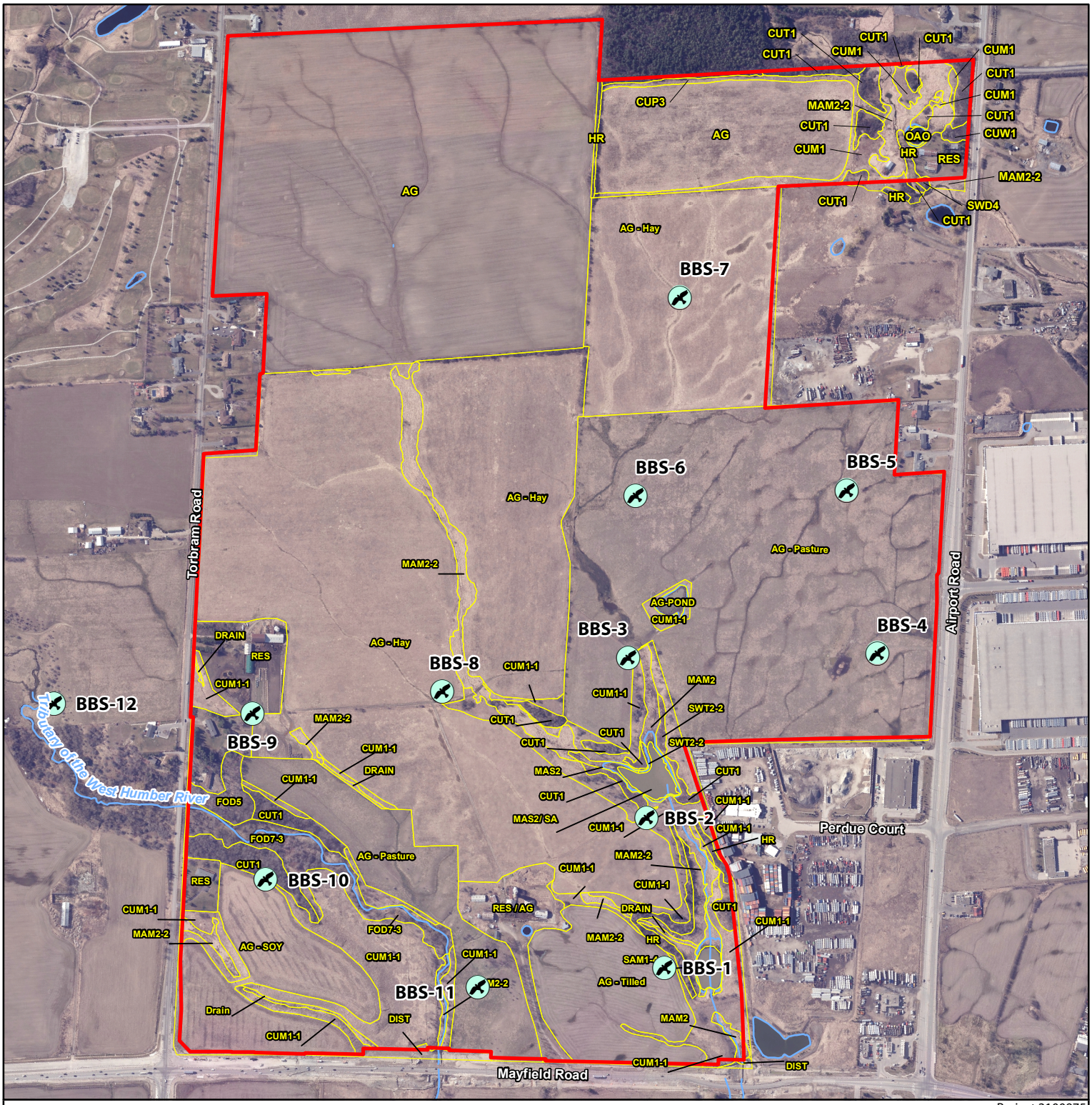

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Legend

- Subject Lands (approximate)
- Watercourse (TRCA)
- Waterbody (LIO)
- Breeding Bird Survey Station
- Ecological Land Classification

ELC Legend

ELC Code, ELC Description

AG, Agricultural
CUM1, Mineral Cultural Meadow
CUM1-1, Dry - Moist Old Field Meadow
CUP3, Coniferous Plantation
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST, Disturbed
FOD5, Dry – Fresh Sugar Maple Deciduous Forest
FOD7-3, Fresh – Moist Willow Lowland Deciduous Forest
HR, Hedgerow
MAM2, Mineral Meadow Marsh
MAM2-2, Reed-canary Grass Mineral Meadow Marsh
MAS2 / SA, Mineral Shallow Marsh / Shallow Aquatic
MAS2, Mineral Shallow Marsh
OAO, Open Aquatic
RES, Residential
SAM1-4, Pondweed Mixed Shallow Aquatic
SWD4, Willow Mineral Deciduous Swamp
SWT2-2, Willow Mineral Thicket Swamp

Project 2100975

Comprehensive Environmental Impact Study
and Management Plan, Tullamore Employment Lands
Tullamore Industrial LP

Figure 6
Breeding Bird Survey Point Count Locations

0 100 m

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N

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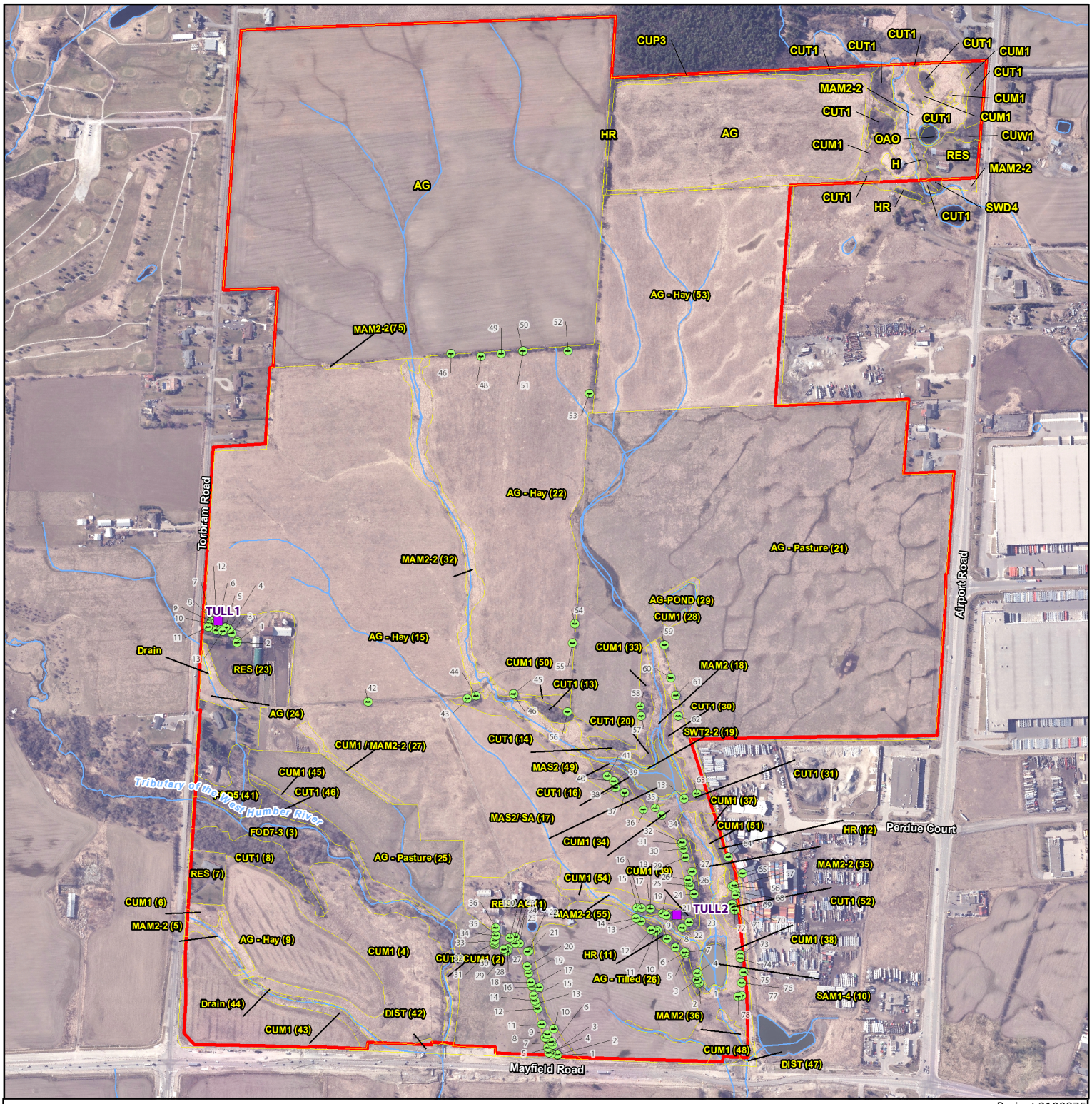

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Legend

- Subject Lands (approximate)
- Bat Snag Tree
- Bat Accoustic Monitoring Station
- Watercourse (TRCA)
- Waterbody
- Ecological Land Classification

ELC Legend

ELC Code, ELC Description

AG, Agricultural
CUM1, Mineral Cultural Meadow
CUM1-1, Dry - Moist Old Field Meadow
CUP3, Coniferous Plantation
CUT1, Mineral Cultural Thicket
CUW1, Mineral Cultural Woodland
DIST, Disturbed
FOD5, Dry – Fresh Sugar Maple Deciduous Forest
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MAS2, Mineral Shallow Marsh
OAO, Open Aquatic
RES, Residential
SAM1-4, Pondweed Mixed Shallow Aquatic
SWD4, Willow Mineral Deciduous Swamp
SWT2-2, Willow Mineral Thicket Swamp

Tullamore Employment Lands
Rice Commercial Group Limited

Figure 7
Bat Survey Locations

0 100 m
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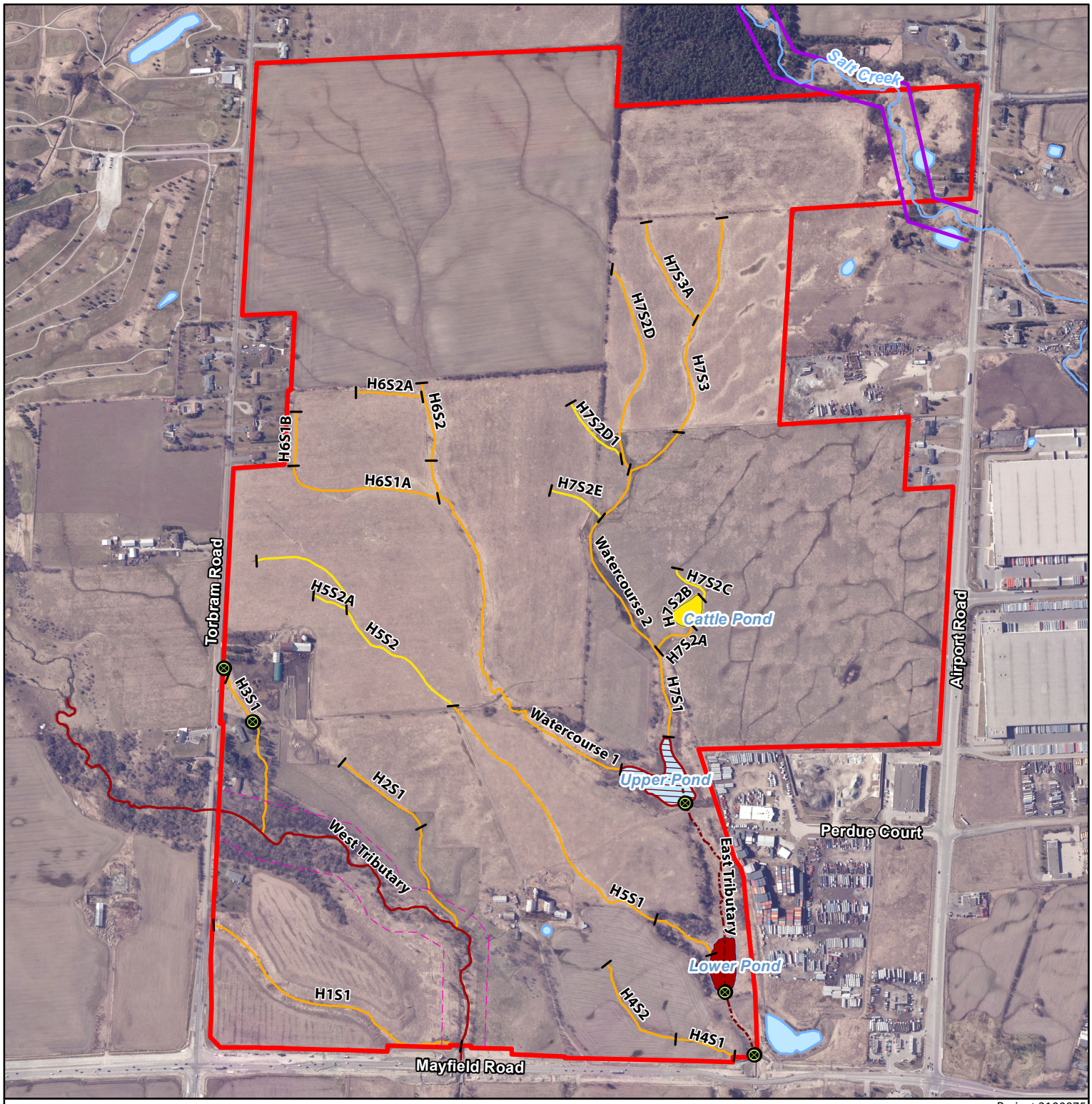

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Legend

- Subject Lands
- Waterbody (LIO)
- Culvert
- Salt Creek
- Meander Belt (GEI, 2023)
- Redside Dace Occupied Habitat

Fish Habitat Type

- Candidate, Permanent, Direct Fish Habitat
- Permanent, Direct Fish Habitat
- Candidate, Direct Fish Habitat (Pond)
- Permanent, Direct Fish Habitat (Pond)
- Indirect Fish Habitat
- No Fish Habitat
- No Fish Habitat (Pond)

Tullamore Employment Lands
Rice Commercial Group Limited

Figure 10
Fish Habitat

0 200 m
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GEI Consultants

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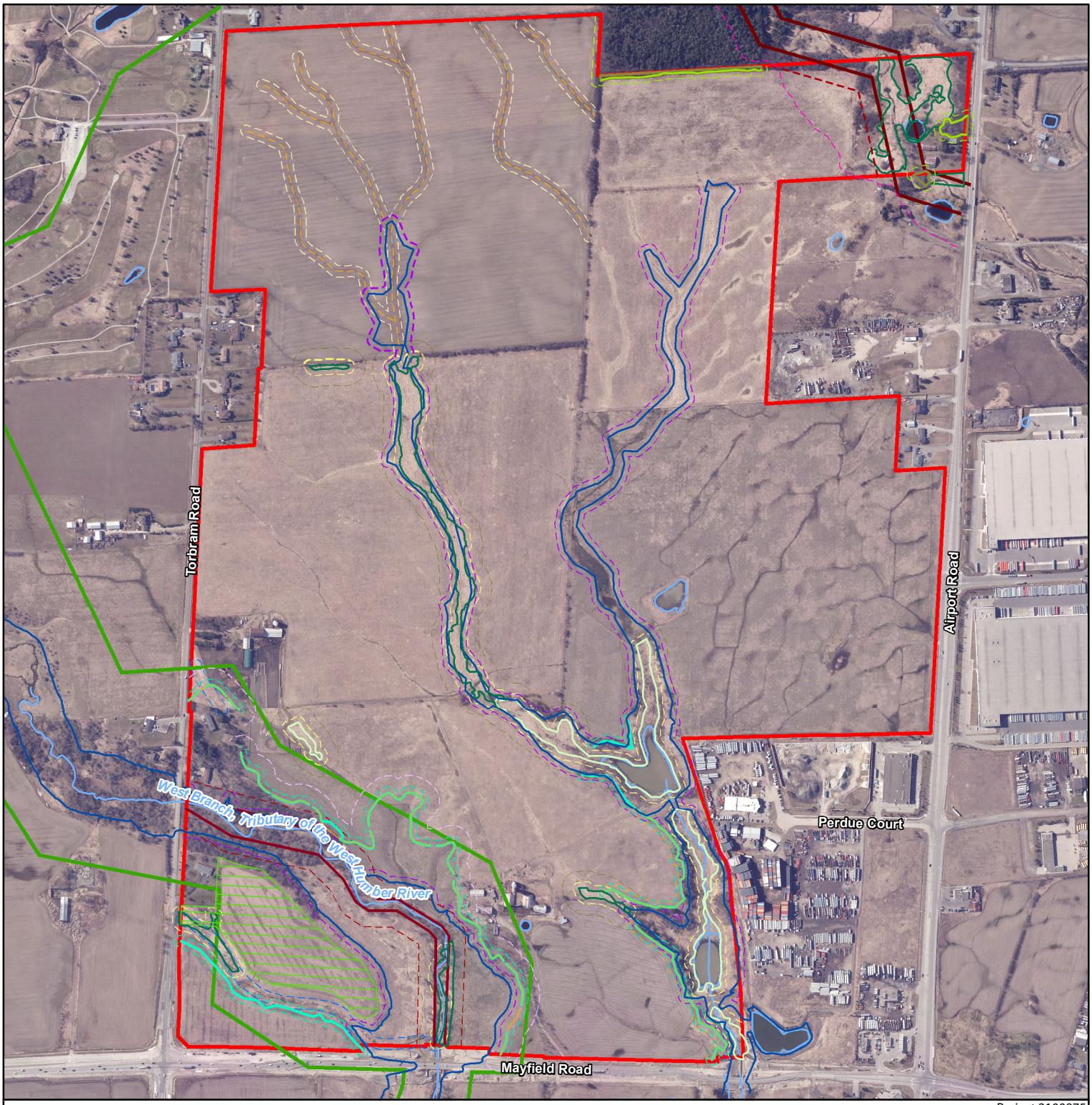

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** Contributing Redside Dace Habitats would also include wetlands and their associated setbacks*

Legend

- Subject Lands
- Watercourse (TRCA)
- Waterbody (LIO)
- Greenbelt Plan
- Long Term Stable Top of Slope (LTSTOS; GEI 2022)
- TRCA Staked Wetland
- TRCA Staked Natural Features (Top of Slope/Dripline)
- ELC Wetlands (Ground-Truthed, Not Staked)
- Regional Floodline (Croziers 2022)
- Dripline (GEI, Jan. 2023)
- Meander Belt
- Contributing Redside Dace Habitat*
- LTSTOS +10M
- Redside Dace Habitat (Meander Belt +30m)
- Regional Floodline +10m
- Staked Natural Features (Top of Slope/Dripline) +10m
- Staked Natural Features (Top of Slope/Dripline) + 30m
- Wetland +10m
- Wetland +30m
- Contributing Redside Dace Habitat and Indirect Fish Habitat
- Contributing Redside Dace Habitat + 10 metres
- Significant Woodland + 10 metres
- Woodlands + 10m
- TRCA Floodline +15m
- Potential Parkland

Comprehensive Environmental Impact Study and Management Plan, Tullamore Employment Lands
Tullamore Industrial LP

Figure 11
Existing Ecological Constraints Analysis

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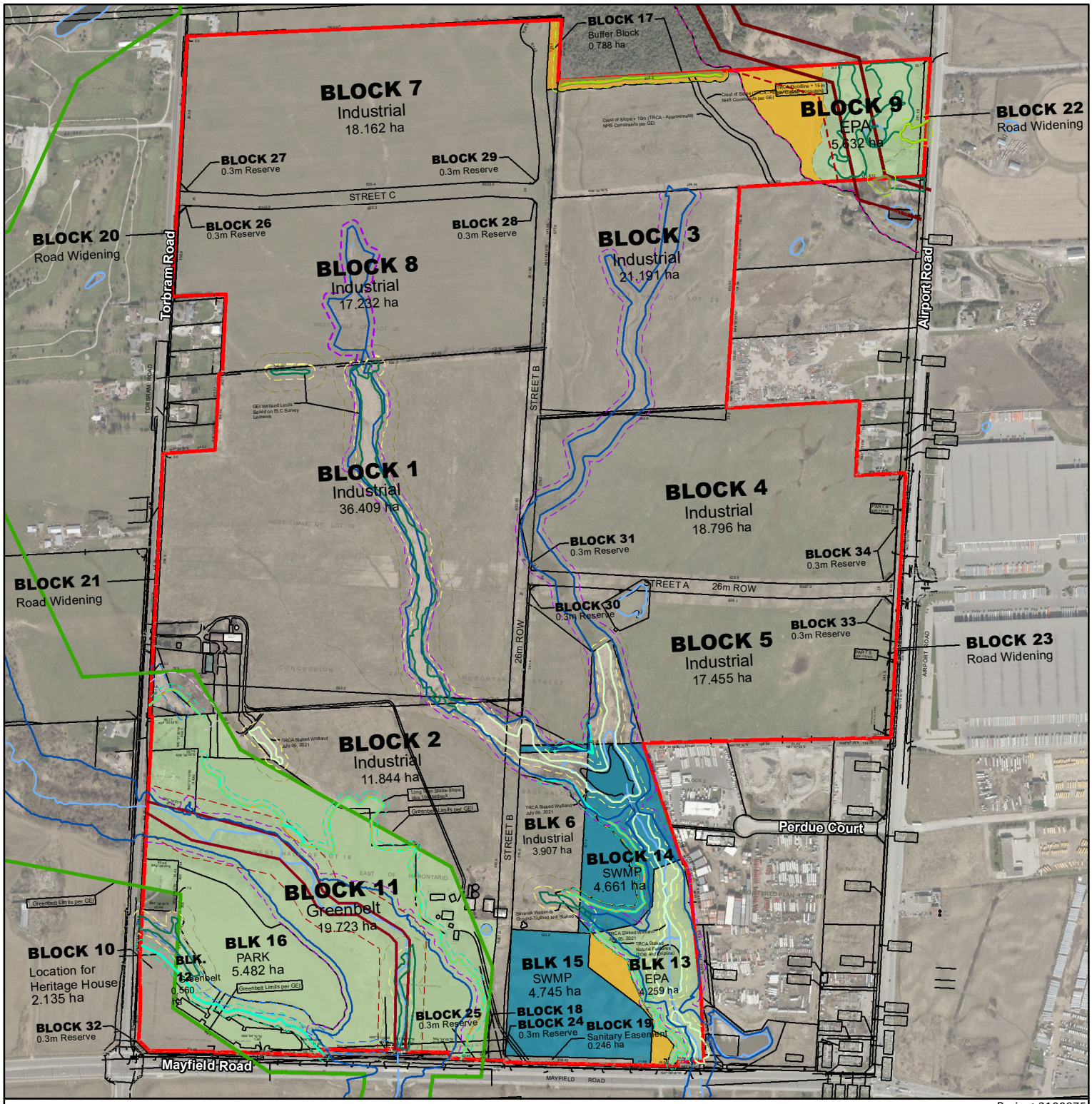

Project 2100975

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3. Orthoimagery © First Base Solutions, 2023. Imagery taken in 2022.
4. Concept Plan: 10208 Draft Plan DS_2023-03-28.dwg

** Contributing Redside Dace Habitats would also include wetlands and their associated setbacks*

Legend

- Subject Lands
- Natural Heritage System
- Landscaped Stormwater Management Blocks
- Restoration Area (3.34 ha)
- Watercourse (TRCA)
- Waterbody (LIO)
- Greenbelt Plan
- Long Term Stable Top of Slope (LTSTOS; GEI 2022)
- TRCA Staked Wetland
- TRCA Staked Natural Features (Top of Slope/Dripline)
- ELC Wetlands (Ground-Truthed, Not Staked)
- Regional Floodline (Croziers 2022)
- Dripline (GEI, Jan. 2023)
- Meander Belt
- Contributing Redside Dace Habitat*
- LTSTOS +10M
- Redside Dace Habitat (Meander Belt +30m)
- Regional Floodline +10m
- Staked Natural Features (Top of Slope/Dripline) +10m
- Staked Natural Features (Top of Slope/Dripline) + 30m
- Wetland +10m
- Wetland +30m
- Significant Woodland + 10 metres
- Woodlands + 10m
- TRCA Floodline +15m

Comprehensive Environmental Impact Study and Management Plan, Tullamore Employment Lands
Tullamore Industrial LP

Figure 12
Conceptual Plan and Natural Heritage System

0 100 m

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GEI Consultants

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Appendix B – Tables

Table 1: Field Studies and Natural Inventories (2021)

SURVEYORS	SURVEY ROUND	SURVEY TYPE	DATE	TIME		AIR TEMP (°C)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
				START	END					
2021										
Leslie, J.	1	Spring Botanical and Ecological Land Classification Survey	21-MA	10:00	16:30	28.8	43	80	4	Mostly Cloudy
Robinson, O., Boucher, N.	1	Headwater Drainage Feature Assessment	29-MR	09:00	16:00	5	49	5	5	Moderately Clear
Lee, R., Leslie, J.	1	Amphibian Call Count Survey	20-AP	21:15	23:00	9	73	100	2	Light Rain
Williamson, L., Szabo, A.	1	Bat Habitat Assessment	22-AP	09:00	16:00	4.5	53	100	5	Snow Showers
Lee R., Lee E.	1	Turtle Basking Survey	23-AP	14:30	16:00	13	33	0	1	Clear skies
Szabo, A.	1	Bat Habitat Assessment	28-AP	09:00	13:45	14.8	95	100	3	Cloudy, Fog
Robinson, O., Rochon, M.	1	Fish Community Sampling	7-MA	11:30	14:00	8	68	80	3	Mostly Cloudy
Lee R., Lee E.	2	Turtle Basking Survey	12-MA	16:00	18:00	17	54	0	1	Clear Skies
Boucher, N., Ng, P.	2	Headwater Drainage Feature Assessment	17-MA	09:00	14:00	23	36	0	5	Clear Skies
Lee R., Lee E.	2	Amphibian Call Count Survey	19-MA	21:20	22:45	20	37	10	0	Cloudy
Lohnes, S.	3	Turtle Basking Survey	27-MA	10:30	13:00	16	47	0	4	Clear Skies
Lee R., Nieroda, M.	1	Bat Acoustic Monitoring Device Deployment	3-JU	20:00	20:30	18	88	0	4	Clear Skies

Table 1: Field Studies and Natural Inventories (2021)

SURVEYORS	SURVEY ROUND	SURVEY TYPE	DATE	TIME		AIR TEMP (°C)	HUMIDITY (%)	CLOUD COVER (%)	BEAUFORT WIND SPEED	PRECIPITATION COMMENTS
				START	END					
Lee, R., Nieroda, M.	3	Amphibian Call Count Survey	4-JU	21:20	22:35	21	75	10	0	Clear skies
Foerster, L.	1	Breeding Bird Survey	13-JU	06:20	10:00	19.3	63	70	3	Mostly Cloudy
Szabo, A., Martin, S.	1	Tree Inventory	23-JU	11:00	17:00	25	70	40	3	Few Clouds
Szabo, A., Martin, S.	1	Tree Inventory	24-JU	09:00	18:00	22.9	45	85	5	Mostly Cloudy
Martin, S.	1	Tree Inventory	25-JU	14:00	20:00	22	80	100	3	Rain and Fog
Foerster, L.	2	Breeding Bird Survey	26-JU	06:28	10:00	21.8	93	100	5	Cloudy
Szabo, A.	1	Tree Inventory	27-JU	11:00	14:00	28.6	59	70	5	Mostly Cloudy
Leslie, J. Lohnes, S.	1	Feature Staking	05-JL	-	-	28.9	60	10	2	Mainly Clear
Leslie, J. Lohnes, S.	2	Feature Staking	22-OC	-	-	8	67	80	2	Mostly Cloudy
Leslie, J, Lohnes, S	3	Feature Staking	8-DE	-	-	4	92	50	2	None

LEGEND:

BEAUFORT WIND SPEED SCALE	
1	Calm (<1 km/hr)
2	Light Air (1-5 km/hr)
3	Light Breeze (6-11 km/hr)
4	Gentle Breeze (12-19 km/hr)
5	Moderate Breeze (20-28 km/hr)

MONTH (CODE)	
JA	January
FB	February
MR	March
AP	April
MA	May
JU	June
JL	July
AU	August
SE	September
OC	October
NO	November
DE	December

Table 2: Ecological Land Classification (ELC) Community Descriptions

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK (NHIC 2021)
FOREST		
Deciduous Forest		
FOD5 Dry-Fresh Sugar Maple Deciduous Forest	• This community was dominated by Sugar Maple (*Acer saccharum)* with American Basswood (*Tilia americana*), White Ash (*Fraxinus americana*), Black Cherry (*Prunus serotina*) and Eastern Hop-Hornbeam (*Ostrya virginiana*). • Understory species often include canopy seedlings as well as Virginia Waterleaf (*Hydrophyllum virginianum var. virginianum*), Garlic Mustard (*Alliaria petiolate*), Yellow Avens (*Geum aleppicum*) and Canada Enchanter's Nightshade (*Circaea canadensis ssp. canadensis*).	Not ranked
FOD7-3 Fresh-Moist Willow Lowland Deciduous Forest	• This mid-aged community was composed mainly of Hybrid Crack Willow (*Salix X fragilis*) and Manitoba Maple (*Acer negundo*) with Black Walnut (*Juglans nigra*) and Red Ash (*Fraxinus pennsylvanica*). • The understory and shrub layers were limited in this community but consisted mainly of Riverbank Grape (*Vitis riparia*) and European Buckthorn (*Rhamnus cathartica*). • The understory consisted of variety of species including Purple-Stemmed Aster (*Symphyotrichum puniceum*) Panicled Aster (*Symphyotrichum lanceolatum ssp. Lanceolatum*), Blue vervain (*Verbena hastata*), Wild Cucumber (*Echinocystis lobata*), Spotted Joe-pye Weed (*Eutrochium maculatum*) and Spotted Jewelweed (*Impatiens capensis*).	S4S5
CULTURAL		
Cultural Meadow		
CUM1-1 Dry-Moist Old Field Meadow	• Cultural meadow communities each contained less than 25% tree and shrub cover. Different variations of this community were observed, consisting of: ○ A sparse canopy was present that consisted of Sugar Maple, Black Walnut, Bur Oak (*Quercus macrocarpa*) and Red Ash. The ground layer contained the dominate vegetation form and consisted of Smooth Brome (*Bromus inermus*), Kentucky Bluegrass (*Poa pratensis*), Tall Goldenrod (*Solidago altissima*), New England Aster (*Symphyotrichum novae-angliae*), Common Milkweed (*Asclepias syriaca*), Canada Thistle (*Cirsium arvense)* and Quackgrass (*Elymus repens*). ○ A sparse canopy and shrub layer was present that consisted of Siberian Elm (*Ulmus pumila*), Common Pear (*Pyrus communis*), Manitoba Maple, European Buckthorn,	Not ranked

Table 2: Ecological Land Classification (ELC) Community Descriptions

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK (NHIC 2021)
	Chokecherry (*Prunus virginiana var. virginiana*) and North American Red Raspberry (*Rubus idaeus ssp. strigosus*). The ground layer contained the dominant vegetation form and consisted mainly of Kentucky Bluegrass, Smooth Brome, Tall Goldenrod, Canada Thistle, Spiked Sedge (*Carex spicata*), and Field Sow-Thistle (*Sonchus arvensis ssp. arvensis*).	
Cultural Thicket		
CUT1 Mineral Cultural Thicket	• Cultural thicket communities each contained less than 25% tree cover and over 25% shrub cover. Different variations of this community were observed, consisting of: ○ Large-Thorned Hawthorn (*Crataegus macracantha*) and Common Pear prevalent in tall shrub canopy with low shrub understory inclusive of Showy Fly Honeysuckle (*Lonicera x bella*), European Buckthorn, and English Hawthorn (*Crataegus monogyna var. monogyna*). Herbs often consisting of Smooth Brome, Tall Goldenrod, Common St. John's-Wort (*Hypericum perforatum ssp. perforatum*), Wild Carrot (*Daucus carota*), and Common Dandelion (*Taraxacum officinale*). ○ Sandbar Willow (*Salix interior)* with fewer occurrences European Buckthorn and Showy Fly Honeysuckle in shrub layer. Herb layer with abundance of Bird's-Foot Trefoil (*Lotus corniculatus*) and common associations of White Sweet-Clover (*Melilotus albus*), Variable Crown Vetch (*Securigera varia*), New England Aster, and Tall Goldenrod, with sparsely scattered occurrences of Reed Canary Grass (*Phalaris arundinacea var. arundinacea)*. This community transitions into a thicket swamp (SWT2-2), as described below. ○ Tall shrub layer dominated by European Buckthorn with fewer Large-Thorned Hawthorn. Herb layer most commonly consisting of Yellow Avens, with associations of Wild Strawberry (*Fragaria virginiana*), White Avens (*Geum canadense*), Garlic Mustard, and Orchard Grass (*Dactylis glomerata*).	Not ranked
SWAMP		
Thicket Swamp		
SWT2-2 Willow Mineral Thicket Swamp	• This community lacked a well-defined canopy or subcanopy; however, shrubs dominated the community.Common shrubs included Cottony Willow (*Salix eriocephala*) and Sandbar Willow. • The ground layer consisted of Reed Canary Grass, Panicled Aster, Purple Loosestrife (*Lythrum salicaria*), Tall Goldenrod, Wild Carrot, Bittersweet Nightshade (*Solanum dulcamara*) and Yellow Avens.	S5

Table 2: Ecological Land Classification (ELC) Community Descriptions

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK (NHIC 2021)
MARSH		
Meadow Marsh		
MAM2 Mineral Meadow Marsh	• A sparse canopy of Hybrid Crack Willow was present. The shrub layer consisted of Red-Osier Dogwood (*Cornus sericea*), Purple Willow (*Salix purpurea*) and Cottony Willow. • The ground layer contained the dominant vegetation form and consisted mainly of: Reed Canary Grass, Small-Leaved Watercress (*Nasturtium microphyllum*), Rice Cutgrass (*Leersia oryzoides*), Nodding Beggarticks (*Bidens cernua*), American Hog Peanut (*Amphicarpaea bracteate*) and Wild Cucumber.	Not ranked
MAM2-2 Reed Canary Grass Mineral Meadow Marsh	• Different variations of this community were observed, which generally consisted of: Manitoba Maple, Hybrid Crack Willow, Peach-Leaved Willow (*Salix amygdaloides*), Eastern Cottonwood (*Populus deltoides ssp. deltoides*) • The ground layer was dominant by Reed Canary Grass with Narrow-Leaved Cattail (*Typha angustifolia*), Hairy Willowherb (*Epilobium hirsutum*), Panicled Aster, Fowl Bluegrass (*Poa palustris*), Purple Loosestrife and New England Aster.	S5
Shallow Marsh		
MAS2 Mineral Shallow Marsh	• The ground layer contained the dominant vegetation form and consisted mainly of Flowering-Rush (*Butomus umbellatus*) with Great Duckweed (*Spirodela polyrhiza*), Leafy Pondweed (*Potamogeton foliosus ssp. foliosus*), Common Hornwort (C*eratophyllum demersum*) and Rice Cutgrass.	Not ranked
SHALLOW WATER		
Mixed Shallow Aquatic		
SAM1-4 Pondweed Mixed Shallow Marsh	• The ground layer contained the dominant vegetation form and consisted mainly of Great Duckweed, Northern Watermeal (*Wolffia borealis*), Columbia Watermeal (*Wolffia columbiana*), Small Duckweed (*Lemna minor*) and Flowering Rush.	S5
OTHER		
Pond	• The feature consisted of Small Pondweed (*Potamogeton pusillus*), Reed Canary Grass, Floating-Leaved Pondweed (*Potamogeton*	Not ranked

Table 2: Ecological Land Classification (ELC) Community Descriptions

ELC TYPE	COMMUNITY DESCRIPTION	S-RANK (NHIC 2021)
	natans), Blue Cattail (*Typha x glauca*) and Soft-Stemmed Bulrush (*Schoenoplectus tabernaemontani*). • Due to active cattle use and evident trampling, this feature was classified as an agricultural pond.	

													LOCAL / REGIONAL STATUS	
FAMILY	LATIN NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	OWES WETLAND SPECIES	WEEDINESS INDEX	INVASIVE EXOTIC RANK (Urban Forest Associates 2002)	PROVINCIAL STATUS (S-RANK)	GLOBAL STATUS (G-RANK)	COSSARO (MNRF)	COSEWIC STATUS		PEEL (Varga 2005)	AUTHORITY
Adoxaceae	Viburnum lentago	Nannyberry	4	0	T			S5	G5				X	L.
Adoxaceae	Viburnum opulus ssp. opulus	Cranberry Viburnum		-3		-1	4	SNA	G5				X	L.
Amaranthaceae	Amaranthus retroflexus	Redroot Amaranth		3		-1		SNA	G5				X	L.
Anacardiaceae	Toxicodendron radicans var. rydbergii	Western Poison Ivy	2	0				S5	G5				X	(Small ex Rydberg) Erskine
Apiaceae	Cicuta maculata var. maculata	Spotted Water-Hemlock	6	-5	I			S5	G5T5				X	L.
Apiaceae	Daucus carota	Wild Carrot		5		-2		SNA	GNR				X	L.
Apocynaceae	Asclepias syriaca	Common Milkweed	0	5				S5	G5				X	L.
Apocynaceae	Vincetoxicum rossicum	European Swallowwort		5			1	SNA	GNR				X	(Kleopow) Barbaricz
Asteraceae	Achillea millefolium	Common Yarrow		3		-1		SNA	G5				X	L.
Asteraceae	Arctium lappa	Great Burdock		3				SNA	GNR				X	L.
Asteraceae	Arctium minus	Common Burdock		3		-2		SNA	G?T?				X	(Hill) Bernh.
Asteraceae	Bidens cernua	Nodding Beggarticks	2	-5	I			S5	G5				X	L.
Asteraceae	Bidens frondosa	Devil's Beggarticks	3	-3	I			S5	G5				X	L.
Asteraceae	Carduus acanthoides ssp. acanthoides	Spiny Plumeless Thistle		5		-1		SNA	GNR				X	L.
Asteraceae	Cichorium intybus	Wild Chicory		5		-1		SNA	GNR				X	L.
Asteraceae	Cirsium arvense	Canada Thistle		3		-1	1	SNA	GNR				X	(L.) Scop.
Asteraceae	Cirsium vulgare	Bull Thistle		3		-1		SNA	G5				X	(Savi) Tenore
Asteraceae	Erigeron annuus	Annual Fleabane	0	3				S5	G5				X	(L.) Pers.
Asteraceae	Erigeron canadensis	Canada Horseweed	0	3				S5	G5				X	(L.)
Asteraceae	Erigeron strigosus	Rough Fleabane	4	3				S5	G5				X	Muhlenb. ex Willd.
Asteraceae	Eupatorium perfoliatum	Common Boneset	2	-3	I			S5	G5				X	L.
Asteraceae	Euthamia graminifolia	Grass-Leaved Goldenrod	2	0				S5	G5				X	(L.) Nutt.
Asteraceae	Eutrochium maculatum var. maculatum	Spotted Joe Pye Weed	3	-5	I			S5	G5T5				X	(L.) E.E. Lamont
Asteraceae	Inula helenium	Elecampane		3	T	-2	4	SNA	GNR				X	L.
Asteraceae	Leucanthemum vulgare	Oxeye Daisy		5		-1		SNA	GNR				X	Lam.
Asteraceae	Solidago altissima var. altissima	Tall Goldenrod	1	3				S5	GNR				X	L.
Asteraceae	Solidago flexicaulis	Zigzag Goldenrod	6	3				S5	G5				X	L.
Asteraceae	Sonchus arvensis ssp. arvensis	Field Sow-Thistle		3				SNA	GNR				X	L.
Asteraceae	Sonchus oleraceus	Common Sow-Thistle		3		-1		SNA	GNR				X	L.
Asteraceae	Symphyotrichum ericoides var. ericoides	White Heath Aster	4	3				S5	G5T5				X	(L.) G.L. Nesom
Asteraceae	Symphyotrichum lanceolatum ssp. lanceolatum	Panicled Aster (ssp. lanceolatum)	3	-3	I			S5	G5T5				X	(Willd.) G.L. Nesom
Asteraceae	Symphyotrichum novae-angliae	New England Aster	2	-3				S5	G5				X	(L.) G.L. Nesom
Asteraceae	Symphyotrichum pilosum var. pilosum	Old Field Aster	1	3				S5	G5T5				R1	(Willd.) G.L. Nesom
Asteraceae	Symphyotrichum puniceum	Purple-Stemmed Aster	6	-5	I			S5	G5				X	(L.) Á. & D. Löve
Asteraceae	Tanacetum vulgare	Common Tansy		5		-1	3	SNA	GNR				X	L.
Asteraceae	Taraxacum officinale	Common Dandelion		3		-2		SNA	G5				X	F.H. Wiggers
Asteraceae	Tragopogon dubius	Yellow Goatsbeard		5		-1		SNA	GNR				X	Scopoli
Asteraceae	Tripleurospermum inodorum	Scentless Chamomile		0		-1		SNA	GNR				X	(L.) Schultz-Bip.
Asteraceae	Tussilago farfara	Coltsfoot		3	T	-2	4	SNA	GNR				X	L.
Balsaminaceae	Impatiens capensis	Spotted Jewelweed	4	-3	I			S5	G5				X	Meerburgh
Betulaceae	Ostrya virginiana	Eastern Hop-Hornbeam	4	3				S5	G5				X	(Miller) K. Koch
Boraginaceae	Hackelia virginiana	Virginia Stickseed	5	3				S5	G5				U	(L.) I.M. Johnston
Boraginaceae	Hydrophyllum virginianum var. virginianum	Virginia Waterleaf	6	0				S5	G5				X	L.
Boraginaceae	Lithospermum officinale	European Gromwell		5		-1		SNA	GNR				X	L.
Brassicaceae	Alliaria petiolata	Garlic Mustard		0		-3	1	SNA	G5				X	(M. Bieb.) Cavara & Grande
Brassicaceae	Barbarea vulgaris	Bitter Wintercress		0		-1	3	SNA	GNR				X	W.T. Aiton
Brassicaceae	Capsella bursa-pastoris	Common Shepherd's Purse		3		-1		SNA	GNR				X	(L.) Medikus
Brassicaceae	Erysimum cheiranthoides	Wormseed Wallflower		3		-1		S5					X	L.
Brassicaceae	Hesperis matronalis	Dame's Rocket		3		-3	1	SNA	G4G5				X	L.
Brassicaceae	Lepidium campestre	Field Peppergrass		5		-1		SNA	GNR				X	(L.) W.T. Aiton
Brassicaceae	Nasturtium microphyllum	Small-Leaved Watercress		-5	I	-3		SNA	GNR				X	(Boenn.) Reichb.
Caprifoliaceae	Lonicera tatarica	Tartarian Honeysuckle		3		-3	1	SNA	GNR				X	L.
Caprifoliaceae	Lonicera x bella	Showy Fly Honeysuckle		3		-3		HYB_e	GNR				X	Zabel
Caryophyllaceae	Cerastium fontanum ssp. vulgare	Common Mouse-Ear Chickweed		3		-1		SNA	GNR				X	(Hartman) Greuter & Burdet
Caryophyllaceae	Dianthus armeria ssp. armeria	Deptford Pink		5		-1		SNA	GNR				X	L.
Caryophyllaceae	Stellaria graminea	Grass-Leaved Starwort		5	T	-2		SNA	GNR				X	L.
Ceratophyllaceae	Ceratophyllum demersum	Common Hornwort	4	-5	I			S5	G5				R3	L.
Convolvulaceae	Convolvulus arvensis	Field Bindweed		5		-1	3	SNA	GNR				X	L.
Cornaceae	Cornus sericea	Red-Osier Dogwood	2	-3	I*			S5	G5				X	L.
Cucurbitaceae	Echinocystis lobata	Wild Cucumber	3	-3	T			S5	G5				X	(Michx.) Torr. & A. Gray
Fabaceae	Amphicarpaea bracteata	American Hog Peanut	4	0	T			S5	G5				X	(L.) Fernald
Fabaceae	Lotus corniculatus	Garden Bird's-Foot Trefoil		3		-2	2	SNA	GNR				X	L.
Fabaceae	Medicago lupulina	Black Medick		3		-1	4	SNA	GNR				X	L.
Fabaceae	Medicago sativa ssp. sativa	Alfalfa (ssp. sativa)		5		-1	4	SNA	GNRTNR				X	L.
Fabaceae	Melilotus albus	White Sweet-Clover		3		-3	2	SNA	GNR				X	Medik.
Fabaceae	Melilotus officinalis	Yellow Sweet-Clover		3		-1	2	SNA	GNR				X	(L.) Pallas
Fabaceae	Robinia pseudoacacia	Black Locust		3		-3	2	SNA	G5				X	L.
Fabaceae	Trifolium pratense	Red Clover		3		-2	4	SNA	GNR				X	L.
Fabaceae	Trifolium repens	White Clover		3		-1	4	SNA	GNR				X	L.
Fabaceae	Vicia cracca	Tufted Vetch		5		-1	2	SNA	GNR				X	L.
Fagaceae	Quercus macrocarpa	Burr Oak	5	3	T			S5	G5				X	Michaux
Fagaceae	Quercus rubra	Northern Red Oak	6	3				S5	G5				X	L.
Geraniaceae	Geranium robertianum	Herb-Robert	2	3		-2		S5	G5				X	L.
Hypericaceae	Hypericum perforatum ssp. perforatum	Common St. John's-Wort		5		-3	4	SNA	GNR				X	L.
Juglandaceae	Juglans nigra	Black Walnut	5	3				S4?	G5				X	L.
Lamiaceae	Leonurus cardiaca ssp. cardiaca	Common Motherwort		5		-2		SNA	GNR				X	L.
Lamiaceae	Nepeta cataria	Catnip		3		-2	4	SNA	GNR				X	L.
Lythraceae	Lythrum salicaria	Purple Loosestrife		-5	I	-3	1	SNA	G5				X	L.
Malvaceae	Abutilon theophrasti	Velvetleaf		3		-1	3	SNA	GNR				X	Medikus
Malvaceae	Tilia americana	Basswood	4	3				S5	G5				X	L.
Oleaceae	Fraxinus americana	White Ash	4	3				S4	G5				X	L.
Oleaceae	Fraxinus pennsylvanica	Red Ash	3	-3	T			S4	G5				X	Marshall
Oleaceae	Syringa vulgaris	Common Lilac		5		-2	2	SNA	GNR				X	L.
Onagraceae	Circaea canadensis ssp. canadensis	Canada Enchanter's Nightshade	2	3				S5	G5T5				X	(L.) Hill
Onagraceae	Epilobium ciliatum ssp. ciliatum	Northern Willowherb	3	-3	I*			S5	G5T?				X	Raf.
Onagraceae	Epilobium hirsutum	Hairy Willowherb		-3	I	-2		SNA	GNR				X	L.
Onagraceae	Epilobium parviflorum	Small-Flowered Willowherb		3	T	-1		SNA	GNR				X	Schreber
Onagraceae	Oenothera parviflora	Small-Flowered Evening Primrose	1	3				S5	G4?				X	L.

													LOCAL / REGIONAL STATUS		
FAMILY	LATIN NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	OWES WETLAND SPECIES	WEEDINESS INDEX	INVASIVE EXOTIC RANK (Urban Forest Associates 2002)	PROVINCIAL STATUS (S-RANK)	GLOBAL STATUS (G-RANK)	COSSARO (MNRF)	COSEWIC STATUS		PEEL (Varga 2005)	AUTHORITY
Papaveraceae	Chelidonium majus	Greater Celandine		5		-3		SNA	GNR				X	L.
Plantaginaceae	Veronica serpyllifolia	Thyme-Leaved Speedwell		0				SNA	G5				X	L.
Polygonaceae	Persicaria hydropiper	Marshpepper Smartweed		-5	I			SNA	GNR				X	(L.) Delarbre
Polygonaceae	Persicaria lapathifolia	Pale Smartweed	2	-3	T			S5	G5				X	(L.) Delarbre
Polygonaceae	Persicaria maculosa	Spotted Lady's-Thumb		-3	T	-1		SNA	G3G5				X	Gray
Polygonaceae	Rumex crispus	Curled Dock		0	T	-2		SNA	GNR				X	L.
Ranunculaceae	Ranunculus acris	Common Buttercup		0	T	-2		SNA	G5				X	L.
Ranunculaceae	Ranunculus sceleratus	Cursed Buttercup	2	-5	I			S5	G5				X	L.
Rhamnaceae	Rhamnus cathartica	European Buckthorn		0	T	-3	1	SNA	GNR				X	L.
Rosaceae	Amelanchier laevis	Smooth Serviceberry	5	5				S5	G5				U	Wiegand
Rosaceae	Crataegus monogyna var. monogyna	English Hawthorn		3		-1	3	SNA	G5				X	Jacquin
Rosaceae	Crataegus punctata	Dotted Hawthorn	4	5				S5	G5				X	Jacquin
Rosaceae	Fragaria virginiana	Wild Strawberry	2	3				S5	G5				X	Miller
Rosaceae	Geum aleppicum	Yellow Avens	2	0	T			S5	G5				X	Jacquin
Rosaceae	Geum canadense	White Avens	3	0	T			S5	G5				X	Jacquin
Rosaceae	Geum laciniatum	Rough Avens	4	-3	T			S4	G5				X	Murray
Rosaceae	Malus pumila	Common Apple		5		-1		SNA	G5				X	Miller
Rosaceae	Potentilla recta	Sulphur Cinquefoil		5		-2		SNA	GNR				X	L.
Rosaceae	Prunus serotina var. serotina	Black Cherry	3	3				S5	G5				X	Ehrhart
Rosaceae	Prunus virginiana var. virginiana	Chokecherry	2	3				S5	G5T?				X	L.
Rosaceae	Pyrus communis	Common Pear		5		-1		SNA	G5				X	L.
Rosaceae	Rubus idaeus ssp. strigosus	North American Red Raspberry	2	3				S5	G5T5				X	(Michaux) Focke
Rosaceae	Rubus occidentalis	Black Raspberry	2	5				S5	G5				X	L.
Rubiaceae	Galium mollugo	Smooth Bedstraw		5		-2	2	SNA	GNR				X	L.
Rubiaceae	Galium verum	Yellow Bedstraw		5		-1	3	SNA	GNR				X	L.
Salicaceae	Populus deltoides ssp. deltoides	Eastern Cottonwood	4	0	T			S5	G5T5				X	Bartram ex Marshall
Salicaceae	Populus tremuloides	Trembling Aspen	2	0	T			S5	G5				X	Michaux
Salicaceae	Populus x canadensis	Canada Poplar					4	HYB_n	GNA				XSR	Moench
Salicaceae	Salix amygdaloides	Peach-Leaved Willow	6	-3	T			S5	G5				R6	Andersson
Salicaceae	Salix eriocephala	Cottony Willow	4	-3	T			S5	G5				X	Michaux
Salicaceae	Salix interior	Sandbar Willow	1	-3	T			S5	GNR				R5	Rowlee
Salicaceae	Salix purpurea	Purple Willow		-3	T	-1	4	SNA	G5				X	L.
Salicaceae	Salix x fragilis	Hybrid Crack Willow			T	-3	3	HYB_e	GNA				XSR	L.
Salicaceae	Salix x sepulcralis	Golden Weeping Willow						HYB_e	GNA				XSR	Simonkai
Sapindaceae	Acer negundo	Manitoba Maple	0	0	T		1	S5	G5				X	L.
Sapindaceae	Acer platanoides	Norway Maple		5		-3	2	SNA	GNR				X	L.
Sapindaceae	Acer saccharinum	Silver Maple	5	-3	I			S5	G5				X	L.
Sapindaceae	Acer saccharum	Sugar Maple	4	3				S5	G5				X	Marshall
Scrophulariaceae	Verbascum thapsus ssp. thapsus	Common Mullein		5		-2		SNA	GNR				X	L.
Solanaceae	Solanum dulcamara	Bittersweet Nightshade		0	T	-2	3	SNA	GNR				X	L.
Ulmaceae	Ulmus americana	White Elm	3	-3	T			S5	G5				X	L.
Ulmaceae	Ulmus pumila	Siberian Elm		3		-1	2	SNA	GNR				X	L.
Urticaceae	Boehmeria cylindrica	Small-Spike False Nettle	4	-5	I			S5	G5				X	(L.) Swartz
Urticaceae	Urtica dioica ssp. gracilis	Slender Stinging Nettle	2	0	T			S5	G5T5				X	(Aiton) Selander
Verbenaceae	Verbena hastata	Blue Vervain	4	-3	I			S5	G5				X	L.
Violaceae	Viola pubescens	Downy Yellow Violet	5	3				S5	G5				X	Aiton
Vitaceae	Parthenocissus vitacea	Thicket Creeper	4	3				S5	G5				X	(Knerr) Hitchcock
Vitaceae	Vitis riparia	Riverbank Grape	0	0				S5	G5				X	Michaux
Cupressaceae	Thuja occidentalis	Eastern White Cedar	4	-3	T			S5	G5				X	L.
Pinaceae	Larix decidua	European Larch		5		-1		SNA	GNR				X	Miller
Pinaceae	Picea abies	Norway Spruce		5		-1		SNA	GNR				X	(L.) Karsten
Pinaceae	Picea glauca	White Spruce	6	3	T			S5	G5				R3	(Moench) Voss
Pinaceae	Picea pungens	Blue Spruce		3				SNA	G5					Engelm.
Pinaceae	Pinus banksiana	Jack Pine	5	3				S5	G5				XSR	Lamb.
Pinaceae	Pinus nigra	Austrian Pine		5		-1		SNA	GNR					Arnold
Pinaceae	Pinus strobus	Eastern White Pine	4	3	T			S5	G5				X	L.
Pinaceae	Pinus sylvestris	Scots Pine		3		-3	2	SNA	GNR				X	L.
Alismataceae	Alisma triviale	Northern Water-Plantain	1	-5	I			S5	G5				X	L.
Alismataceae	Sagittaria latifolia	Broad-Leaved Arrowhead	4	-5	I			S5	G5				X	Willdenow
Araceae	Lemna minor	Small Duckweed	5	-5	I			S5	G5				X	L.
Araceae	Spirodela polyrhiza	Great Duckweed	4	-5	I			S5	G5				U	(L.) Schleiden
Araceae	Wolffia borealis	Northern Watermeal	4	-5	I			S5	G5				R2	(Engelm.) Landolt & Wildi ex Gandhi, Wiersema & Brouillet
Araceae	Wolffia columbiana	Columbia Watermeal	4	-5	I			S5	G5				R3	H. Karsten
Butomaceae	Butomus umbellatus	Flowering-Rush		-5	I	-2	1	SNA	G5				X	L.
Cyperaceae	Carex cristatella	Crested Sedge	3	-3	I			S5	G5				X	Britton
Cyperaceae	Carex spicata	Spiked Sedge		3		-1		SNA	GNR				X	Hudson
Cyperaceae	Carex stipata var. stipata	Awl-Fruited Sedge	3	-5	I			S5	G5				X	Muhlenb. ex Willdenow
Cyperaceae	Cyperus esculentus var. leptostachyus	Perennial Yellow Flatsedge	1	-3	T			S5	G5				X	Boeckeler
Cyperaceae	Eleocharis erythropoda	Red-Stemmed Spikerush	4	-5	I			S5	G5				X	Steudel
Cyperaceae	Eleocharis obtusa	Blunt Spikerush	5	-5	I			S5	G5				U	(Willd.) Schultes
Cyperaceae	Schoenoplectus tabernaemontani	Soft-Stemmed Bulrush	5	-5	I			S5	G5				X	(C.C. Gmelin) Palla
Liliaceae	Erythronium americanum ssp. americanum	Yellow Trout Lily	5	5				S5	G5T5				X	Ker Gawler
Poaceae	Agrostis stolonifera	Creeping Bentgrass		-3	T			SNA	G5				X	L.
Poaceae	Beckmannia syzigachne	American Sloughgrass	4	-5	I			S4	G5				X	(Steud.) Fernald
Poaceae	Bromus inermis	Smooth Brome		5		-3	4	SNA	G5TNR				X	Leysser
Poaceae	Dactylis glomerata	Orchard Grass		3		-1	3	SNA	GNR				X	L.
Poaceae	Echinochloa crus-galli	Large Barnyard Grass		-3	T	-1		SNA	GNR				X	(L.) Palisot de Beauvois
Poaceae	Elymus repens	Quackgrass		3		-3	3	SNA	GNR				X	(L.) Gould
Poaceae	Eragrostis minor	Little Lovegrass		5		-1		SNA	GNR				X	Host
Poaceae	Hordeum jubatum ssp. jubatum	Foxtail Barley	0	0	T			S5?	G5T5				X	L.
Poaceae	Leersia oryzoides	Rice Cutgrass	3	-5	I			S5	G5				X	(L.) Swartz
Poaceae	Lolium multiflorum	Annual Ryegrass						SNA	GNR					Lamarck
Poaceae	Panicum dichotomiflorum ssp. dichotomiflorum	Fall Panicgrass		-3		-1		SNA	G5				X	Michaux
Poaceae	Phalaris arundinacea var. arundinacea	Reed Canary Grass	0	-3	T		P	S5	GNR				X	L.
Poaceae	Phleum pratense ssp. pratense	Common Timothy		3		-1		SNA	GNR				X	L.
Poaceae	Phragmites australis ssp. australis	European Reed		-3	T		1	SNA	G5T5				X	(Cav.) Trinius ex Steudel
Poaceae	Poa palustris	Fowl Bluegrass	5	-3	I			S5	G5				X	L.
Poaceae	Poa pratensis	Kentucky Bluegrass	0	3			2	S5	G5				X	L.

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Poaceae	Setaria pumila ssp. pumila	Yellow Foxtail		0		-1	4	SNA	GNR				X	(Poir.) Roemer & Schultes	
Potamogetonaceae	Potamogeton foliosus ssp. foliosus	Leafy Pondweed	4	-5	I			S5	G5				R7	Rafinesque	
Potamogetonaceae	Potamogeton natans	Floating-Leaved Pondweed	5	-5	I			S5	G5				U	L.	
Potamogetonaceae	Potamogeton pusillus	Small Pondweed	4	-5	I			S4?	G5T5				R3	L.	
Typhaceae	Typha angustifolia	Narrow-Leaved Cattail		-5	I		P	SNA	G5				X	L.	
Typhaceae	Typha latifolia	Broad-Leaved Cattail	1	-5	I			S5	G5				X	L.	
Typhaceae	Typha x glauca	Blue Cattail		-5	I		P	HYB_n	GNA				X	Godron	

STATISTICS		
Species Diversity		
Total Number of Species:	183	
Native Species:	94	51%
Exotic Species:	89	49%
S1-S3 Species:	0	0%
S4 Species:	6	6%
S5 Species:	86	91%
Floristic Quality Indices		
Mean Co-efficient of Conservatism (CC)	3.2	
CC 0 - 3 = lowest sensitivity	44	47%
CC 4 - 6 = moderate sensitivity	47	50%
CC 7 - 8 = high sensitivity	0	0%
CC 9 - 10 = highest sensitivity	0	0%
Floristic Quality Index (FQI)	31	
Weedy & Invasive Species		
Mean Weediness Index (Oldham et al):	-1.7	
-1 = low potential invasiveness	44	49%
-2 = moderate potential invasiveness	20	22%
-3 = high potential invasivenss	16	18%
Mean Exotic Rank (Urban Forest Associates):	3	
Category 1	10	11%
Category 2	11	12%
Category 3	10	11%
Category 4	13	15%
Potentially Invasive (P)	3	3%
Wetland Species		
Mean Wetness Index	0.7	
Upland	35	19%
Facultative upland	63	34%
Facultative	22	12%
Facultative wetland	30	16%
Obligate wetland	29	16%

COMMON NAME	Provincial Status (S RANK)	Global Status (G RANK)	SARO (MECP)	COSEWIC (Federal)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Region of Waterloo	Local Status CVC	Niagara Region CA Status	SWH Indicator Species 6E	SWH Indicator Species 7E
AMPHIBIANS												
American Toad	S5	G5					L4	X		W	X	X
Gray Treefrog	S5	G5					L2	X		L	X	X
Wood Frog	S5	G5					L2	X		L	X	X
REPTILES												
Snapping Turtle	S4	G5	SC	SC			L3				X	X
Midland Painted Turtle	S4	G5T5		SC			L3			L	X	X
BIRDS										L		
Mallard	S5	G5					L5			U	X	X
Rock Pigeon	SNA	G5										
Mourning Dove	S5	G5					L5					
Killdeer	S4B	G5					L4					
Spotted Sandpiper	S5B	G5								U		
Ring-billed Gull	S5	G5					L4				X	X
Herring Gull	S4B,S5N	G5					L4					X
Great Blue Heron	S4	G5				m	L3	X		R	X	X
Cooper's Hawk	S4	G5			HU	m	L4	X		U	X	X
Red-bellied Woodpecker	S5	G5			HU	m	L4	X		R		
Eastern Kingbird	S4B	G5					L4					
Willow Flycatcher	S4B	G5			HU		L4	X		U	X	X
Warbling Vireo	S5B	G5					L5	X				
Red-eyed Vireo	S5B	G5					L4			C		
Blue Jay	S5	G5					L5					
American Crow	S5	G5					L5			C		
Horned Lark	S4	G5			HU		L3					
Tree Swallow	S4S5B	G5					L4			C		
Northern Rough-winged Swallow	S4B	G5			HU		L4			C	X	X
Cliff Swallow	S4S5B	G5				m	L5			C	X	X
Barn Swallow	S4B	G5	THR	SC			L4			U		
Black-capped Chickadee	S5	G5					L5			C		
American Robin	S5	G5					L5			U		
Gray Catbird	S5B, S3N	G5					L4			C		
Brown Thrasher	S4B	G5				m	L3	X		C	X	X
European Starling	SNA	G5				E	L+			U		
Cedar Waxwing	S5	G5					L5					
House Sparrow	SNA	G5				E	L+			C		
American Goldfinch	S5	G5					L5					
Savannah Sparrow	S5B, S3N	G5					L4				X	X
Song Sparrow	S5	G5					L5			C		
Bobolink	S4B	G5	THR	THR			L2					
Eastern Meadowlark	S4B, S3N	G5	THR	THR		m	L3			U		

COMMON NAME	Provincial Status (S RANK)	Global Status (G RANK)	SARO (MECP)	COSEWIC (Federal)	Local Status Halton	Local Status Hamilton	Local Status TRCA	Regional Status Region of Waterloo	Local Status CVC	Niagara Region CA Status	SWH Indicator Species 6E	SWH Indicator Species 7E
Orchard Oriole	S4B	G5			HR	m	L5	X				
Red-winged Blackbird	S5	G5					L5			C		
Brown-headed Cowbird	S5	G5					L5			C		
Common Grackle	S5	G5					L5					
Common Yellowthroat	S5B, S3N	G5					L4					
Yellow Warbler	S5B	G5					L5					
Northern Cardinal	S5	G5					L5			U		
Indigo Bunting	S5B	G5					L4					

SUMMARY

Total Odonata:	0
Total Butterflies:	0
Total Other Arthropods	0
Total Amphibians:	3
Total Reptiles:	2
Total Birds:	42
Total Breeding Birds:	9
Total Mammals:	0

SIGNIFICANT SPECIES

Global:
National:
Provincial:
Regional:
Local:

Explanation of Status and Acronymns

COSSARO: Committee on the Status of Species at Risk in Ontario
COSEWIC: Committee on the Status of Endangered Wildlife in Canada
S1: Critically Imperiled—Critically imperiled in the province (often 5 or fewer occurrences)
S2: Imperiled—Imperiled in the province, very few populations (often 20 or fewer),
S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)
S4: Apparently Secure—Uncommon but not rare
S5: Secure—Common, widespread, and abundant in the province
SX: Presumed extirpated
SH: Possibly Extirpated (Historical)
SNR: Unranked
SU: Unrankable—Currently unrankable due to lack of information
SNA: Not applicable—A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S#: Range Rank—A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species
S#B- Breeding status rank

S#N- Non Breeding status rank
?: Indicates uncertainty in the assigned rank
G1: Extremely rare globally; usually fewer than 5 occurrences in the overall range
G1G2: Extremely rare to very rare globally
G2: Very rare globally; usually between 5-10 occurrences in the overall range
G2G3: Very rare to uncommon globally
G3: Rare to uncommon globally; usually between 20-100 occurrences
G3G4: Rare to common globally
G4: Common globally; usually more than 100 occurrences in the overall range
G4G5: Common to very common globally
G5: Very common globally; demonstrably secure
GU: Status uncertain, often because of low search effort or cryptic nature of the species; more data needed.
T: Denotes that the rank applies to a subspecies or variety
Q: Denotes that the taxonomic status of the species, subspecies, or variety is questionable.
END: Endangered
THR: Threatened
SC: Special Concern
NAR: Not At Risk
IND: Indeterminant, insufficient information to assign status
DD: Data Deficient
6: Rare in Site Region 6
7: Rare in Site Region 7
Area: Minimum patch size for area-sensitive species (ha)
H- highly significant in Hamilton Region (i.e. rare)
m- moderately significant in Hamilton Region (i.e. uncommon)
L1- extremely rare locally (Toronto Region)
L2- very rare locally (Toronto Region)
L3- rare to uncommon locally (Toronto Region)
HR- rare in Halton Region, highly significant
HU- uncommon in Halton Region, moderately significant

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Table 5: Amphibian Call Count Survey Station Results

SURVEY ROUND	STATION NUMBER	SPECIES CODE												WATER
		NOAM	AMTO	FOTO	GRTR	SPPE	CHFR	WOFR	NLFR	PIFR	GRFR	BULL	MIFR	Present (Y/N)
1	AMC1	X												Y
2	AMC1		1(1)		1(1)									Y
3	AMC1				1(3)									Y
1	AMC2	X												Y
2	AMC2		1(1)											Y
3	AMC2	X												Y
1	AMC3	X												Y
2	AMC3	X												Y
3	AMC3				1(5)									Y
1	AMC4	X												N
2	AMC4				1(1)									Y
3	AMC4				3									Y
1	AMC5	X												Y
2	AMC5	X												Y
3	AMC5	X												N
1	AMC6							1(1)						Y
2	AMC6	X												Y
3	AMC6				1(4)									Y
1	AMC7	X												Y
2	AMC7	DRY												N
1	AMC8	X												N
2	AMC8	DRY												N
1	AMC9	X												Y
2	AMC9	DRY												N
1	AMC10	X												Y
2	AMC10	DRY												N

Table 5: Amphibian Call Count Survey Station Results

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOAM	No Amphibians	No amphibians despite survey effort
AMTO	American Toad	*Anaxyrus americanus*
FOTO	Fowler's Toad	*Anaxyrus fowleri*
GRTR	Gray Treefrog	*Hyla versicolor*
CHFR	Western Chorus Frog	*Pseudacris triseriata*
WOFR	Wood Frog	*Lithobates sylvaticus*
NLRF	Northern Leopard Frog	*Lithobates pipiens*
PIFR	Pickerel Frog	*Lithobates palustris*
GRFR	Green Frog	*Lithobates clamitans*
BULL	American Bullfrog	*Lithobates catesbeianus*
MIFR	Mink Frog	*Lithobates septentrionalis*

CALL CODES	
X	No amphibians heard
1	Calls can be counted without error
2	Calls overlap but can be reliably estimated
3	Calls overlap too much to estimate number

Note: For each species, the first number is the call code and the second number, which is in brackets, is the number of individuals of that species heard calling.

Table 6: Turtle Survey Results

DATE SURVEYED (2021)	SURVEY ROUND	TRANSECT OR STATION NUMBER	SPECIES CODE								
			NOTU	MPTU	SNTU	MATU	BLTU	SSTU	WOTU	STIN	SPTU
23-AP	1	BS1		1							
13-MA	2	BS1	X								
27-MA	3	BS1	X								
23-AP	1	BS2		4							
13-MA	2	BS2		8							
27-MA	3	BS2		1							
23-AP	1	BS3		1							
13-MA	2	BS3		13	1						
27-MA	3	BS3		1							

LEGEND:

SPECIES CODE	COMMON NAME	SCIENTIFIC NAME
NOTU	No Turtles	No turtles despite survey effort
MPTU	Midland Painted Turtle	*Chrysemys picta marginata*
SNTU	Snapping Turtle	*Chelydra serpentina*
MATU	Northern Map Turtle	*Graptemys geographica*
BLTU	Blanding's Turtle	*Emydoidea blandingii*
SSTU	Spiny Soft-shelled Turtle	*Apalone spinifera*
WOTU	Wood Turtle	*Glyptemys insculpta*
STIN	Stinkpot Turtle	*Stemotherus odoratus*
SPTU	Spotted Turtle	*Clemmys guttata*

DATE	
MONTH	CODE
January	JA
February	FE
March	MR
April	AP
May	MA
June	JN
July	JL
August	AU
September	SE
October	OC
November	NO
December	DE

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									
	X	**Anseriformes**								
	X	***Anatidae***								
		Mallard	MALL	*Anas platyrhynchos*	S5	G5			X	PO-H
	X									
	X	**Columbiformes**								
	X	***Columbidae***								
		Rock Pigeon	ROPI	*Columba livia*	SNA	G5				PO-H
		Mourning Dove	MODO	*Zenaida macroura*	S5	G5				PR-T
	X									
	X	**Charadriiformes**								
	X	***Charadriidae***								
		Killdeer	KILL	*Charadrius vociferus*	S5B, S5N	G5				PR-P
	X									
	X	***Scolopacidae***								
		Spotted Sandpiper	SPSA	*Actitis macularius*	S5	G5			X	PO-H
	X									
	X	***Laridae***								
		Ring-billed Gull	RBGU	*Larus delawarensis*	S5B,S4N	G5			X	OB-X
		Herring Gull	HEGU	*Larus argentatus*	S5B,S5N	G5			X	OB-X
	X									
	X	**Pelecaniformes**								
	X	***Ardeidae***								
		Great Blue Heron	GBHE	*Ardea herodias*	S4	G5			X	OB-X
	X									
	X	**Accipitriformes**								
	X	***Accipitridae***								
		Northern Harrier	NOHA	*Circus hudsonius*	S4B	G5	NAR	NAR	X	PR-T
		Cooper's Hawk	COHA	*Accipiter cooperii*	S4	G5	NAR	NAR	X	PR-T
	X									
	X	**Piciformes**								
	X	***Picidae***								
		Red-bellied Woodpecker	RBWO	*Melanerpes carolinus*	S4	G5				PO-H
	X									
	X	**Passeriformes**								
	X	***Tyrannidae***								
		Eastern Kingbird	EAKI	*Tyrannus tyrannus*	S4B	G5				CO-NE
		Willow Flycatcher	WIFL	*Empidonax traillii*	S5B	G5			X	PR-T
	X									
	X	***Vireonidae***								
		Warbling Vireo	WAVI	*Vireo galvis*	S4B	G5				PR-T
		Red-eyed Vireo	REVI	*Vireo olivaceus*	S5B	G5				PO-S
	X									
	X	***Corvidae***								
		Blue Jay	BLJA	*Cyanocitta cristata*	S5	G5				PR-T
		American Crow	AMCR	*Corvus brachyrhynchos*	S5B	G5				PO-H
	X									
	X	***Alaudidae***								
		Horned Lark	HOLA	*Eremophila alpestris*	S5B	G5				PO-S
	X									
	X	***Hirundinidae***								
		Tree Swallow	TRES	*Tachycineta bicolor*	S4B	G5				PO-H
		Northern Rough-winged Swallow	NRWS	*Stelgidopteryx serripennis*	S4B	G5			X	PO-H
		Cliff Swallow	CLSW	*Petrochelidon pyrrhonota*	S4B	G5			X	CO-AE
		Barn Swallow	BARS	*Hirundo rustica*	S5B	G5	THR	THR		CO-FY
	X									
	X	***Paridae***								
		Black-capped Chickadee	BCCH	*Poecile atricapillus*	S5	G5				PO-H
	X									
	X	***Turdidae***								
		American Robin	AMRO	*Turdus migratorius*	S5B	G5				CO-FY
	X									
	X	***Mimidae***								
		Gray Catbird	GRCA	*Dumetella carolinensis*	S4B	G5				PR-T
		Brown Thrasher	BRTH	*Toxostoma rufum*	S4B	G5			X	PR-T
	X									
	X	***Sturnidae***								
		European Starling	EUST	*Sturnus vulgaris*	SNA	G5				PO-H

No.	X	Common Name	Species Code	Scientific Name	Provincial Status (S Rank)	Global Status (G Rank)	COSSARO (MNRF)	COSEWIC (Federal)	SWH Indicator Species	Highest Breeding Evidence
	X									
	X									
	X									
	X	***Bombycillidae***								
		Cedar Waxwing	CEDW	*Bombycilla cedrorum*	S5B	G5				PR-T
	X									
	X	***Passeridae***								
		House Sparrow	HOSP	*Passer domesticus*	SNA	G5				PO-H
	X									
	X	***Fringillidae***								
		American Goldfinch	AMGO	*Spinus tristis*	S5B	G5				PR-P
	X									
	X	***Passerellidae***								
		Savannah Sparrow	SAVS	*Passerculus sandwichensis*	S4B	G5			X	CO-CF
		Song Sparrow	SOSP	*Melospiza melodia*	S5B	G5				CO-FY
	X									
	X	***Icteridae***								
		Bobolink	BOBO	*Dolichonyx oryzivorus*	S4B	G5	THR	THR		CO-FY
		Eastern Meadowlark	EAME	*Sturnella magna*	S4B	G5	THR	THR		CO-CF
		Orchard Oriole	OROR	*Icterus spurius*	S4B	G5				PO-S
		Red-winged Blackbird	RWBL	*Agelaius phoeniceus*	S4	G5				CO-CF
		Brown-headed Cowbird	BHCO	*Molothrus ater*	S4B	G5				PO-P
		Common Grackle	COGR	*Quiscalus quiscula*	S5B	G5				PO-H
	X									
	X	***Parulidae***								
		Common Yellowthroat	COYE	*Geothlypis trichas*	S5B	G5				PO-S
		Yellow Warbler	YWAR	*Setophaga petechia*	S5B	G5				PR-T
	X									
	X	***Cardinalidae***								
		Northern Cardinal	NOCA	*Cardinalis cardinalis*	S5	G5				PR-T
		Indigo Bunting	INBU	*Passerina cyanea*	S4B	G5				PR-T
	X									

Species Common Name and Scientific Name: Chesser, R. T., K. J. Burns, C. Cicero, J. L. Dunn, A. W. Kratter, I. J. Lovette, P. C. Rasmussen, J. V. Remsen, Jr., D. F. Stotz, and K. Winker. 2019. Check-list of North American Birds (online). American Ornithological Society. Available online: http://checklist.aou.org/taxa

Species Code: Consistent with the American Ornithologists' Union. 2019. Species 4-Letter-Codes. Available online: http://www.birdsontario.org/atlas/codes.jsp?lang=en&pg=species

Highest Breeding Evidence: Codes assigned for breeding evidence are consistent with the Ontario Breeding Bird Atlas (OBBA). 2018. Breeding Evidence Codes. Available online: http://www.birdsontario.org/atlas/codes.jsp?lang=en&pg=breeding&sortorder=aou

S ranks: Provincial ranks are from the Natural Heritage Information Centre; S1 (critically imperiled), S2 (imperlied), S3 (vulnerable), S4 (apparently secure), S5 (secure); ranks were updated using NHIC species list December 2018. Available to download from: https://www.ontario.ca/page/get-natural-heritage-information

G ranks: Global ranks are from the Natural Heritage Information Centre; G1 (extremely rare), G2 (very rare), G3 (rare to uncommon), G4 (common), G5 (very common); ranks were updated using NHIC species list December 2018. Available to download from: https://www.ontario.ca/page/get-natural-heritage-information

COSSARO (MNRF): Ontario Species at Risk as listed by the Committee on the Status of Species at Risk in Ontario (from NHIC Table December 2018 and updates posted on Ontario Regulation 230/08 Species at Risk in Ontario website as of August 1, 2018: https://www.ontario.ca/laws/regulation/080230/); END - Endangered; THR - Threatened; SC - Special Concern; NAR - Not at Risk

COSEWIC: Assessed Species at Risk at the national level as listed by the Committee on the Status of Endangered Wildlife in Canada (from COSEWIC: https://wildlife-species.canada.ca/species-risk-registry/sar/index/default_e.cfm); END - Endangered, THR - Threatened, SC - Special Concern, NAR - Not at Risk

SWH Indicator Species: SWH refers to Significant Wildlife Habitat as defined by the MNRF (2015) Significant Wildlife Habitat Criteria Schedules for Ecoregions 7E and 6E (as appropriate for the Subject Lands). SWH indicator species are identified in this table and any potential SWH is discussed in the text of this report. Available online: http://www.townofnemi.on.ca/wp-content/uploads/2016/02/NEMI-OP-App-C-schedule-6e-jan-2015-access-ver-final-s.pdf

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
H1S1	FT – 6 (wetland) FC – 4 (Round 1) FC – 4 (Round 2) FC – 1 (Round 3) **Valued** – Reach was flowing during Round 1. Flow observed within portions of reach in Round 2, but there was no flow at downstream end. The feature was dry upon summer assessment.	Reach receives surface runoff from Torbram Road (does not receive drainage from properties west of Torbram as no culvert under roadway)	**Important –** feature is a wetland Meadow habitat located on either side of the feature.	**Valued -** Reach does not support direct fish habitat, but provides contributing habitat functions to downstream occupied Redside Dace habitat	**Important** – feature is a wetland and could support amphibian habitat.	**Protection**– Reach assigned a Protection management recommendation as it is a wetland providing contributing Redside Dace habitat	**Protection**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
H2S1	FT – 6 (wetland) FC – 4 (Round 1) FC – 1 (Round 2) **Contributing** – Reach was flowing during early spring assessment and was dry upon late spring assessment. Although flow in the reach was noted in the early spring, there was no downstream hydrological connection observed at the time of study.	Agricultural	**Important –** feature is a wetland Meadow habitat located on either side of the feature.	**Contributing** – No direct fish habitat is present. Given that the reach was not observed to have a direct hydrological connection with the West Humber River during Round 1, it has been assessed as not providing contributing habitat functions for the downstream Redside Dace population.	**Valued** – feature is a wetland; however, was determined to be unsuitable amphibian breeding habitat (dry upon first round call count visit)	**Conservation**	**Conservation**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
H3S1	FT – 7 (swale) FC – 4 (Round 1) FC – 4 (Round 2) FC – 1 (Round 3) **Valued** – Reach was flowing during early spring assessment. Most of reach was dry in late spring, but there was minimal flow at the downstream culvert. This feature was dry upon summer assessment.	Agricultural Reach receives drainage from Torbram Road and upstream (offsite) properties	**Valued** - Meadow Meadow habitat located on the right bank. Torbram Road is located along the left bank of the reach.	**Valued** - Reach does not support direct fish habitat, but provides contributing habitat functions to downstream occupied Redside Dace habitat	**Limited –** As per Table 7 in HDFA Guidelines, swale provides limited terrestrial function.	**Conservation**	**Conservation**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
H4S1	FT – 7 (swale) FC – 4 (Round 1) FC – 1 (Round 2) **Contributing** – Reach was flowing during early spring assessment and was dry upon late spring assessment.	Agricultural	**Valued** – meadow	**Contributing** – No direct fish habitat is present. Although some flow was coming from upstream cropped agricultural field during Round 1, this is not considered to be contributing habitat for Redside Dace.	**Limited –** As per Table 7 in HDFA Guidelines, swale provides limited terrestrial function.	**Mitigation**	**Mitigation**
H4S2	FT – 7 (swale) FC – 4 (Round 1) FC – 1 (Round 2) **Contributing** – Reach was	Agricultural	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. Although some flow was coming from upstream	**Limited –** As per Table 7 in HDFA Guidelines, swale provides limited terrestrial function.	**Mitigation**	**Mitigation**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	flowing during early spring assessment and was dry upon late spring assessment.			cropped agricultural field during Round 1, this is not considered to be contributing habitat for Redside Dace.			
H5S1	FT –7 (swale) FC – 4 (Round 1) FC – 1 (Round 2) **Contributing** – Reach was flowing during early spring assessment and was dry upon late spring assessment.	Agricultural	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. Although some flow was present in the agricultural field during Round 1, this is not considered to be contributing habitat for Redside Dace given the	**Limited –** As per Table 7 in HDFA Guidelines, swale provides limited terrestrial function.	**Mitigation**	**Mitigation**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
				minimal flow observed and agricultural land use.			
H5S2	FT – 4 (no defined feature) FC – 2 (Round 1) FC – 1 (Round 2) **Limited** – Reach had standing water during early spring assessment and was dry upon late spring assessment.	Agricultural Portion of reach had been removed by fill spread on the agricultural field as part of normal agricultural practices in Round 2	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. Reach only contained standing water in Round 1 and is not considered to be contributing habitat for Redside Dace given the lack of hydrological contribution and agricultural land use.	**Limited –** As per Table 7 in HDFA Guidelines, undefined feature provides limited terrestrial function.	**No Management Required**	**No Management Required**
H5S2A	FT – 4 (no defined feature)	Agricultural.	**Limited –** Cropped	**Contributing** – No direct fish habitat is	**Limited –** As per Table 7 in HDFA	**No Management Required**	**No Management Required**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	FC – 2 (Round 1) FC – 1 (Round 2) **Limited** – Reach had standing water during early spring assessment and was dry upon late spring assessment. No flow was observed.	Reach had been removed prior to Round 2 by fill spread on the agricultural field as part of normal agricultural practices	Cropped (agricultural) vegetation is located on either side of the reach.	present. Reach only contained standing water in Round 1 and is not considered to be contributing habitat for Redside Dace given the lack of hydrological contribution and agricultural land use.	Guidelines, undefined feature provides limited terrestrial function.		
H6S1A	FT – 7 (swale) FC – 4 (Round 1) FC – 1 (Round 2) **Contributing** – Reach was flowing	Agricultural	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. Although some flow was present in the agricultural field during	**Limited –** As per Table 7 in HDFA Guidelines, swale provides limited terrestrial function.	**Mitigation**	**Mitigation**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	during early spring assessment and was dry upon late spring assessment.			Round 1, this is not considered to be contributing habitat for Redside Dace given the minimal flow observed and agricultural land use.			
H6S1B	FT – 4 (no defined feature) FC – 4 (Round 1) FC – 1 (Round 2) **Contributing** – Reach was flowing during early spring assessment and was dry upon late	Agricultural	**Contributing –** Lawn Residential lawn present on one side of feature and cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. Although some flow was present in the agricultural field during Round 1, this is not considered to be contributing habitat for Redside Dace	**Limited –** As per Table 7 in HDFA Guidelines, no defined feature provides limited terrestrial function.	**Mitigation**	**Mitigation**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	spring assessment.			given the minimal flow observed and agricultural land use.			
H6S2A	FT – 7 (swale) FC – 4 (Round 1) FC – 1 (Round 2) **Contributing** – Reach was flowing during early spring assessment and was dry upon late spring assessment.	Agricultural	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. Although some flow was present in the swale during Round 1, this is not considered to be contributing habitat for Redside Dace given the minimal flow observed and adjacent agricultural land use.	**Limited –** As per Table 7 in HDFA Guidelines, swale provides limited terrestrial function.	**Mitigation**	**Mitigation**
H7S2A	FT – 7 (swale)	Agricultural	**Limited –** Cropped	**Contributing** – No direct	**Limited –** As per Table 7 in HDFA	**Mitigation**	**Mitigation**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	FC – 4 (Round 1) FC – 1 (Round 2) **Contributing** – Reach was flowing during early spring assessment and was dry upon late spring assessment.	Active pastureland (from late spring onwards) Narrow overflow channel downstream of cattle watering pond	Cropped (agricultural) vegetation is located on either side of the reach.	fish habitat is present.	Guidelines, swale provides limited terrestrial function.		
H7S2B	FT – 9 (pond) FC – 2 (Round 1) FC – 2 (Round 2) FC – 2 (Round 3) **Limited** – Pond holds water year-round but was not	Agricultural Feature is a man-made pond which retains water Pond was constructed to act as a watering hole for cattle	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** - Man-made pond with augmented flows to supply downstream cattle watering structure; not be considered fish habitat	**Important** – Amphibians were recorded within the pond during targeted call count surveys.	**No Management Required** – Anthropogenic pond that provides no downstream hydrological contributions	**No Management Required**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	contributing downstream flows during any of the assessment periods						
H7S2C	FT – 7 (swale) FC – 2 (Round 1) FC – 1 (Round 2) **Limited** – Reach had standing water during early spring assessment and was dry upon late spring assessment.	Agricultural Active pastureland (from late spring onwards)	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. Reach does not provide any contributing habitat functions for the downstream Redside Dace population	**Limited –** As per Table 7 in HDFA Guidelines, swale provides limited terrestrial function.	**No Management Required**	**No Management Required**
H7S2D	FT – 7 (swale) FC – 4 (Round 1) FC – 1	Agricultural	**Limited –** Cropped Cropped (agricultural)	**Contributing** – No direct fish habitat is present. Although	**Limited –** As per Table 7 in HDFA Guidelines, swale provides	**Mitigation**	**Mitigation**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	(Round 2) **Contributing** – Reach was flowing during early spring assessment and was dry upon late spring assessment.		vegetation is located on either side of the reach.	some flow was present in the reach during Round 1, this is not considered to be contributing habitat for Redside Dace given the minimal flow observed and existing agricultural land use.	limited terrestrial function.		
H7S2D1	FT – 7 (swale) FC – 2 (Round 1) FC – 1 (Round 2) **Limited** – Reach had standing water during early spring assessment	Agricultural	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. Although some flow was present in the reach during Round 1, this is not considered to be contributing	**Limited –** As per Table 7 in HDFA Guidelines, swale provides limited terrestrial function.	**No Management Required**	**No Management Required**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	and was dry upon late spring assessment.			habitat for Redside Dace given the lack of downstream flow and existing agricultural land use.			
H7S2E	FT – 7 (swale) FC – 2 (Round 1) FC – 1 (Round 2) **Limited** – Reach had standing water during early spring assessment and was dry upon late spring assessment.	Agricultural	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. Although some flow was present in the reach during Round 1, this is not considered to be contributing habitat for Redside Dace given the lack of downstream flow and existing	**Limited –** As per Table 7 in HDFA Guidelines, swale provides limited terrestrial function.	**No Management Required**	**No Management Required**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
				agricultural land use.			
H7S3	FT – 7 (swale) FC – 4 (Round 1) FC – 1 (Round 2) **Contributing** – Reach was flowing during early spring assessment and was dry upon late spring assessment.	Agricultural	**Limited –** Cropped Cropped (agricultural) vegetation is located on either side of the reach.	**Contributing** – No direct fish habitat is present. Although some flow was present in the reach during Round 1, this is not considered to be contributing habitat for Redside Dace given the minimal downstream flow and existing agricultural land use.	**Limited –** As per Table 7 in HDFA Guidelines, swale provides limited terrestrial function.	**Mitigation**	**Mitigation**
H7S3A	FT – 7 (swale) FC – 4 (Round 1)	Agricultural	**Limited –** Cropped Cropped (agricultural)	**Contributing** – No direct fish habitat is present. Although	**Limited –** As per Table 7 in HDFA Guidelines, swale provides	**Mitigation**	**Mitigation**

Table 8: Headwater Drainage Feature Classification and Management Recommendations

DRAINAGE FEATURE SEGMENT	STEP 1. HYDROLOGY		STEP 2. RIPARIAN	STEP 3. FISH HABITAT	STEP 4. TERRESTRIAL HABITAT	MANAGEMENT RECOMMENDATION (PER HDFA GUIDELINES)	GEI'S MANAGEMENT RECOMMENDATION
	FUNCTION	MODIFIERS					
	FC – 1 (Round 2) **Contributing** – Reach was flowing during early spring assessment and was dry upon late spring assessment.		vegetation is located on either side of the reach.	some flow was present in the reach during Round 1, this is not considered to be contributing habitat for Redside Dace given the minimal downstream flow and existing agricultural land use.	limited terrestrial function.		

LEGEND:

FT	Feature Types (1-defined natural channel, 2-channelized, 3-multi-thread, 4-no defined feature, 5-tiled drainage, 6-wetland, 7-swale, 8-roadside ditch, 9-online pond outlet)
FC	Flow Conditions (1-no surface water, 2-standing water, 3-interstitial flow, 4-surface flow minimal, 5-surface flow substantial)

Note: Codes correspond with Ontario Stream Assessment Protocol (OSAP) guidelines

Table 9: Significant Wildlife Habitat Assessment (6E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
1. SEASONAL CONCENTRATION AREAS					
Waterfowl Stopover and Staging Areas (terrestrial)	Yes – CUT1 and CUM1 vegetation communities are present on the Subject Lands.	No – No evidence of sheet water during spring surveys.	No	N/A	Not Present
Waterfowl Stopover and Staging Areas (aquatic)	Yes – MAS vegetation communities are present on the Subject Lands.	No – pond sizes considered insufficient to support significant aggregations of migratory waterfowl.	No	N/A	Not Present
Shorebird Migratory Stopover Areas	Yes – MAM2 vegetation communities are present on the Subject Lands.	No – MAM vegetation communities are small features and ponds are too small to provide substantive stopover shoreline habitats. These features would not attract or support migratory shorebirds.	No	N/A	Not Present
Raptor Wintering Areas	Yes – CUT, CUM and FOD vegetation communities are present on the Subject Lands.	No – The upland and forested communities on the Subject Lands do not meet minimum	No	N/A	Not Present

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SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
		combined size criteria (>20 ha).			
Bat Hibernacula	No – Eligible vegetation communities are absent from the Subject Lands.	No	No	N/A	Not Present
Bat Maternity Colonies	Yes – FOD5 and FOD7-3 vegetation communities are present on the Subject Lands within the Greenbelt.	Yes – Vegetation communities contain large diameter snag trees (>25cm DBH) to support maternity colonies on the Subject Lands.	Yes	Based on the abundance of suitable roosting and woodland cover on the Subject Lands, Bat Maternity Colonies are assumed to be present in the FOD5 and FOD7-3.	Candidate Habitat
Turtle Wintering Areas	Nos – While ponds (i.e., SA, MA, and OA vegetation communities) are present on the Subject Lands, all three features are manmade/dug ponds which are not considered suitable habitat for this type of SWH.	No – SA and OA features (i.e., East Tributary ponds and cattle pond) are manmade/dug ponds; therefore they are not considered suitable habitat for this types of feature	No	N/A	Not Present
Reptile Hibernacula	Yes – Ecosites are present on the Subject Lands.	Yes – old farmstead outbuildings may provide suitable access to below frost-line; no rock outcrop	Yes – any reptiles observed will be recorded during	Potential suitable habitat for these species may occur on the Subject Lands. No observations of snake species were	Not Present

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SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
		features were identified within the proposed project footprint.	all field investigations,	recorded during surveys conducted by GEI in 2021.	
Colonial Bird Nesting Sites (bank/cliff)	Yes - CUT1 CUM1 vegetation communities are present on the Subject Lands. Areas of eroding sandy slopes exist associated with manmade berms at East Tributary.	Yes – failure of the manmade berms has created eroding sandy slopes	Yes	No: While breeding bird surveys were completed and both indicator species (i.e., Cliff Swallow and Northern Rough-winged Swallow) were recorded on the Subject Lands. No nests of the species or breeding pairs were recorded within the areas of eroding sandy slopes exist associated with manmade berms at East Tributary.	Not Present
Colonial Bird Nesting Sites (tree/shrubs)	No – Eligible vegetation communities are absent from the Subject Lands.	No	No	N/A	Not Present
Colonial Bird Nesting Sites (ground)	No – No rocky islands or peninsulas are present on the Subject Lands.	No	No	N/A	Not Present

Table 9: Significant Wildlife Habitat Assessment (6E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
Migratory Butterfly Stopover Areas	No – Subject Lands are over 5km from Lake Ontario.	N/A	No	N/A	Not Present
Migratory Landbird Stopover Areas	Yes – FOD vegetation communities are present on the Subject Lands.	No – Subject Lands are greater than 5 km from Lake Erie and Lake Ontario.	No	N/A	Not Present
Deer Yarding Area / Winter Congregation Areas	No – MNRF has not identified the Subject Lands a Wildlife Values Area (White-tailed Deer Wintering Area – Stratum 2).	As identified by MNRF	No	As identified by MNRF	Not Present
2. RARE VEGETATION COMMUNITIES OR SPECIALIZED HABITAT FOR WILDLIFE					
2a. Rare Vegetation Communities					
Rare Vegetation Types (cliffs, talus slopes, sand barrens, alvars, old-growth forests, savannahs, and tallgrass prairies)	No – Eligible vegetation communities are absent from the Subject Lands.	No	No	N/A	Not Present

Table 9: Significant Wildlife Habitat Assessment (6E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
Other Rare Vegetation Types (S1 to S3 communities)	N/A	N/A	Yes	Three-season botanical inventory and refinements to existing Ecological Land Classification mapping were undertaken by GEI in 2021. No rare vegetation communities were identified on the Subject Lands.	Not Present
2b. Specialized Wildlife Habitat					
Waterfowl Nesting Area	Yes – MAM2, MAS, SA vegetation communities on the Subject Lands.	No – upland areas adjacent to wetlands on the Subject Lands less than 120m ha in width.	No	N/A	Not Present
Bald Eagle and Osprey Habitats	Yes – FOD vegetation communities are present on the Subject Lands.	Yes – Forested communities occur adjacent to the West Tributary of West Humber River.	Yes	No bald eagle or osprey nests were observed during field investigations	Not Present
Woodland Raptor Nesting Habitat	Yes – Forested ecosites are present on the Subject Lands.	No – Minimum size criteria (i.e., >30 ha with >4 ha interior habitat) aren't met.	No	N/A	Not Present

Table 9: Significant Wildlife Habitat Assessment (6E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
Turtle Nesting Areas	Yes – MAM and MAS vegetation communities are present on the Subject Lands.	No – Suitable substrates were not identified near the ponds .	No	N/A	Not Present
Seeps and Springs	Yes – Forested vegetation communities are present on the Subject Lands.	No – Forested vegetation communities on the Subject Lands are associated with permanent stream of West Tributary.	No	None observed.	Not Present
Woodland Amphibian Breeding Habitats (within or < 120m from woodland)	No – Breeding pools are not present within 120 m of woodland habitat on the Subject Lands.	N/A	No	Minimum species diversity and numbers not met. No significant wildlife habitat for amphibian breeding present on the subject lands.	Not Present
Wetland Amphibian Breeding Habitats (wetland >120m from woodland)	Yes – OA and SA vegetation communities are present on the Subject Lands.	Yes	Yes	Minimum species diversity and numbers not met. No significant wildlife habitat for amphibian breeding present on the subject lands.	Not Present
Woodland Area-Sensitive Bird Breeding Habitat	Yes – FOD vegetation communities are present on the Subject Lands.	No – woodland on the Subject Lands are smaller than 30 ha in	No	N/A	Not Present

Table 9: Significant Wildlife Habitat Assessment (6E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
		size and contain no interior forest habitat.			
3. SPECIES OF CONSERVATION CONCERN					
Marsh Bird Breeding Habitat	Yes – MAM and CUM1 vegetation communities are present on the Subject Lands.	Yes – All wetlands that contain shallow water and emergent aquatic vegetation should be considered.	Yes	No – Breeding Bird Surveys were conduct on the Subject Lands and none of the indicator species were recorded.	Not Present
Open Country Bird Breeding Habitat	Yes – CUM1 vegetation community is present on the Subject Lands.	No – Minimum size criteria (>30 ha) are not met.	No	N/A	Not Present
Shrub/Early Successional Bird Breeding Habitat	Yes – CUT vegetation communities are present on the Subject Lands.	No – Minimum size criteria (>10 ha) are not met.	No	N/A	Not Present
Terrestrial Crayfish	Yes – MAM, MAS and SWT vegetation communities are present on the Subject Lands.	Yes – No minimum size requirement.	Yes	No – Terrestrial crayfish were searched for in suitable habitat during other field investigations (i.e., aquatic habitat assessment, breeding bired surveys, turtle basking surveys etc.) On one occasion a single terrestrial crayfish burrow (i.e., one chimney) was	Not Present

Table 9: Significant Wildlife Habitat Assessment (6E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
				noted within a dry wetland on the north-west branch of the Upper Pond. No other chimneys were identified within this wetland unit. Based on this singular observation, significance has not meet achieved. Field investigations were not yet complete at the time of report preparation.	
3a. Special Concern and Rare Wildlife Species					
(i) Snapping Turtle (*Chelydra serpentine*)	N/A	Yes – Shallow, slow-moving waterbodies are present on the Subject Lands in the anthropogenic ponds associated with the East Tributary.	Yes	Three rounds of turtle basking surveys were completed on the Subject Lands. One Snapping Turtles was observed in the upper pond on East Tributary. Two turtle nesting sites and suitable nesting substrate were also identified on the Subject Lands.	Present - Confirmed

Table 9: Significant Wildlife Habitat Assessment (6E Ecoregion)

SIGNIFICANT WILDLIFE HABITAT (SWH) TYPE	ELC ECOSITE(S) PRESENT	HABITAT CRITERIA MET	TARGETED FIELD STUDIES REQUIRED	DEFINING CRITERIA MET (MINIMUM ABUNDANCES AND/OR DIVERSITY REQUIRED TO CONFIRM SWH)	SWH TYPE PRESENT
4. ANIMAL MOVEMENT CORRIDORS					
Amphibian Movement Corridors	N/A	No – No Amphibian Breeding Habitat – Wetland is present on the Subject Lands; therefore, this habitat type does not need to be assessed.	No	N/A	Not Present