WESTWOOD VILLAGE, PHASE 2
TOWNSHIP OF NORTH DUMFRIES, ONTARIO

SCOPED ENVIRONMENTAL IMPACT STUDY (EIS) REPORT

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1.0 INTRODUCTION

1.1 Site and Study Overview

WSP Canada Inc. (WSP), formerly MMM Group Limited and Ecoplans Limited, has been retained by Hallman Construction Limited (HCL) and Brian Domm to complete a Scoped Environmental Impact Study (EIS) in support of proposed development of Westwood Village Phase 2 (herein referred to as the Subject Property) in the Township of North Dumfries, Ontario (Figure 1).

To date, WSP has authored or provided natural heritage input to the following reports within the vicinity of the Subject Property:

- Cambridge West Community, Master Environmental Servicing Plan and Community Master Plan. Technical Work Plan (MHBC et.al.; November 2010)
- Cambridge West MESP, Natural Environment Study. Final (Ecoplans; November 2013)
- Cambridge West Collector Road Network Class Environmental Assessment. Technical Memorandum - Natural Heritage. Evaluation of Alternatives (MMM; October 2015)
- Cambridge West Lands - Jefferson Salamander Encounter Response Plan - Revised (WSP/ MMM: December 2016)
- Cambridge West Lands, Hallman Construction Limited & Brian Domm Ltd., Draft Plan of Subdivisions, Cambridge, Ontario. Scoped Environmental Impact Study (MMM Group; December 2016)
- Cambridge West Lands, Hallman Construction Limited & Brian Domm Ltd., Draft Plan of Subdivision, Cambridge, Ontario. Scoped Environmental Impact Study - Addendum 1 (WSP; October 2017)
- Collector Road Network Class Environmental Assessment. Environmental Study Report. Cambridge West, City of Cambridge. Natural Heritage Summary Report (WSP; April 2018)
- Cambridge West Lands, Hallman Construction Limited & Brian Domm Ltd., Draft Plan of Subdivision, Cambridge, Ontario. Pre-Construction (2014 - 2015) Biological Monitoring Report (WSP; in process)
- Cambridge West Lands, Hallman Construction Limited & Brian Domm Ltd., Draft Plan of Subdivision, Cambridge, Ontario. Pre-Construction (2019) Biological Monitoring Report (WSP; in process)
- Cambridge West Lands, Hallman Construction & Cachet Developments (Cam West) Inc. Tree Management Plan (Cambridge West Lands), Cambridge Ontario (WSP; August 2019)

- Cambridge West Lands, Hallman Construction & Cachet Developments (Cam West) Inc. Tree Management Plan, Realigned Blenheim Road and Related Infrastructure, Cambridge Ontario (WSP; February 2020)
- Cambridge West Lands, Hallman Construction & Cachet Developments (Cam West) Inc. Blenheim Road Re-alignment and Devil's Creek Culvert Replacement Scoped Environmental Impact Study (WSP; May 2020)

The proposed development addressed herein builds upon the numerous background studies and, in particular, the Cambridge West Master Environmental Servicing Plan (MESP) completed in 2013 (City of Cambridge and Landowner Group 2013) and approved by City Council March 2014.

The purpose of the MESP study was to guide the development of the Cambridge West Community lands by recommending appropriate land uses. The MESP study integrated environmental, servicing, transportation, and land use planning concepts and was based on technical studies in several areas, including natural heritage. The MESP has also guided the development of the Cambridge West Community Plan, submitted to the City of Cambridge as part of an Official Plan Amendment Application on July 24, 2014. Phases 1 and 2 of the Cambridge West Collector Road Network EA were completed as part of the MESP. Phases 1 and 2 of the Cambridge West Collector Road Network EA were completed as part of the MESP. The remaining phases were addressed as part of an integrated approach that coordinated the EA process with an Official Plan Amendment that had the effect of designating the collector roads in the City of Cambridge Official Plan.

WSP staff completed the natural heritage study component of the Cambridge West MESP. Natural heritage input to the MESP included detailed characterization of existing conditions through comprehensive multi-year (2008 - 2013) field studies and thorough background desktop review of available information. That study also included: an analysis of potential impacts on ecological features and functions from changes to existing land use; identification of mitigation measures to eliminate or reduce those impacts; and recommendations for the protection and enhancement of existing significant natural heritage features and their functions adjacent to the Subject Property. Key recommendations included: implementation of setbacks / buffers where natural features are situated adjacent to proposed development; maintenance of wildlife movement corridors through retained, created or enhanced wildlife movement linkages / corridors; and wildlife habitat enhancement. These recommendations laid the framework for the natural heritage system adopted with the approval of the MESP in 2014. Refer to the Cambridge West MESP for additional details.

The results of the MESP form the basis of information provided in the current scoped EIS. Additional ecological monitoring and targeted field surveys in support of the Collector Road EA were undertaken in 2014 and 2015; results from that work have been integrated with the findings of the MESP to inform this scoped EIS. Further additional surveys to supplement the existing data were completed in 2019 and 2020.

This report summarizes findings of the natural heritage assessment of the Subject Property and adjacent lands, including: a summary of background data collection; results of field surveys to characterize existing ecological conditions; an evaluation of the sensitivity and significance of the natural features within and adjacent to the Subject Property; review and assessment of natural heritage policy; and proposed development details. Impacts on the identified natural features and functions as a result of the proposed development are presented along with recommendations for mitigation measures to eliminate or reduce the potential impacts. Recommendations for ecological enhancements (e.g., ecological linkages, enhanced buffers, etc.) and biological monitoring are also provided.

This EIS has been prepared in support of five applications to be submitted:

- An Official Plan Amendment, which will be in the form of a *Special Policy* for the Westwood Village-Phase 2 Community. Refer to Policy 2.1.4 of the Township Official Plan and the concurrent Planning Report (MHBC April 2021).
- Two zoning by-law amendments (one each for HCL and Brian Domm).
- Two Plans of Subdivision (one for each parcel of land).

The study team consists of MHBC Planning, Urban Design & Landscape Architecture (planning and project coordination), MTE Consultants Inc. (all engineering including, stormwater management, surface water resource management and hydrogeology), Paradigm Transportation Solutions Limited (transportation) and WSP (natural heritage and fluvial geomorphology).

1.2 Subject Property

The Subject Property[1], as shown in Figure 1, is approximately 25.43 ha and located in the Township of North Dumfries, immediately west of the Westwood Village Phase 1 lands in the City of Cambridge. The Subject Property is bounded by the Blair-Bechtel-Cruickston *Environmentally Sensitive Landscape* (ESL) to the west, south and north, and Newman Drive, within the approved Westwood Village Phase 1 lands to the east. Existing land use within the development envelope was under agricultural use (cropland) until preliminary grading and filling was undertaken in 2020. As a condition of GRCA Permit No. 690/19 and the Township of North Dumfries' Pre Servicing Agreement, the pre-graded area will be re-established as interim agricultural lands.

[1] Note that all descriptions of the 'subject property' refer to the existing site conditions prior to area grading / filling undertaken on the subject property in 2020.

The proposed development within the properties includes single and multiple residential / residential housing, mixed-use, a park, and roads. In addition, the development will include the required municipal services (storm, sanitary, sewer) and a stormwater management (SWM) system.

1.3 Study Area

The broader area discussed within the MESP NES has been referred to within this document as the 'MESP General Study Area'. In this report, the Study Area includes the Westwood Village Phase 2 development area (the Subject Property), as well as adjacent natural areas (i.e., WSU 2, 3, 4, 6, and 8 on Figure 4) - to ensure the potential for impacts have been considered in context of the local landscape.

Natural features within the Study Area and adjacent lands are clustered in several large blocks; they have several overlapping designations as shown in Figure 1. These features include a diverse mix of aquatic, wetland, and upland habitats. While habitat continuity is generally good within these blocks, intervening agricultural / urban land uses have resulted in a fragmented local ecosystem. The primary natural feature blocks are:

West of Subject Property – Lands are designated as part of the Blair-Bechtel-Cruickston ESL. This ESL includes portions of the Barrie's Lake - Bauman Creek *Provincially Significant Wetland* (PSW), Barrie's Lake *Environmentally Sensitive Policy Area* (ESPA), and the *rare* Charitable Research Reserve ('*rare*') lands to the north.

East of the Subject Property – A feature referred to as the 'Central Wetland', part of the Barrie's Lake - Bauman Creek PSW, is located east of the Subject Property, within the Westwood Village Phase 1 lands.

All of the large natural areas described above are identified as *Core Environmental Features* (CEFs) in the Waterloo Region Official Plan, ROP (2015) and all have been recommended for retention in the MESP / subsequent studies as part of the *Natural Heritage System*.

For additional details refer to the MESP NES (2013).

2.0 POLICY FRAMEWORK

2.1 Overview

This scoped EIS is being undertaken in accordance with relevant policies and guidelines of the Township of North Dumfries, Region of Waterloo, Grand River Conservation Authority (GRCA), Government of Ontario and Government of Canada. The natural heritage policy framework, including designations, guidelines and recommendations at the federal, provincial, regional and municipal level, has informed this

study. Key documents include the Provincial Policy Statement (PPS) and its guidance documents, and Official Plans for the Region and Township. A detailed discussion of relevant natural heritage policies and compliance is included in Section 9, with key documents also listed in the References.

2.2 Species of Conservation Concern (SCC)

The term "Species of Conservation Concern" (SCC), in this report, includes:

- Species listed by COSEWIC[2], and potentially subject to the provisions of the federal Species at Risk Act (SARA; 2002)
- Species listed by COSSARO[3] and potentially subject to the provisions listed of Ontario's Endangered Species Act (ESA; 2007)
- Provincially significant species (NHIC S-rank of S1 to S3 or SH)
- Regionally significant species, per the Checklist of the Waterloo Region's Significant Species List (Regional Municipality of Waterloo 1999) and the List of the Vascular Plants of Ontario's Carolinian Zone (Oldham 2017)
- *Area Sensitive* species listed in the Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (MNRF 2015)
- Vascular plant species with provincial *Coefficients of Conservatism* (CC)[4] of 9 or 10

Prior to undertaking the field survey, a list of SCC with the potential to be present within the general vicinity of the Study Area was generated based on the background resources listed in Section 3.

The potential for plant and wildlife SCC was assessed through a habitat suitability assessment / screening process, as well as through detailed surveys, where warranted (based on species range, records and habitat suitability). See Section 5, 6 and 9 for further details regarding the results of field surveys and the SAR habitat suitability assessment.

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2 Committee on the Status of Endangered Wildlife In Canada

3 Committee on the Status of Species at Risk in Ontario

4 Coefficient of Conservatism. Rank of 0 to 10 based on plants degree of fidelity to a range of synecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with plant communities in advanced successional stages with minor disturbance; (9-10) Taxa with high fidelity to a narrow range of synecological parameters.

3.0 STUDY APPROACH

This report outlines methodology and findings from the Westwood Village Phase 2 ecology fieldwork in 2019 - 2020 and results from field work conducted as part previous studies from 2008 to 2015. In previous reports, listed in Section 1.1, natural environment features and functions were characterized and evaluated using a combination of a review of background information and findings of a comprehensive multi-season, multi-year (2008 – 2015) field survey program. Detailed results from previous natural heritage surveys are presented in the reports listed in Section 1.1, with key findings included herein.

Surface water quality / quantity and hydrogeological studies were completed as part of the MESP study by MTE Consultants Inc. and LVM Inc. Details are provided in reports titled Cambridge West Master Environmental Servicing Plan – Surface Water Resources and Municipal Servicing Study (MTE Consultants Inc. 2013) and Hydrogeology Study Report - Cambridge West Community Master Environmental Servicing Plan (MESP) Roseville / Blenheim Road, Cambridge, Ontario (LVM Inc. 2013). Updated hydrogeology, stormwater management and functional servicing studies have been completed for the subject property, with relevant information considered herein:

- Cambridge West Community. Westwood Village Phase 2. Brian Domm Subdivision, Hallman Subdivision. Functional Servicing Report (MTE; January 2021)
- Cambridge West Community. Westwood Village Phase 2. Brian Domm Subdivision, Hallman Subdivision. Preliminary Stormwater Management Report (MTE; January 2021)
- Cambridge West Community. Westwood Village Phase 2. Brian Domm Subdivision, Hallman Subdivision. Hydrogeological Assessment (MTE; January 2021).

3.1 Background Review

Natural environment features and functions within the vicinity of the Study Area have been characterized and evaluated using a combination of background information and field surveys, as discussed below. The review of secondary source background information included the following sources:

- Topographic mapping (OBM, NTS), and both historical and current aerial photography
- eBird website – Interactive species range maps
- Environmental reports relevant to the Study Area
- Fisheries and Oceans Canada (DFO) – Aquatic species at risk mapping
- Grand River Conservation Authority (GRCA) – GRIN resource mapping
- INaturalist website - Interactive species observation and range maps

- Land Information Ontario (LIO) database information
- MNRF Regional SAR List for Waterloo
- Natural Heritage Information Centre (NHIC) database and mapping
- Ontario Mammal Atlas (Dobbyn 1994)
- Ontario Reptile and Amphibian Atlas (Ontario Nature website)
- Relevant Township of North Dumfries Official Plan (2018) policies and guidelines
- Relevant Waterloo Region Official Plan (2015) policies and guidelines
- Relevant Studies:
    - MESP Natural Environment Study (NES) Report (Ecoplans 2013)
    - Cambridge West Lands Scoped EIS (MMM 2016)
    - Cambridge West Lands Biological Monitoring Report: Pre-construction (2014 - 2018) (WSP; in process)
    - Cambridge West Master Environmental Servicing Plan (City of Cambridge and Landowner Group 2013)

3.2 Agency Liaison

Agencies engaged for this study include: Region of Waterloo; Township of North Dumfries; City of Cambridge; GRCA; Ministry of Natural Resources and Forestry (MNRF) - Guelph District; Ministry of the Environment, Conservation and Parks (MECP). Extensive agency consultation was undertaken as part of the MESP study with respect to natural heritage issues. As part of this scoped EIS, agencies were circulated a draft Terms of Reference on November 18, 2020, which outlined the proposed scope of work (Appendix A).

This report also incorporates input received at the following agency meetings and liaison:

- October 3, 2019. Pre-consultation Meeting. Attended by staff from Region of Waterloo, Township of North Dumfries, City of Cambridge, GRCA, Energy + Inc., and proponents / study team.
- October 18, 2019. Site meeting to review feature limits previously flagged by WSP. Attended by staff from Region of Waterloo, Township of North Dumfries, City of Cambridge, GRCA, MHBC, and WSP.
- March 9, 2020. Meeting at Township. Attended by staff from Township of North Dumfries and City of Cambridge, as well as proponents / project team

- September 15, 2020. WSP submitted a memo documenting analysis of a small wetland (identified as Vegetation Unit 18 in submitted reports for planning of the Cambridge West community) to MNRF. The memo concluded that the wetland should be removed from the PSW.
- December 14, 2020. Region of Waterloo Ecological and Environmental Advisory Committee (EEAC) meeting to review the EIS Terms of Reference.
- January 18, 2021. Email from MNRF confirming agreement with the WSP Sept. 15 2020 memo / conclusions, specifically that Vegetation Unit 18 should be removed from the PSW and LIO mapping.

3.3 Field Surveys

An overview of field surveys carried out for this EIS study (2019 to 2020), including supplementary work carried out during previous studies is provided below.

3.3.1 MESP Surveys

A comprehensive multi-year (2008 – 2013), multi-season ecological field survey program within the Study Area was undertaken as part of the MESP, and as documented in the MESP NES Report (Ecoplans 2013). An overview of fieldwork relevant to the Subject Property, conducted as part of the MESP and subsequent studies, is provided below.

Vegetation

- Vegetation community classification and description
- Botanical inventory
- Natural feature delineation
- Specialized surveys; forest edge assessment, old growth assessment

Wildlife

- Avifaunal surveys (breeding birds, migrant / supplemental, owls, crepuscular birds, marsh birds)
- Herpetofaunal surveys (spring calling amphibians, Ambystomid salamander trapping, road / mortality, 'cover board', turtle basking / nesting)
- Butterflies and Dragonflies (Lepidoptera and Odonata)
- American Badger habitat assessment
- General wildlife
- *Species at Risk* (SAR) screening, surveys and habitat suitability assessment

3.3.2 2014 - 2015 Surveys and 2019 - 2020 Surveys

Based on anticipated timing for construction, pre-construction monitoring for Westwood Village Phase 1 was initiated in 2014 - 2015, then resumed in 2019 - 2020; this included coverage of the current Study Area. In addition, pre-construction monitoring specific to Westwood Village Phase 2 has been undertaken in 2019 and 2020 based on the approved biological monitoring specified in the MESP, the approved biological monitoring program as specified in the EIS for adjacent City lands (WSP; 2016) and conditions of approval for Draft Plans of Subdivision 30T-16103 and 30T-16104. Relevant information from all of the above has been considered herein.

Additional monitoring components will be added in the during- and post-construction monitoring phases, once established or installed: wildlife passage monitoring; and buffer integrity / function monitoring. The recommended biological monitoring component for the Subject Property, per approved MESP recommendations, is presented in Section 11.

For 2019 - 2020 biological surveys, survey station locations in the Study Area were consistent with the MESP study recommendations, with minor modifications (i.e., field fitting where safety concerns regarding water depth were present) and to provide the best overall representation of each vegetation community. Locations of the biological monitoring / survey components are shown on Figure 2.

For a detailed summary of all ecological field surveys undertaken as part of the EIS study for 2019 and 2020, see the Field Chronology provided in Appendix B.

4.0 OVERVIEW OF SITE CONDITIONS

An overview of the Study Area and existing natural heritage features is provided in Section 1.0 of this report. The following sections provide additional characterization of the natural features and functions within the Study Area.

4.1 Past & Present Land Use

The Subject Property has been under agricultural production since the early nineteenth century. Feature limits / extent of active agricultural use have varied slightly year to year and over time, but adjacent ‘core’ natural areas in the Study Area are relatively unchanged over the past 50 years.

Within the Study Area, lands are a mix of active agriculture (cropland), future urban areas (development ongoing) and natural heritage features, including marsh / open water wetlands (WSU 2, WSU 3, WSU 6 and WSU 8), as well as upland and swamp communities associated with the Blair-Bechtel-Cruickson ESL and *rare* lands (WSU 4).

As part of site grading construction for the adjacent approved subdivisions in Westwood Village Phase 1, some grading related activities have been undertaken on the Subject Property in 2020: installation of Erosion & Sediment Control (ESC) fencing at MESP-recommended buffer limits; and preliminary site filling and grading, in accordance with GRCA Permit No. 690/19 and the Township's Pre-Servicing Agreement. Extent of filling and location of ESC fencing is shown on Drawings AG3.1, AG3.2 and AG3.3 (MTE 2021).

4.2 Designated Features

The following designated natural heritage features are found within (or partially within) the Study Area (see Figure 1). Most of these features have multiple / overlapping natural environment designations.

- **PSW's:** Barrie's Lake – Bauman Creek PSW
- **GRCA Regulated Areas (O. Reg. 150 / 06):** watercourses and wetlands.
- **Region of Waterloo, Regional Official Plan (ROP 2015) Designated 'Greenlands Network' Features:** Blair-Bechtel - Cruickston ESL; Barrie's Lake ESPA, CEF's; Supporting Environmental Features (SEF's); and fish habitat (Barrie's Lake).
- **Township of North Dumfries Official Plan (2018) Designated 'Greenlands Network" Features:** Blair-Bechtel – Cruickston Creek ESL; Barrie's Lake ESPA; hazard lands, SEF's, and CEF's.

4.3 Physiography, Soils & Drainage

This overview considers previous MESP work, field surveys undertaken by WSP and relevant information in the Functional Servicing Report, Preliminary SWM Report and Hydrogeological Assessment (MTE; 2021). All descriptions refer to the existing site conditions prior to area grading / filling undertaken on the subject property in 2020.

The Study Area includes a mix of active and former agricultural fields (row crops), wetlands and forest, with development underway on adjacent lands to the east. The Subject Property was formerly comprised of agricultural fields (currently area-graded).

The Subject Property is in the Grand River Watershed, within the Cruickston Creek subwatershed. It is important to note that none of subject lands drain to Barrie's Lake under current conditions. No defined watercourses are present on the Subject Property. Diffuse and defined channels associated with Cruickston Creek and Newman Creek are located on adjacent lands to the north. Devil's Creek is located ~950m to the east, with an intervening subdivision under construction.

As shown on MTE Figure 2.1 (Appendix I), the eastern portion of the Subject Property primarily drains to the central wetland on adjacent City lands to the east. That feature does not have a surface outlet and as a result recharges and drains internally. The northern and western portion of the Subject Property drains externally towards the adjacent woodland and wetland areas to the west and north. Both the northern and western portions of the subject lands are currently within the Cruickston Creek subwatershed; however the MESP recommended that these be redirected to the Grand River via SWMF 2.

There are several PSW wetland features in the study area, outside of the Subject Property (i.e., WSU 2, WSU 3, WSU 6, Barrie's Lake (WSU 8) and Devil's Creek Swamp and Forest ESPA (WSU 1 and WSU 9). All are located outside of lands proposed for development. One small evaluated / non-PSW wetland is present on the subject property: Vegetation Unit 18. There are no defined surface water channel outlets to any of the adjacent wetland areas from the subject property; rather surface water is conveyed as sheet flow or in low lying areas to the wetland interface.

The Subject Property is moderately sloped, with a topographic high located near BH13-10. Existing ground surface elevations range between 307.0m amsl near the Wetland 6 boundary to 316.0m amsl near the boundary between the Domm Township Lands boundary and Hallman Township Lands boundary.

Soils on the subject property range from silt with trace sand and gravel to gravelly sand with trace silt and clay (MTE; 2021).

4.4 Hydrogeology

As noted in the Hydrogeological Assessment (MTE; 2021), groundwater on the subject property follows pre-grading topography, ranging in depth from 1.10m below ground surface (mbgs) to 6.52mbgs. The greatest depth to groundwater occurs near the centralized high points at BH13-10. The shallowest depth to groundwater, other than in the mini piezometers that are located adjacent to the wetlands, occurs near the northern wetland/woodlot limit at BH113-10. Groundwater is interpreted to flow north toward the rare 'hogsback' / Cruickston Creek as well as north and east toward the Grand River and Devil's Creek.

Average surface water elevation in Wetland 4 and Wetland 5 in 2019 and 2020 was 308.1m masl and 308.3m masl. Wetland 4 is interpreted to be a depression focused recharge feature and it appears to be hydraulically connected to Wetland 5. Neither feature has an outlet and both are sustained by surface water runoff from adjacent lands.

For additional detail, refer to the Hydrogeology Study Report (LVM 2013) and the Cambridge West Community. Westwood Village Phase 2. Brian Domm Subdivision, Hallman Subdivision. Hydrogeological Assessment (MTE; April 2021).

5.0 VEGETATION

5.1 Vegetation Community Characterization

5.1.1 Approach

Multi-season, multi-year field surveys of vegetation were undertaken between 2008 and 2015 as part of the previous studies, and additional surveys were completed in 2019 and 2020 to update the floristic inventory. Natural heritage features within 120 m of the Subject Property have been discussed in this scoped EIS. Vegetation communities have been: delineated on an air photo base and refined based on field visits (Figure 3); described using general characteristics, dominant flora, age, exotic / invasive species, size, rare flora, notable features etc.; and classified to 'vegetation type'. Vegetation types we described using the Ecological Land Classification System for Southern Ontario (Lee et.al. 1998). Vegetation community significance has been evaluated using Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario (Bakowsky 1996) and vegetation community significance listed on the NHIC website.

5.1.2 Results

5.1.2.1 Study Area

The general area is typical of southern Ontario landscapes, consisting of a mix of land uses: urban residential (to the north and east); agricultural (within and to the south / east); rural residential / farmstead (several properties along Blenheim Road); and natural (forest / wetland / pond areas within and adjacent to the Study Area).

The natural features within the Study Area are associated with the woodlands and wetlands to the west, the Central wetland on City lands to the east and Barrie's Lake to the south; these are generally coincident with the designated natural heritage features (i.e., PSW, ESPA, ESL). See Figure 1.

Vegetation communities are shown in Figure 3 and described in detail in Table 1.

In total, twelve composite Vegetation Units for which detailed studies were conducted are present within the Study Area; some are relatively homogeneous, with or without inclusions; and some are complexes or mosaics of different habitat types. None of the vegetation community types surveyed is considered provincially significant (per Bakowsky 1996 / NHIC).

5.1.2.2 Subject Property

Portions of the following vegetation units are present adjacent to the Subject Property: Unit 1A, 1B, 2, 3, 4, 5, 10a, 10b, 11a, 11a, and 12. With the exception of Unit 18 (small wetland), none is within the proposed development envelope. Per the WSP Technical Memo (Sept. 2020; Appendix G) and concurrence by MNRF, this wetland has been reaffirmed as not part of the PSW. Note that this is the same conclusion reached in the MESP. Additional commentary and assessment is provided in Section 9.9, with the conclusion that the wetland meets GRCA policies allowing removal (consistent with the MESP and 2016 EIS for adjacent City lands).

5.2 Botanical Inventory

5.2.1 Approach

As part of previous studies, a comprehensive, multi-season botanical inventory was undertaken within the Study Area on 42 separate dates between 2008 and 2018, as detailed in previous studies listed in Section 1.1. In addition, botanical inventory surveys were complete on 10 separate dates between 2019 and 2020 (Appendix B). The quality of a particular vegetation community can be reflected in its richness of conservative species as indicated by the *Floristic Quality Index* (FQI) number (Oldham et al. 1995). FQI is a measurement of a vegetation community's ecological quality based on its plant species composition. FQI is calculated by weighting the mean *Coefficient of Conservatism* divided by species richness. Generally, 1 to 10 is low quality, 11 to 20 is moderate, 21 to 35 is high quality, and > 35 is exceptional.

Plant species status was evaluated using the Region of Waterloo Listing of Significant Vascular Plants (1999) for regional significance; the NHIC website for provincial rarity ranks (i.e. S-Ranks); the Species At Risk in Ontario list (MNRF) for provincial status designations; and the Canadian Species At Risk list (COSEWIC – current list at the time of report preparation) for national status designations. Additional commentary regarding Species at Risk (SAR) is provided in Section 9 and Appendix E.

5.2.2 Results

Detailed results from previous studies have been submitted separate cover, in the reports listed in Section 1.1. Species lists presented herein are cumulative, and include results from all previous surveys, with the addition of the 2019 and 2020 data. Vascular plant species are listed by Vegetation Unit and provided in Appendix C.

In total, 419 vascular plant species were recorded by WSP within the Study Area (seven identified to genus due to lack of identifiable characteristics).

- Most are native species (313 native species [74.7%]) and most are common and secure or apparently secure in Ontario (i.e., ranked S5, S4, or SNA).
- Two species designated by COSEWIC as SAR in Canada:
    - **Black Ash** (Threatened)
    - **Butternut** (Endangered)
- One species afforded protection under the Endangered Species Act (2007):
    - **Butternut** (Endangered)
- **Provincially Rare Species**. Four species with moderate to high risk of extirpation in Ontario: Black Ash (*Fraxinus nigra*; S3); Butternut (*Juglans cinerea*; S2?); and Northern Pin Oak (*Quercus ellipsoidalis*; S3).
- **Regionally Rare Species**. Twenty-six species considered significant in the Region of Waterloo[5]. Sixty-one species are considered significant within the Carolinian Zone[6].
- **Invasive species**.

No *Species of Conservation Concern* were recorded on the Subject Property; all are within the retained adjacent natural areas.

5.3 Feature Delineation

Wetland and CEF limits were previously determined in the MESP NES based on the following: spring and summer floristic surveys; ELC habitat classifications; guidance in the Ontario Wetland Evaluation System for Southern Ontario (2013); and guidance in the Region of Waterloo's Greenlands Network Implementation Guidelines, 2nd Draft (2010). Preliminary wetland / CEF delineations by Ecoplans were completed on nine dates in 2010 and 2011, confirmed by City, Region, and GRCA staff during site walks in 2010 and 2011 and subsequent surveyed for inclusion on base plans.

Limits were reviewed in the field based on existing conditions and updated guidelines (e.g., Final Greenlands Network Implementation Guidelines [2016]) in 2019, confirmed with agencies on October 18, 2019 and surveyed for inclusion on base plans. See Figure 5 for the updated surveyed wetland and CEF limits. Feature limits are also accurately shown on the proposed plans of subdivision.

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[5] Regional Municipality of Waterloo, 1999. Revisions to Waterloo Region's Significant Species List: Vascular Plants Component. Report to Planning and Culture Committee PC-99-028.1. Approved by Council June 23, 1999.

[6] Oldham, Michael J. 2017. List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Carolinian Canada and Ontario Ministry of Natural Resources and Forestry. Peterborough, ON. 132 pp.

5.4 General Vegetation Inventory and Analysis

5.4.1 Methodology

A General Vegetation Inventory and Analysis (GVIA) was undertaken in support of the current Draft Plan Application – per the City of Cambridge Tree Management Policy (2002). The four main requirements addressed as part of the GVIA are:

- **Inventory Information.** Inventory information on the vegetation units within the study area is detailed in Section 5.1, Section 5.2 and Table 1.
- **Air Photo.** The Subject Property and Study Area are shown on all figures.
- **Maps.** The Draft Plan is shown on Figure 6.
- **Analytical Report.** Discussed in Sections 5.4.2, 8, and 10.

5.4.2 GVIA – Results and Recommendations

GVIA vegetation community assessment and recommendations are provided in Table 1. All vegetation communities within the adjacent natural features are recommended for retention with no further assessment - protect (RFA-P). Vegetation Unit 18 (isolated wetland in the southern portion of the Subject Property) is recommended for removal with no further assessment- remove (NFA-R), consistent with MESP NES, City lands EIS (WSP 2016) recommendations and based on the updated analysis in Section 9.

Table 1. Vegetation Community Descriptions

UNIT	HABITAT / ELC VEGETATION TYPE	LAYER	DOMINANT SPECIES	DESCRIPTION AND COMMENTS
1a	**Upland Fringe** **FOD1-4** Dry-Fresh Oak - Hardwood Deciduous Forest **FOD3-1** Dry-Fresh Poplar Deciduous Forest **CUM1-1** Dry-Moist Old Field Meadow	**Canopy**	Red Oak, Trembling Aspen, Northern Pin Oak, Manitoba Maple, Bur Oak, Black Cherry,	• Area: 2.0 ha • 105 spp. recorded (48% native; FQI 14.6) • Age: successional meadow, thicket, young woodland; occasional mid-aged to mature trees • Disturbance: moderate to high overall; higher in cultural meadows; plowing to / within dripline in many areas • Overall botanical quality: **Moderate** • GVIA Recommendation: **NFA-P**
		Shrub Layer	Common Buckthorn, Glossy Buckthorn, Chokecherry, Black Raspberry	
		Ground Layer	Enchanter's Nightshade, Goldenrod spp., Dandelion, Wild Carrot, Smooth Brome, Aster spp.	
1b	**Wetland Habitat Complex** **SWT3-2** Willow Organic Thicket Swamp **SWT3-7** Winterberry Organic Thicket Swamp **MAM3-3** Reed-canary Grass Organic Meadow Marsh **MAM3-9** Forb Organic Meadow Marsh **MAS3-1** Cattail Organic Shallow Marsh **SAF3-1** Duckweed Floating-leaved Shallow Aquatic	**Canopy**	Occasional larger Willows (White Willow, Meadow Willow, Reddish Willow), Peach-leaved Willow, Freeman's Maple, Manitoba Maple	• Area: 11.7 ha • 82 spp. recorded (83% native; FQI 29.7) • Age: mature • Disturbance: low overall – some edge intrusions abutting active farm fields. Sparse Phragmites (*Phragmites australis* ssp. *australis*) patches along pond edge that have been actively managed since 2017. • Organic soils > 40 cm deep • Overall botanical quality: **High** • GVIA Recommendation: **NFA-P**
		Shrub Layer	Heart-leaved Willow, Bebb's Willow, White Willow, Meadow Willow, Winterberry, Silky Dogwood, Red-osier Dogwood	
		Ground Layer	Spotted Jewel-weed, Fowl Manna Grass, Reed-canary Grass, Cattail spp., Purple Loosestrife, Sedge spp., Rice-cut Grass, Sensitive Fern, Spotted Joe-pye-weed, Purple-stemmed Aster, Panicled Aster, Large Bur-reed	
2	**Deciduous Forest** **FOD5-3** Dry-Fresh Sugar Maple – Oak Deciduous Forest	**Canopy**	Sugar Maple, Red Oak, American Beech, Black Cherry, Red Maple, White Pine, Bur Oak, Large-tooth Aspen and American Basswood	• Area: 1.9 ha • 93 spp. Recorded (81% native; FQI 36.0) • Age: mid-aged / sub-mature • Disturbance: moderate – some edge effects, canopy gaps, farm lane at north end; excavated drainage channel; invasive / exotic species; rubbish • Old drainage channel extends from pond at south end to forest / swamp to the north – no surface water connection and no flow conveyance • Overall botanical quality: **High** • GVIA Recommendation: **NFA-P**
		Shrub Layer	Sugar Maple, American Beech, Black Cherry, White Ash, Ironwood, Blue Beech, Chokecherry, Alternate-leaved Dogwood, Common Buckthorn, Bush Honeysuckle, Riverbank Grape,	
		Ground Layer	Sugar Maple, Red Baneberry, White Baneberry, White Trillium, Evergreen Wood Fern, Wild Leek, Zigzag Goldenrod, Wild Ginger, False Solomon's Seal, Dame's Rocket	
3	**Deciduous Forest** **FOD5-2** Dry-Fresh Sugar Maple – Beech Deciduous Forest * Partial inventory/habitat assessment (south portion)	**Canopy**	Sugar Maple, American Beech, Red Oak, Black Cherry, Yellow Birch, White Pine, Bitternut Hickory, Large-tooth Aspen, American Basswood	• Area: 3.4 ha • 145 spp. recorded (87% native; FQI 50.9) • Age: mid-aged to mature • Disturbance: low overall – some edge effects; exotic species present • Notable stands of Leatherwood on local knolls between vernal pond and swamp. • Includes upland fringe and inclusions between the swamp and agricultural field to the east /
		Shrub Layer	Sugar Maple, American Beech, White Ash, Ironwood, Blue Beech, Chokecherry, Alternate-leaved Dogwood, Common Buckthorn, Smooth Serviceberry, Leatherwood	

UNIT	HABITAT / ELC VEGETATION TYPE	LAYER	DOMINANT SPECIES	DESCRIPTION AND COMMENTS
		Ground Layer	Sugar Maple, Red Baneberry, Wild Sarsaparilla, White Trillium, Evergreen Wood Fern, Wild Leek, Wild Ginger, False Solomon's Seal, Tall Hairy Agrimony, Yellow Avens, Garlic Mustard	northeast. • Overall botanical quality: **Exceptional** • GVIA Recommendation: **NFA-P**
4	**Vernal Pond / Thicket Swamp** **SAF3-1** Duckweed Floating-leaved Shallow Aquatic **SWT3-7** Winterberry Organic Thicket Swamp	**Canopy**	Partial canopy cover by adjacent forest trees (Sugar Maple, American Beech, Yellow Birch, White Pine).	• Area: 0.4 ha • 69 spp. recorded (93% native; FQI 36.5) • Age: mature • Disturbance: low – a few exotic species; limited recent anthropogenic disturbance • Organic soils > 40 cm deep • Overall botanical quality: **Exceptional** • GVIA Recommendation: **NFA-P**
		Shrub Layer	Fringe of Winterberry, *Salix* spp., Blue Beech, Red-osier Dogwood and Glossy Buckthorn	
		Ground Layer	Lesser Duckweed, Spotted Jewel-weed, Fowl Manna Grass, Skunk Cabbage, Marsh Fern, *Carex* spp., Rice-cut Grass, Sensitive Fern, Crested Shield Fern, Blueflag, Cinnamon Fern,	
5	**Swamp** **SWM6-1** Birch-Conifer Organic Mixed Swamp * Partial inventory /habitat assessment (south portion)	**Canopy**	Yellow Birch, Black Ash, White Pine, Red Maple, American Larch, Freeman's Maple, Eastern White Cedar, Bur Oak, Trembling Aspen, American Elm	• Area: 7.6 ha • 146 spp. recorded (90% native; FQI 51.5) • Age: mature overall • Disturbance: low – limited exotic / invasive species and edge effects. One dense Phragmites patch along wetland edge at the southern portion of the woodlot • Part of the 'Hogsback', primarily located on *rare* lands to the north (Figure 1) • Contains interior forest habitat (5.5 ha) with hummocky and rich organic swamp • Organic soils > 40 cm deep • Overall botanical quality: **Exceptional** • GVIA Recommendation: **NFA-P**
		Shrub Layer	Yellow Birch, Red Maple, Eastern White Cedar, American Elm, Blue Beech, Common Elderberry, Spicebush, Glossy Buckthorn	
		Ground Layer	Cinnamon Fern, Sensitive Fern, Marsh Marigold, Spotted Jewel-weed, Fowl Manna Grass, *Carex* spp., Rice-cut Grass, Rough-leaved Goldenrod, Royal Fern	
10a	**Wetland / Pond** **SAF3-1** Duckweed Floating-leaved Shallow Aquatic **MAS3-1** Cattail Organic Shallow Marsh **MAM3-3** Reed-canary Grass Organic Meadow Marsh	**Canopy**	n/a	• Area: 1.6 ha • 131 spp. recorded between 10a and 10b (55% native; FQI 20.3) • Age: mature overall, but recent fill / veg removal and hydrological alterations • Disturbance: moderate (locally high). Sparse Phragmites patches along pond edge that have been actively managed since 2017. • Organic soils > 40 cm deep • South 'lobe' ploughed through during drier years; also, there have been some alterations to drainage for farming. Flora is more tolerant and variable. • Overall botanical quality: **High** • GVIA Recommendation: **NFA-P**
		Shrub Layer	A few scattered willows, Red-osier Dogwood and Common Elderberry.	
		Ground Layer	Cattail spp., Lesser Duckweed, Wild Mint, Reed-canary Grass, Rice-cut Grass, Purple Loosestrife, *Carex* spp., Spotted Joe-pye-weed	
10b	**Upland Fringe** **CUM1-1** Dry-Moist Old Field Meadow	**Canopy**	n/a	• Area: 0.3 ha • 131 spp. recorded between 10a and 10b (55% native; FQI 20.3) • Width of upland margin varies year to year depending on limits of ploughing.
		Shrub Layer	A few scattered Common Buckthorn and Raspberry spp.	

UNIT	HABITAT / ELC VEGETATION TYPE	LAYER	DOMINANT SPECIES	DESCRIPTION AND COMMENTS
		Ground Layer	Goldenrods, Aster spp., Mullein, Wild Carrot, Smooth Brome, Motherwort, Common Burdock, Velvetleaf, Common Milkweed.	• Age: pioneer / early successional • Disturbance: high – recent / ongoing ploughing, fill and grading • Overall botanical quality: **Low – Moderate** • GVIA Recommendation: **NFA-P**
11a	**Thicket Swamp** **SWT3-2** Willow Organic Thicket Swamp	**Canopy**	n/a	• Area: 2.4 ha • 111 spp. recorded between 11a and 11b (78% native; FQI 30.6) • Age: mature • Disturbance: moderate overall, some local infill / dumpling and invasive species • Organic soils > 40 cm deep • Overall botanical quality: **Moderate** • GVIA Recommendation: **NFA-P**
		Shrub Layer	A few scattered Common Buckthorn, Raspberry spp.	
		Ground Layer	Goldenrods, Aster spp., Smooth Brome, Common Burdock, Common Milkweed.	
11b	**Wetland Mosaic** **SAF3-1** Duckweed Floating-leaved Shallow Aquatic **MAS3-1** Cattail Organic Shallow Marsh **MAM3-3** Reed-canary Grass Organic Meadow Marsh Inclusions: **CUM1-1** Dry-Moist Old Field Meadow **CUW1** Mineral Cultural Woodland	**Canopy**	Occasional tree willows, Freeman's Maple, Manitoba Maple	• Area: 3.0 ha • 111 spp. recorded between 11a and 11b (78% native; FQI 30.6) • Organic soils > 40 cm deep • Narrow bands of cultural meadow / woodland present along portions of the wetland perimeter. • Width of upland and wetland margin varies year to year depending on limits of ploughing. • Age: varies - immature to mature • Disturbance: low to moderate overall, but some areas are ploughed regularly • Overall botanical quality: **High** • GVIA Recommendation: **NFA-P**
		Shrub Layer	Heart-leaved Willow, Bebb's Willow, Peach-leaved Willow, Meadow Willow, Winterberry, Silky Dogwood, Red-osier Dogwood	
		Ground Layer	Spotted Jewel-weed, Fowl Manna Grass, Reed-canary Grass, Narrow-leaved Cattail, Purple Loosestrife, *Carex* spp., Rice-cut Grass, Sensitive Fern, Spotted Joe Pye-weed, Purple-stemmed Aster, Panicled Aster,	
12	**Wetland** **SAF3-1** Duckweed Floating-leaved Shallow Aquatic **MAM2-2** Reed-canary Grass Mineral Meadow Marsh	**Canopy**	Occasional tree willows, Trembling Aspen, Balsam Poplar, Manitoba Maple	• Area: 0.22 ha • 29 spp. recorded (48% native; FQI 5.9) • Age: pioneer / early successional • Disturbance: high – regularly plowed through / planted • Anthropogenically disturbed ephemeral pond / wetland area between / abutting two large wetlands. • Wetland limits vary year to year depending on hydrology and limits of ploughing. • Overall botanical quality: **Low** • GVIA Recommendation: **NFA-P**
		Shrub Layer	Heart-leaved Willow, Pussy Willow, Sandbar Willow, Bebb's Willow, Peach-leaved Willow, Meadow Willow, Winterberry, Silky Dogwood, Red-osier Dogwood	
		Ground Layer	Reed-canary Grass, Cattail species, Spotted Jewel-weed, Fowl Manna Grass, Purple Loosestrife, *Carex* spp., Rice-cut Grass, Spotted Joe-pye-weed, Purple-stemmed Aster,	
18	**Seasonally wet area** ELC not applicable	**Canopy**	n/a	• Area: 0.07 ha • 18 spp. recorded (50% native; FQI 2.4) • Isolated wet depression with wetland vegetation in wet years and ploughed in dry years. As a result, vegetation typically does not mature and no ELC vegetation community type applies. • No surface inlets / outlets – water source is likely surface run-off from field. • Age: pioneer / early successional • Disturbance: high. Limits vary year to year depending on hydrology / ploughing. • Overall botanical quality: **Low** • GVIA Recommendation: **NFA-R**
		Shrub Layer	n/a	
		Ground Layer	Yellow Nutgrass, Mustard, Old Witch Panic Grass, Barnyard Grass, Orchard Grass, Broad-leaved Water-plantain.	

Table 2. Vascular Plant SCC Recorded within the Study Area

SCIENTIFIC NAME	COMMON NAME	CC [7]	G RANK	S RANK	COSEWIC Status	SARO Status	CAROLINIAN ZONE (OLDHAM 2017)	WATERLOO REGION (1999)	UNIT 1A	UNIT 1B	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 10	UNIT 11	UNIT 12
Acer spicatum	Mountain Maple	6	G5	S5			**U**							X			
Agrostis scabra	Rough Bentgrass	6	G5	S5			**R**						X				
Asclepias exaltata	Poke Milkweed	8	G5	S4			**R**				X	X					
Brachyelytrum erectum	Southern Shorthusk	7	G4G5	S4			**U**					X					
Calla palustris	Wild Calla	8	G5	S5			**R**	**W***		X							
Carex atherodes	Wheat Sedge	6	G5	S4			**R**	**W**								X	
Carex laevivaginata	Smooth-sheathed Sedge	8	G5	S4			**U**	**W**						X			
Carex laxiculmis var. *laxiculmis*	Spreading Sedge	7	G5T5	S4			C	**W**				X					
Carex leptonervia	Finely-nerved Sedge	5	G5	S5			**U**					X					
Carex pseudocyperus	Cyperus-like Sedge	6	G5	S5			**U**						X			X	
Carex scabrata	Eastern Rough Sedge	8	G5	S5			**U**	**W**						X			
Carex sparganioides	Burreed Sedge	5	G5	S4S5			C	**W***			X	X					
Celtis occidentalis	Common Hackberry	8	G5	S4			C	**W***			X	X					
Ceratophyllum demersum	Common Hornwort	4	G5	S5			**U**			X					X		
Chrysosplenium americanum	American Golden-saxifrage	8	G5	S4			**U**						X				
Cinna latifolia	Drooping Woodreed	7	G5	S5			**R**							X			

[7] Refer to Appendix D for legend

SCIENTIFIC NAME	COMMON NAME	CC [7]	G RANK	S RANK	COSEWIC Status	SARO Status	CAROLINIAN ZONE (OLDHAM 2017)	WATERLOO REGION (1999)	UNIT 1A	UNIT 1B	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 10	UNIT 11	UNIT 12
Clintonia borealis	Yellow Clintonia	7	G5	S5			**U**							X			
Comarum palustre	Marsh Cinquefoil	7	G5	S5			**R**						X				
Cornus canadensis	Bunchberry	7	G5	S5			**U**							X			
Corylus cornuta	Beaked Hazelnut	5	G5	S5			**U**							X			
Crataegus coccinea var. *pringlei*	Pringle's Hawthorn	4	G--T5	S5			**U**	**W***				X					
Dirca palustris	Eastern Leatherwood	7	G4	S4			**U**					X					
Dryopteris cristata	Crested Wood Fern	7	G5	S5			**U**						X	X			
Dulichium arundinaceum	Three-way Sedge	7	G5	S5			**R**						X				
Eleocharis palustris	Common Spikerush	6	G5?	S5			**R**								X	X	X
Equisetum fluviatile	Water Horsetail	7	G5	S5			**U**			X							
Equisetum palustre	Marsh Horsetail	**10**	G5	S5			**R**	**W**						X			
Equisetum scirpoides	Dwarf Scouring-rush	7	G5	S5			**R**					X					
Fragaria vesca ssp. *americana*	Woodland Strawberry	4	G5T5	S5			**U**					X			X	X	
Fraxinus nigra	Black Ash	7	G5	**S3**	**THR**		C			X		X	X	X			
Galium obtusum	Blunt-leaved Bedstraw	6	G5	S4S5			C	**W***								X	
Galium palustre	Common Marsh Bedstraw	5	G5	S5			**R**			X				X		X	
Geum fragarioides	Barren Strawberry	5	G5	S5			**U**		X			X		X			
Glyceria grandis	Tall Mannagrass	5	G5	S5			**U**								X		X
Glyceria septentrionalis	Eastern Mannagrass	7	G5	S4			**U**	**W***							X	X	
Gymnocarpium dryopteris	Common Oak Fern	7	G5	S5			**U**					X		X			
Hackelia virginiana	Virginia Stickseed	5	G5	S5			C	**W***	X		X	X		X			
Hylodesmum glutinosum	Large Tick-trefoil	6	G5	S4			**U**					X					
Juglans cinerea	Butternut	6	G4	**S2?**	**END**	**END**	**U**					X					

SCIENTIFIC NAME	COMMON NAME	CC [7]	G RANK	S RANK	COSEWIC Status	SARO Status	CAROLINIAN ZONE (OLDHAM 2017)	WATERLOO REGION (1999)	UNIT 1A	UNIT 1B	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 10	UNIT 11	UNIT 12
Juglans nigra	Black Walnut	5	G5	S4?			C	**W*+**	X			X					
Juncus articulatus	Jointed Rush	5	G5	S5			**U**								X	X	
Juncus canadensis	Canada Rush	6	G5	S5			**R**	**W**		X						X	
Larix laricina	Tamarack	7	G5	S5			**U**							X			
Lemna trisulca	Star Duckweed	6	G5	S5			**U**			X			X		X	X	
Lepidium virginicum	Poor-man's Peppergrass	0	G5	S5			**U**								X		
Lonicera hirsuta	Hairy Honeysuckle	7	G5	S5			**R**	**W**			X	X					
Lysimachia terrestris	Swamp Yellow Loosestrife	6	G5	S5			**R**	**W**						X			
Lysimachia thyrsiflora	Tufted Yellow Loosestrife	7	G5	S5			**U**								X	X	
Nabalus altissimus	Tall Rattlesnakeroot	5	G5	S5			**U**					X					
Panicum flexile	Wiry Panicgrass	8	G5	S4			**R**								X		
Pedicularis canadensis	Canada Lousewort	7	G5	S5			**U**				X	X					
Persicaria sagittata	Arrow-leaved Smartweed	5	G5	S4S5			**U**	**W**		X							
Pilea fontana	Lesser Clearweed	5	G5	S4			**U**	**W**				X	X				
Polygaloides paucifolia	Fringed Milkwort	6	G5	S5			**R**					X		X			
Populus balsamifera	Balsam Poplar	4	G5	S5			**U**			X						X	
Populus deltoidies	Cottonwood	4	G5	S5			C	**W+**								X	
Potamogeton zosteriformis	Flat-stemmed Pondweed	5	G5	S5			**R**			X							
Pyrola elliptica	Shinleaf	5	G5	S5			**U**					X					
Quercus ellipsoidalis	Northern Pin Oak	**9**	G5	**S3**			**R**	**W**	X								
Rudbeckia laciniata	Cut-leaved Coneflower	7	G5	S5			**U**							X			
Rubus hispidus	Bristly Dewberry	6	G5	S4			C	**W#**		X							
Rumex verticillatus	Swamp Dock	7	G5	S4			**U**			X							

SCIENTIFIC NAME	COMMON NAME	CC [7]	G RANK	S RANK	COSEWIC Status	SARO Status	CAROLINIAN ZONE (OLDHAM 2017)	WATERLOO REGION (1999)	UNIT 1A	UNIT 1B	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 10	UNIT 11	UNIT 12
Salix lucida	Shining Willow	5	G5	S5			**U**								X	X	
Salix nigra	Black Willow	6	G5	S4			**U**			X						X	
Spirodela polyrhiza	Great Duckweed	4	G5	S5			**U**			X					X	X	
Streptopus lanceolatus	Rose Twisted-stalk	7	G5	S5			**U**							X			
Stuckenia pectinata	Sago Pondweed	4	G5	S5			**U**			X					X	X	
Triosteum aurantiacum	Orange-fruit Horse-gentian	7	G5	S4S5			**U**				X	X					
Vaccinium angustifolium	Early Lowbush Blueberry	6	G5	S5			C	**W***				X	X				
Wolffia borealis	Northern Watermeal	4	G5	S5			**U**	**W***		X					X	X	
Wolffia columbiana	Columbia Watermeal	4	G5	S5			**U**	**W***		X					X	X	
Totals					**2**	**0**	**61**	**24**	**4**	**17**	**7**	**25**	**10**	**19**	**15**	**19**	**2**

6.0 WILDLIFE

Results and discussion for avifauna, herpetofauna, Lepidoptera / Odonata, mammals and wildlife movement are discussed in Sections 6.1 through 6.5. Additional discussion and details regarding SAR and Significant Wildlife Habitat (SWH) are included in Section 9, Appendix E and Appendix F.

6.1 Birds (Avifauna)

6.1.1 Approach

6.1.1.1 MESP Study

As part of field surveys for the MESP study, avifaunal field surveys were completed on 37 dates from 2008 – 2013 (with a total of more than 140 person-hours: Appendix B), incorporating the following components:

- Thirteen **breeding bird surveys** from 2008 - 2011. Undertaken by thoroughly walking random transects[8] within or along the perimeter of Wildlife Survey Units (WSU's) and recording presence, abundance and level of breeding evidence (using Ontario Breeding Bird Atlas [OBBA] protocols). Additional evidence of breeding activity was recorded during other field surveys within and outside of the breeding window.

- Seventeen **supplemental / migrant bird surveys** from 2008 - 2011. Species and abundance were recorded, by survey unit (same as breeding bird units). In some cases, these observations included evidence of breeding both within and outside of the 'breeding window' for southern Ontario.

- Four **nocturnal Owl surveys** in 2010 and 2011, following the protocols set out in the Ontario Breeding Bird Atlas (OBBA) Standardized Owl Surveys Instruction Manual (March 2002).

- Two **marsh bird monitoring surveys** in June - July 2011. The marsh bird monitoring surveys followed the protocols set out in the Marsh Monitoring Program (MMP) Participant's Handbook for Surveying Marsh Birds (Bird Studies Canada & Environment Canada, Revised 2008), with some minor revisions to study timing and reporting.

[8] With the exception of wildlife survey unit 8 (Barrie's Lake) and Unit 9 (Devil's Creek floodplain east of rail line), where reconnaissance level / edge surveys were completed

- One **crepuscular bird survey** in July 2010. Crepuscular species are those that are most active during twilight hours, either at dawn or dusk, such as Common Nighthawk and Eastern Whip-poor-will. Suitable habitats (i.e., forest edges, agricultural fields, proximity to bodies of water) were surveyed during favourable conditions (clear, calm conditions with an air temperature of 17^0C).

For further details on MESP field survey methodology, refer to the MESP NES report.

6.1.1.2 2014 - 2015 and 2019 - 2020 Surveys

Additional avifaunal surveys were undertaken in 2014 - 2015 and 2019 - 2020 (with a total of 93 person-hours during targeted avifaunal surveys):

- Breeding bird surveys
    - 2014: May 26, June 3 and June 16 (in WSU 2, WSU 3, WSU 4, WSU 6 and WSU8)
    - 2015: June 2, June 13 (in WSU 2, WSU 3, WSU 6 and WSU 8)
    - 2019: May 31 and June 18 (in WSU 2, WSU 3, WSU 4, WSU 6 and WSU 8 west)
    - 2020: May 27 and June 18 (in WSU 2, WSU 3, WSU 4, WSU 6 and WSU 8 west)
- Marsh bird monitoring
    - 2014: June 6, June 20 and July 4 (in WSU 2, WSU 3, WSU 6 and WSU 8)
    - 2015: May 23, June 2 and June 13 (in WSU 2, WSU 3, WSU 6 and WSU 8)
    - 2019: May 29 and June 27 (in WSU 2, WSU 3, WSU 6 and WSU 8 west)
    - 2020: May 25 and June 17 (in WSU 2, WSU 3, WSU 6 and WSU 8 west)
- Least Bittern Surveys
    - 2014: June 6, June 20 and July 4 (in WSU 2, WSU 3, WSU 6 and WSU 8)
    - 2015: May 23, June 2 and June 13 (in WSU 2, WSU 3, WSU 6 and WSU 8)
    - 2019: May 31, June 18 and June 28 (in WSU 2, WSU 3, WSU 6 and WSU 8 west)
    - 2020: May 27, June 18 and July 6 (in WSU 2, WSU 3, WSU 6 and WSU 8 west)
- Supplemental / migrant bird surveys across the Subject Property and adjacent lands
    - 2014: 5 dates in April and May
    - 2015: 6 dates in May
    - 2019: 3 dates in May
    - 2020: 5 dates in April and May

Methods for each are described in the following sections. Avifaunal surveys were conducted in WSUs as shown in Figure 4.

Breeding Bird Surveys

Five wildlife survey units (WSU 2, WSU 3, WSU 4, WSU 6 and WSU 8) were surveyed for breeding birds in 2014. Four units were surveyed in 2015 (WSU 4 was to be surveyed as part of future monitoring). All five units were surveyed again in 2019 - 2020. In 2014 - 2015, surveys within WSU 8 were undertaken in both the east and west section of Barrie's Lake, whereas in 2019 - 2020, only the west section of WSU 8 was surveyed. These areas were surveyed by walking along the edges of the WSUs and recording presence, abundance and level of breeding evidence using OBBA protocols.

Marsh Bird Surveys

Targeted marsh bird surveys (using call-playback protocols) were undertaken in 2014 - 2015 and 2019 - 2020. The marsh bird monitoring surveys followed the protocols set out in the Marsh Monitoring Program Participant's Handbook for Surveying Marsh Birds (MMP) (Bird Studies Canada & Environment Canada, Revised 2008), with some minor revisions to study timing and reporting.

The following outlines survey methods based on the MMP protocols:

- Marsh birds were surveyed on two or three dates: Each station was surveyed for approximately 15 minutes: a five-minute passive (silent) observation period; a five-minute call playback period; and a second five-minute passive observation period. The MMP Broadcast CD was used for playback recordings.
- Surveys were undertaken in weather that was favourable for surveying marsh birds (good visibility, warm temperatures (at least 16^0C), no precipitation and little to no wind).

The four survey stations are located within the four large wetland areas (WSU 2, 3, 6 and 8). In 2014 - 2015, surveys were undertaken in both the east and west sections of WSU 8 (Barrie's Lake). In 2019 - 2020, only the west section of WSU 8 was surveyed. Stations are oriented to maximize sampling area and observation potential. Station locations included the following target habitats: marsh habitat dominated by non-woody emergent plants such as cattails, rushes, reeds, grasses or sedges intermingled with shallow open water.

In addition to species recorded during the multiple breeding bird surveys, the MMP surveys also targeted secretive marsh birds that may otherwise go undetected. These secretive marsh birds, which are considered "focal" species in the MMP, include American Bittern (*Botaurus lentiginosus*); American Coot (*Fulica americana*); Common Gallinule (*Gallinula galeata)*; Least Bittern (*Ixobrychus exilis*); Pied-billed Grebe (*Podilymbus podiceps*); Sora (*Porzana carolina)*; Virginia Rail (*Rallus limicola*); and Yellow Rail (*Coturnicops noveboracensis*).

Secondary species (non-focal species which were observed or heard during these targeted surveys) were also recorded.

Least Bittern

Methodology for surveys followed the National Least Bittern Survey Protocol (Environment Canada 2011) The Environment Canada methodology has the following key elements:

- At least 3 surveys; early am timing (30 minutes before sunrise to 10 am);
- Stationary counts at stations at least 250 m apart; not conducted under adverse weather conditions (e.g., rain, fog, extreme heat or winds exceeding 19 km/h);
- 13-minute call response broadcasts at each station, with 5 minutes of passive listening, 5 minutes of call broadcasts and 3 minutes of passive listening;
- Recording numbers, call type, and distance of recorded Least Bitterns; and
- Recording other marsh birds and habitat characteristics.

The survey stations are located within the four major wetland units (WSU 2, 3, 6 and 8). In 2014 - 2015, surveys within WSU 8 were undertaken in both the east and west sections of Barrie's Lake. In 2019 - 2020, only the west section of WSU 8 was surveyed.

Migrant Waterfowl

Pond and wetland areas (WSU 2, WSU 3, WSU 6 and WSU 8) were surveyed incidentally in conjunction with other spring surveys (i.e., amphibian breeding, turtle basking, other avifaunal surveys). Species presence and abundance were recorded.

6.1.2 Results

Detailed results from the MESP and subsequent studies are provided under separate cover, with key findings discussed herein. Results from the 2019 - 2020 biological surveys are summarized herein, to act as a baseline for future monitoring.

Breeding Bird Surveys

Results from 2019 - 2020 avifaunal surveys were similar to the MESP and 2014 - 2015 survey results, though there were some differences in richness and composition year to year. Refer to Appendix D for MESP, 2014 - 2015 and 2019 - 2020 survey results for WSU 2, WSU 3, WSU 4, WSU 6 and WSU 8).

Within WSUs 2, 3, 4, 6 and 8, there were 60 species recorded in 2020, 66 species recorded in 2019, 58 species recorded in 2015, and 77 species recorded in 2014, relative to the 82 species recorded during the MESP study. Also, fewer species were recorded in each of the WSUs, with the exception of WSU 8

(Barrie's Lake), during the 2019 - 2020 and 2014 - 2015 surveys compared to the MESP study. This could be due to a number of factors:

- Fewer in-field survey hours relative to the MESP (where many additional field surveys were undertaken, with associated supplemental observations, and a greater total number of breeding bird survey hours were undertaken).
- Different focus for monitoring surveys (i.e., focus on portions of survey units adjacent to the proposed development rather than the entire survey unit). For example, the eastern and western sections of WSU 8 were surveyed in 2014 - 2015, but only the western half was surveyed in 2019 - 2020.
- General year to year environmental variability affecting habitat for less tolerant species or those with specific hydrologic requirements (e.g., Trumpeter Swan, Common Gallinule, American Coot, Hooded Merganser, American Black Duck, Blue-winged Teal).
- Infrequent observations of less common, less abundant or less easily detected species (e.g., owls, Scarlet Tanager, Veery, Yellow-rumped Warbler, Canada Warbler, Black-billed Cuckoo, Green Heron, Least Bittern).
- Inclusion of edge / open-country birds with woodland / wetland areas in 2014 - 2015 monitoring to provide a more comparable 'site total' relative to the MESP - where open areas were covered as a separate survey unit (e.g., Savannah Sparrow, Mourning Dove, Vesper Sparrow, Turkey Vulture).

During the 2014 - 2015 surveys, 11 previously unrecorded 'breeding' bird species were observed, relative to MESP survey results: Alder Flycatcher; American Black Duck; Bobolink; Cooper's Hawk; Mourning Warbler; Orchard Oriole; Osprey; Ovenbird; Wilson's Snipe; Double-crested Cormorant; and Field Sparrow. Furthermore, one previously unrecorded 'non-breeding' bird species, American Kestrel, was observed outside of the breeding season during 2014 vegetation monitoring surveys.

During the 2019 - 2020 surveys, an additional four previously unrecorded 'breeding' bird species were observed in the current Study Area: American Woodcock; Common Raven; Pine Siskin; and Yellow-billed Cuckoo.

In total, 105 bird species have been recorded in the broader MESP General Study Area from 2008-2020. Most of these species are considered breeders within this EIS Study Area, with the following possible exceptions:

- Possible migrants: American Coot, Bay-breasted Warbler, Blackpoll Warbler, Black-throated Green Warbler, Canada Warbler, Pine Siskin, Swainson's Thrush and Yellow-rumped Warbler.
- Potential / likely breeders in the local landscape, but with no evidence of nesting and/or no suitable habitat in the Study Area: Bank Swallow, Chimney Swift, Cliff Swallow, Northern Rough-winged Swallow, Osprey, Great Blue Heron and Turkey Vulture.

Of the 105 species recorded in the broader MESP General Study Area across all years, 98 species were confirmed within the EIS Study Area (i.e. WSUs 2, 3, 4, 6 and 8). Of these 105 species, 51 are considered SCC (as described in Section 4.6 above)Species of Conservation Concern (SCC) and 47 species have been recorded within the EIS Study Area (i.e. WSUs 2, 3, 4, 6 and 8) (as presented in Tables 8.1 and 8.2 and described below):

- Five SAR avifauna afforded protection under the Endangered Species Act (2007):
    - **Bank Swallow** (Threatened)
        - Foraging visitants (up to 40 individuals recorded on various dates foraging over wetland / agricultural fields). No suitable nesting habitat is present (typically sand, clay or gravel river bands or steep cliffs) within the development envelope.
    - **Barn Swallow** (Threatened)
        - Foraging visitants (up to 40 individuals recorded on various dates foraging over wetland / agricultural fields). Confirmed nesting in a barn at 1034 Roseville Road. No suitable nesting habitat is present within the development envelope.
    - **Bobolink** (Threatened)
        - Possible breeder. Single singing male recorded on one date (May 21, 2014) in pasture fronting Roseville Road west of 1034 Roseville Road laneway.
    - **Chimney Swift** (Threatened)
        - Foraging visitants (2-4 individuals recorded on various dates foraging over wetland / agricultural fields). No suitable nesting habitat is present within the development envelope.
    - **Least Bittern** (Threatened)
        - Possible and probable breeders. Two individuals recorded in WSU 3 wetland on June 20, 2011, and one individual recorded in WSU 6 wetland on two dates in 2019 (May 31 and June 28).
- Two species designated as *Special Concern* – not subject to the provisions of the ESA:
    - **Canada Warbler**
        - Probable migrants. Two singing males recorded on a single date (May 20, 2009) in WSU 2.
    - **Eastern Wood-pewee**
        - Probable breeders recorded in small numbers (1-4 individuals) on various dates in suitable woodland habitat (WSU 4).
- One provincially rare species: **Trumpeter Swan** (S2S3):

- Confirmed breeder in WSU 2 and WSU 3 (adults observed with fledged young) and possible breeder in WSU 8 (2 individuals). Recorded on various dates.

- Seven species designated by COSEWIC as SAR in Canada:
  - **Bank Swallow** (Threatened). See comments above.
  - **Barn Swallow** (Threatened). See comments above.
  - **Bobolink** (Threatened). See comments above.
  - **Canada Warbler** (Threatened). See comments above.
  - **Chimney Swift** (Threatened). See comments above.
  - **Eastern Wood-pewee** (Special Concern). See comments above.
  - **Least Bittern** (Threatened). See comments above.
- **Regionally Rare Species**. Forty-one species considered significant in the Region of Waterloo (per Region of Waterloo Report PC-96-021, 1996).
- **Area Sensitive Species**. Six species considered *Area Sensitive* per MNRF (2015a)[9]

Marsh Bird Surveys

Species observed during the 2019 - 2020 surveys were consistent with those observed as part of the MESP study and 2014 – 2015 surveys, which include:

- American Coot responded to playback calls in WSU 6 (5 individuals) in 2014;
- Common Gallinule responded to playback calls in WSU 2 (2011, 2019), WSU 3 (2011, 2019, 2020), WSU 6 (2011, 2014, 2015, 2020) and WSU 8 (2011);
- Least Bittern responded to playback calls in WSU 3 in 2011;
- Pied-billed Grebe responded to playback calls in WSU 2 (2011), WSU 3 (2011, 2015, 2019, 2020), WSU 6 (2011, 2019) and WSU 8 (2011, 2014, 2015, 2020);
- Sora responded to playback calls in WSU 2 (2014, 2015, 2019), WSU 3 (2011, 2014, 2015, 2019), WSU 6 (2015) and WSU 8 (2011); and
- Virginia Rail responded to playback calls in WSU 2 (2011, 2015), WSU 3 (2011, 2015, 2019), WSU 6 (2015) and WSU 8 (2011).

[9] **Ecoregion 6E Area Sensitive Birds** (MNRF 2015a). Area Sensitive species in Ontario are generally defined as species requiring large areas of suitable habitat for long term population survival.

Least Bittern

Two Least Bittern were heard calling from suitable habitat (cattail marsh) in WSU 3 in 2011 during MMP surveys as part of the MESP study (possible breeders). No Least Bittern were recorded in 2014 or 2015 from any of the survey stations or WSUs. One Least Bittern was heard calling from suitable habitat (cattail marsh) in WSU 6 on two dates in May and June 2019 (probable breeder). No additional observations were recorded in 2020.

Migrant Waterfowl

Migrant waterfowl species were recorded in the wetland/pond areas in 2014 - 2015 and 2019 - 2020 including: American Wigeon; Blue-winged Teal; Bufflehead; Common Gallinule; Double-crested Cormorant; Great Blue Heron; Green-winged Teal; Hooded Merganser; Killdeer; Osprey; Pied-billed Grebe; Ring-necked Duck; Sandhill Crane; Solitary Sandpiper; Sora; Trumpeter Swan; Virginia Rail; Wilson's Snipe; and Wood Duck. Generally, these were low in abundance (<10 individuals) and short-term visitors. Larger numbers (10 – 30 individuals) of common species (e.g., Canada Goose, Mallard) were recorded in ponds and fields on various dates, but not consistently.

Table 2. Summary of Avifaunal SCC Recorded Within WSUs 2, 3 and 4[10]

COMMON NAME	SRANK	SARO (ESA) STATUS	COSEWIC STATUS	SARA STATUS-Schedule	WATERLOO REGION 1996 SIGNIFICANCE	AREA SENSITIVE BIRDS - ECOREF 6E	WSU 2 SOUTH-WEST WETLAND										WSU 3 WEST CENTRAL WETLAND										WSU 4 NORTH-WEST WOODLAND							
							2008-2012		2014		2015		2019		2020		2008-2012		2014		2015		2019		2020		2008-2012		2014		2019		2020	
							BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.
Alder Flycatcher	S5B				W								S/H	1									S/H	2									
American Black Duck	S5B				W														P	2												
American Coot	S4B	NAR	NAR		W		S	1									S	2														
American Redstart	S5B				W												T	3							S/H	2	A	1			S/H	1	S/H	1
Bank Swallow	S4B	THR	THR	THR-1			X	3	X	10	X	5					X	6			X	15			S/H	3	FY	8	T	1				
Barn Swallow	S4B	THR	THR	THR-1			FY	30	X	15	X	15	X	10	X	9	FY	10	X	10	X	15	X	1	X	1								
Belted Kingfisher	S4B				U						X	1					S	1	H	1			H	1									
Black-billed Cuckoo	S4B				W														S	1					T	1	S	1					
Black-throated Green Warbler	S5B				W	X																											
Brown Creeper	S5B				W																												
Bobolink	S4B	THR	THR	THR-1					S	1																							
Brown Thrasher	S4B				W												S	1			T	1											
Canada Warbler	S4B	SC	THR	THR-1	W	X	S	2																									
Chestnut-sided Warbler	S5B				W												S	1															
Chimney Swift	S4B	THR	THR	THR-1			X	4																									
Cliff Swallow	S4B				W*		P	3	X	7			X	1			FY	40															
Common Gallinule (Common Moorhen)	S4B				W		FY	7	T	1			T	2			FY	6	T	3			T	1	T	1							
Eastern Wood-pewee	S4B	SC	SC	SC-1																							T	2					T	1
Great Blue Heron	S4				W										X	1	P	2	T	2	H	1	X	1	X	1	X	1						
Green Heron	S4B				W		H	1	H	1									T	1					T	1							
Hooded Merganser	S5B				W												FY	4	T	1			P	2									
Least Bittern	S4B	THR	THR	THR-1	CV												S	2															
Least Flycatcher	S4B				W												S	1			S	1											
Marsh Wren	S4B				W		T	2	S	2													T	2	T	1							
Mourning Warbler	S4B				W								S/H	1																	H	1	
Northern Mockingbird	S4				W																						S	1			S/H	1		

[10] Refer to Appendix E for legend

COMMON NAME	SRANK	SARO (ESA) STATUS	COSEWIC STATUS	SARA STATUS-Schedule	WATERLOO REGION 1996 SIGNIFICANCE	AREA SENSITIVE BIRDS - ECOREF 6E	WSU 2 SOUTH-WEST WETLAND										WSU 3 WEST CENTRAL WETLAND										WSU 4 NORTH-WEST WOODLAND							
							2008-2012		2014		2015		2019		2020		2008-2012		2014		2015		2019		2020		2008-2012		2014		2019		2020	
							BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.
Northern Waterthrush	S5B				W																								S	1				
Orchard Oriole	S4B				W						S	1																						
Osprey	S5B				W														X	1					X	1							
Ovenbird	S4B				W	X																												
Pied-billed Grebe	S4B				W		S	1	T	1			T	1	S/H	1	FY	4	N	4			S/H	1	FY	5	S	1						
Pileated Woodpecker	S5				W																								T	1				
Pine Warbler	S5B				W																						S	2	T	1	S/H	1		
Pine Siskin	S4B				W																										S/H	1		
Red-bellied Woodpecker	S4				W																H	1					T	8	T	5	T	3	T	1
Ruby-throated Hummingbird	S5B				W*												D	2	H	1														
Sandhill Crane	S4B	NAR	NAR		W												D	2	H	1			T	3										
Savannah Sparrow	S4B					X	S	2											T	4									S	1				
Scarlet Tanager	S4B				W	X																					A	4	T	4				
Sora	S4B				W		S	1	S	1					S/H	1	T	4	T	3	A	1	S/H	1										
Swainson's Thrush	S4B				W																										X	1		
Trumpeter Swan	S2S3						P	2							FY	6	FY	5	N	2			S/H	3	H	2								
Turkey Vulture	S5B				W												X	2			X	2					X	4	X	3			X	1
Veery	S4B				W	X																					FY	1						
Vesper Sparrow	S4B				W	X													S	1							S	2						
Virginia Rail	S5B				W		T	2			A	1			S/H	1	T	5	T	4	A	1												
Wilson's Snipe	S5B				W				H	6																								
Winter Wren	S5B				W	X																					S	2						
Wood Duck	S5				W*		FY	10	T	4	T	2	P/T	2	FY	11	FY	12	FY	18	FY	8	P	2	FY	3	P	2					S/H	2
Wood Thrush	S4B	SC	THR	THR-1																														
Yellow-billed Cuckoo	S5B				W										S/H	1									S/H	1								
Yellow-rumped Warbler	S5B				W		S	1									S	1																
52[11]	**1 S1-S3**	**8**	**8**	**8**	**44**	**8**	**16**		**11**		**6**		**7**		**8**		**21**		**18**		**10**		**12**		**13**		**13**		**8**		**6**		**6**	

[11] Note that totals for SCC reflect WSUs 2,3,4,6 and 8; totals by WSU are presented in two separate tables (Table 2 shows SCC for WSUs 2, 3 and 4; Table 3 shows SCC for WSUs 6 and 8 and former agricultural lands)

Table 3. Summary of Avifaunal SCC Recorded Within WSUs 6, 8 and Agricultural Lands

COMMON NAME	SRANK[2]	SARO (ESA) STATUS[3]	COSEWIC STATUS[4]	SARA STATUS[5]	SARA SCHEDULE[5]	WATERLOO REGION 1996 SIGNIFICANCE[6]	AREA SENSITIVE BIRDS - ECOREGION 6E	WSU 6 CENTRAL ISOLATED WETLAND										WSU 8 BARRIE'S LAKE										AGRICULTURAL LANDS					
								2008-2012		2014		2015		2019		2020		2008-2012		2014		2015		2019		2020		2008-2012		2019		2020	
								BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.
Alder Flycatcher	S5B					W																		S/H	1								
American Black Duck	S5B					W																											
American Coot	S4B	NAR	NAR			W		S/H	1	T	1																						
American Redstart	S5B					W														T	2	T	2										
Bank Swallow	S4B	THR	THR	THR	1			X	8	X	40	X	1	X	25	X	6			X	6	X	9										
Barn Swallow	S4B	THR	THR	THR	1			X	6	X	40	X	4	X	2	X	1			FY	10	T	10			X	1	X	20				
Belted Kingfisher	S4B					U														T	2	H	1			H	1						
Black-billed Cuckoo	S4B,SZN					W																											
Black-throated Green Warbler	S5B					W	X																										
Brown Creeper	S5B					W																											
Bobolink	S4B	THR	THR	THR	1																												
Brown Thrasher	S4B					W														S	1												
Canada Warbler	S4B	SC	THR	THR	1	W	X																										
Chestnut-sided Warbler	S5B					W																											
Chimney Swift	S4B,S4N	THR	THR	THR	1																									X	2		
Cliff Swallow	S4B					W*				X	50	X	2							X	4												
Common Gallinule (Common Moorhen)	S4B,SZN					W		FY	7	T	1	H	1	T	1	S/H	1	S	1														
Eastern Wood-pewee	S4B	SC	SC	SC	1																												
Great Blue Heron	S4					W		P	2	X	1							S/H	7	T	3	T	3	X	1	X	4						
Green Heron	S4B					W				X	1					H	1			H	1												
Hooded Merganser	S5B,S5N					W		S/H	2									FY	4														
Least Bittern	S4B	THR	THR	THR	1	CV								S/H	1																		
Least Flycatcher	S4B					W																											
Marsh Wren	S4B					W						S	1	T	3	S/H	1							S/H	1	S/H	1						
Mourning Warbler	S4B					W																											
Northern Mockingbird	S4					W																											
Northern Waterthrush	S5B					W																											
Orchard Oriole	S4B					W																				S/H	1						
Osprey	S5B					W						X	3							CF	1			T	1								
Ovenbird	S4B					W	X																										

COMMON NAME	SRANK[2]	SARO (ESA) STATUS[3]	COSEWIC STATUS[4]	SARA STATUS[5]	SARA SCHEDULE[5]	WATERLOO REGION 1996 SIGNIFICANCE[6]	AREA SENSITIVE BIRDS - ECOREGION 6E	WSU 6 CENTRAL ISOLATED WETLAND										WSU 8 BARRIE'S LAKE										AGRICULTURAL LANDS					
								2008-2012		2014		2015		2019		2020		2008-2012		2014		2015		2019		2020		2008-2012		2019		2020	
								BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.	BE	No.
Pied-billed Grebe	S4B,S4N					W		FY	9	N	3							FY	5	FY	7	N	4	FY	6	FY	2						
Pileated Woodpecker	S5					W																											
Pine Warbler	S5B					W																											
Pine Siskin	S4B					W																											
Red-bellied Woodpecker	S4					W																											
Ruby-throated Hummingbird	S5B					W*																											
Sandhill Crane	S4B,SZN	NAR	NAR			W												P	3	T	1			T	3								
Savannah Sparrow	S4B						X			T	2																						
Scarlet Tanager	S4B					W	X																										
Sora	S4B					W		S	3	T	2	S	1																				
Swainson's Thrush	S4B					W																											
Trumpeter Swan	S2S3																	H	2									X	8				
Turkey Vulture	S5B					W		X	8													H	2										
Veery	S4B					W	X																										
Vesper Sparrow	S4B					W	X			T	2																						
Virginia Rail	S5B					W				S	1			T	1			T	2														
Wilson's Snipe	S5B,SZN					W																											
Winter Wren	S5B					W	X																										
Wood Duck	S5					W*		P	2									FY	5	FY	11	FY	3										
Wood Thrush	S4B	SC	THR	THR	1																												
Yellow-billed Cuckoo	S5B					W																											
Yellow-rumped Warbler	S5B					W																											
52	**1 S1-S3**	**8**	**8**	**8**	**8**	**44**	**8**	**10**		**12**		**7**		**6**		**5**		**8**		**12**		**8**		**6**		**6**		**3**		**0**		**0**	

Notes:

American Coot: Recorded in WSU 2/3 on May 20 & 22, 2009; Recorded in Unit 6 on July 9, 2009. Earlier records possible migrants.
Bank Swallow: Foraging visitants. No suitable nesting habitat (typically sand, clay or gravel river banks or steep cliffs) is present in the General Study Area. Local breeding habitat may be present in nearby gravel pits.
Barn Swallow: Foraging visitants. Confirmed breeding of at least 10 pairs within the barns at 200 Blenheim Road (adjacent to WSU2). No suitable nesting habitat is present elsewhere in the General Study Area.
Bobolink: Single singing /displaying male recorded on May 21, 2014 west of the laneway west of WSU 2 (in field adjacent to barn)
Canada Warbler: Recorded on May 20 and May 22, 2009. Likely a late migrant. Typically breeds further north.
Chimney Swift: Nesting habitat not known from / observed in the General Study Area; Chimney Swifts are aerial insectivores typically foraging over water, flying distances from nesting site for food supply.
Cliff Swallow: Nesting habitat not known observed in Study Area (typically cliffs/bluffs/bridges/houses). Fledged young in WSU 3. CLSW's are aerial insectivores typically foraging over water, flying from nesting site for food supply. Nesting occurs on local bridges (e.g. Grand River).
Northern Rough-winged Swallow: Recorded on May 29, 2008; July 9, 2009; June 8, 2010; July 7, 2010; July 26, 2010; May 25, 2011. Nesting habitat not known from/observed in the General Study Area (sandy road banks, steep riparian banks or drainage holes). Fledged young observed in WSU 3. NRWS's are aerial insectivores foraging over water, flying from nesting site for food supply.
Northern Waterthrush: 1 S recorded on July 26, 2010 WSU 4.
Osprey: Foraging visitants. No nests recorded in the General Study Area.
Pine Siskin: Recorded on May 31, 2019. Likely a late migrant. Typically breeds further north.
Swainson's Thrush: Recorded on May 31, 2019. Likely a late migrant. Typically breeds further north.
Yellow-rumped Warbler: Recorded on May 20 and May 22, 2009. Likely a late migrant. Typically breeds further north

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6.2 Reptiles and Amphibians (Herpetofauna)

6.2.1 Approach

6.2.1.1 MESP and Subsequent Studies

Extensive herpetofaunal surveys were undertaken as part of the MESP and subsequent studies over a multi-year period (2008 - 2016). Further detail is provided in the MESP NES, EIS, and 2014 - 2015 monitoring reports under separate cover.

6.2.1.2 2019 - 2020 Surveys

Two types of herpetofaunal survey were undertaken in 2019 - 2020:

- Spring amphibian breeding surveys in WSU 2, WSU 3, WSU 4[12], WSU 6 and WSU 8[13]. These surveys followed the Marsh Monitoring Program Amphibian Calling Survey Protocol (Bird Studies Canada 2008, revised 2009) and were completed on the following dates:
    - 2019: April 8, May 29, and June 27
    - 2020: April 8, May 25, and June 17
- Turtle basking surveys in WSU 2, WSU 3, WSU 6, and WSU 8[14]. These were carried out according to the Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (MNRF 2014[15]) on the following dates:
    - 2019: May 5, May 15, May 21, May 31, and June 18
    - 2020: April 27, May 16, May 21, June 1, and June 13

[12] Note: amphibian breeding surveys in WSU 4 were undertaken from 2008-2011 (MESP), then re-initiated for monitoring in 2019 (i.e. it was not surveyed during the 2014 – 2015 surveys).

[13] Note: 2014 and 2015, amphibian breeding surveys were conducted only in the East Section of WSU 8 only. In 2019, amphibian breeding surveys were conducted in both the East and West Sections of WSU 8 (with the East Section being surveyed as part of adjacent landowner monitoring).

[14] Note: 2014 and 2015, turtle basking surveys were conducted in both the East and West Sections of WSU 8. In 2019, turtle basking surveys were conducted only in the West Section.

[15] Note: The survey protocol was updated in August 2015 (MNRF 2015b), however, the approach for basking turtle surveys between the 2014 and 2015 protocols was consistent.

6.2.2 Results

Detailed results from the MESP and subsequent studies are provided under separate cover, with key findings considered herein. Results from the 2019 - 2020 biological surveys are summarized herein, to act as a baseline for comparison with during- and post-construction biological monitoring.

Amphibian Breeding Surveys

Overall, calling anurans showed a high species richness and were observed in relatively high abundance where suitable habitat was present during surveys. Calling was fairly consistent between surveyed years in terms of distribution and abundance, though some variation in species composition / abundance was noted among survey years. A summary of survey results from the MESP study (2008 - 2011) compared to 2014 - 2015 surveys and 2019 - 2020 surveys is presented in Appendix D.

The summary presented in Appendix D shows that the results from the 2019 - 2020 spring amphibian calling surveys were generally consistent with the MESP and 2014 - 2015 biological monitoring surveys, noting that two species with limited to no observations in 2019/2020 (Chorus Frog and American Toad) were previously recorded sporadically and in low abundance (i.e., no trends in their presence / abundance). Moreover, it is important to note that for all but one survey round, there were no alterations to this amphibian breeding habitat or adjacent lands between 2015 and 2020 (i.e., the Subject Property and adjacent City development lands were still 'pre-development' for all surveys except for the 3rd survey in 2020 [June 17, 2020], in which site grading had commenced on adjacent lands prior to this date).

Table 4. Amphibian Calling surveys – Summary of Results (2019 - 2020)

SPECIES	AMPHIBIAN CALLING STATION & MAXIMUM CALLING CODE									# STNS RECORDED
	AM2	AM3	AM4	AM5	AM6	AM9	AM10	AM11	AM12	
American Toad	1									1
American Bullfrog								1		1
Green Frog	1	1	1	2	1			1		6
Gray Treefrog	3	3	3	3	3	3		1	2	8
Northern Leopard Frog	1	1	1	2	1					5
Spring Peeper	3	3	3	3	3	3	3	3	1	9
Wood Frog	1	2	2	3	1	2	3			7
Species Richness	**6**	**5**	**5**	**5**	**5**	**3**	**2**	**4**	**2**	

Call Code 1- individual calls can be counted, no overlap; Call Code 2- some calls can be counted, some overlap; Call Code 3- calls continuous and overlapping, individuals not distinguishable

Turtle Basking Surveys

Results from the 2019 - 2020 turtle basking surveys were generally consistent with the MESP and 2014 - 2015 surveys; however, results for WSU 8 were much lower in 2019 - 2020 compared to 2014 - 2015 given that the lake was surveyed from only one location in 2019 - 2020, compared to two locations in 2014- 2015.

During 2019 - 2020, two turtle species were observed during turtle basking surveys (and incidentally during other surveys), with similar distribution and abundances to those recorded in previous survey years:

- Midland Painted Turtle: widespread and abundant within WSUs 2, 3, 6 and 8.
- Snapping Turtle: widespread in low abundances within WSUs 2, 3, 6 and 8.

No Blanding's Turtles have been observed during any field surveys.

Table 5. Turtle Basking Survey Summary Results (2019 - 2020)

FEATURE ID	2019		2020	
	Midland Painted Turtle	Snapping Turtle	Midland Painted Turtle	Snapping Turtle[16]
Pond 2 (WSU 6)	13	2	48	
Pond 3 (WSU 2)	4	1	13	
Pond 4 / 5 (WSU 3)	37	2	93	1
Barrie's Lake (WSU 8 West Section)	37	1	17	1

* Maximum count for a single survey, not cumulative.

Incidental Turtle Observations

- Agricultural Field adjacent to WSU 3: One nesting Snapping Turtle and several Snapping Turtle nest sites were observed on June 18, 2019, in the agricultural field adjacent to WSU 3 (within 15-20m of the wetland edge).

[16] Note that Snapping Turtle abundance in each of the wetlands is likely under-estimated given this species' more cryptic behaviour.

- Agricultural Field adjacent to WSU 4: On June 18, 2019 one Snapping Turtle was observed wandering in the agricultural field within 50m of WSU 4 in search of a nest site; one Snapping Turtle nest site was also observed in the agricultural field adjacent to WSU 4 (within 5m of the woodland edge).
- Roseville Road adjacent to WSU 8 (West Section): On May 5, 2019, two road-killed Midland Painted Turtles were observed on Roseville Road.
- No incidental observations of turtle nesting evidence or turtle road mortality were observed in 2020.

6.2.3 Summary of Herpetofaunal Survey Results

The following summarizes key herpetofaunal survey results, including MESP surveys (2008 - 2011) and biological surveys in 2014- 2015 and 2019 - 2020:

- Based on 2008 - 2009 and 2016 survey results, MNRF concluded that Jefferson Salamanders (JESA) were not present within the MESP General Study Area (MNRF 2010; 2016)
- In total, 15 herpetofaunal species have been recorded in the MESP General Study Area across all survey years. Of these, the following are SCC:
    - Three COSEWIC designated SAR:
        - Midland Painted Turtle (Special Concern)
        - Snapping Turtle (Special Concern)
        - Western Chorus Frog (Threatened)
    - Two federally designated SAR
        - Snapping Turtle (Special Concern)
        - Western Chorus Frog (Threatened)
    - One provincially designated SAR
        - Snapping Turtle (Special Concern)
    - One provincially Rare species
        - Western Chorus Frog (S3)

Survey results / list of herpetofaunal species recorded via spring anuran breeding and turtle basking surveys within the MESP General Study Area are provided in Appendix D.

6.3 Insects (Lepidoptera and Odonata)

6.3.1 Approach

Targeted Lepidoptera (butterflies, moths, skippers) and Odonata (dragonflies and damselflies) field surveys were completed as part of the MESP study on 11 dates in late spring through fall, from 2009 – 2011 (see Appendix B for survey details). Supplemental observations were recorded during other wildlife surveys undertaken as part of the MESP study and during 2014 - 2015 and 2019 - 2020 fieldwork.

6.3.2 Results

In total, 34 species of Lepidoptera species and 51 Odonata species were recorded as part of the MESP study. A list of species is provided in Appendix D. Additional survey results are provided in the MESP NES report. Results from 2014 - 2015 and 2019 - 2020 insect monitoring surveys were generally similar to MESP results. No 'new' notable observations were recorded.

Of the total 85 Lepidoptera and Odonata species recorded across all years, 10 are SCC:

- One federally designated SAR
    - Monarch (Special Concern)
- One provincially designated SAR
    - Monarch (Special Concern)
- Eight Provincially Rare Species
    - Giant Swallowtail (S3)
    - Amber-winged Spreadwing (S3)
    - Harlequin Darner (S3)
    - Painted Skimmer (S2)
    - Spatterdock Darner (S1)
    - Swamp Darner (S2S3)
    - Tawny Emperor (S2S3)
    - Unicorn Clubtail (S2S3)
- Seven species which could be considered locally uncommon

Table 6. Odonata and Lepidoptera SCC Recorded in WSU 2, 3, 4, 6, and 8 (2008 - 2020)

COMMON NAME	G-RANK[1]	S-RANK[2]	SARO (ESA)[3]	COSEWIC[4]	SARA STATUS[5]	SARA SCHEDULE[5]	LOCALLY UNCOMMON[6]	WSU 2	WSU 3	WSU 4	WSU 6	WSU 8
LEPIDOPTERA												
Columbine Duskywing	G4	S4					X		X	X		
Common Sootywing	G5	S3S4							X	X		
Giant Swallowtail	G5	S3								X		
Spicebush Swallowtail	G5	S4					X					
American Snout	G5	SZB					X			X		
Tawny Emperor	G5	S2S3								X		
Monarch	G4	S4	SC	END	SC	1		X	X	X	X	X
ODONATA												
American Emerald	G5	S5					X	X				X
Variable Darner	G5	S5					X	X				
Spatterdock Darner	G3G4	S1										X
Unicorn Clubtail	G5	S2S3										X
Swamp Darner	G5	S2S3								X		
Harlequin Darner	G5	S3								X		
Chalk-fronted Corporal	G5	S5					X		X			X
Amber-winged Spreadwing	G4	S3							X			
Frosted Whiteface	G5	S5					X		X	X		X
Painted Skimmer	G5	S2					X		X			
Slaty Skimmer	G5	S4					X		X			
Band-winged Meadowhawk	G5	S4					X			X		
Carolina Saddlebags	G5	SZB					X		X	X		X
Total = 20			**1**	**1**	**1**	**1**	**11**	**2**	**8**	**10**	**1**	**7**

6.4 Mammals

6.4.1 Approach

6.4.1.1 MESP Study

Mammal surveys were undertaken as part of the MESP study over a multi-year period (2008 - 2011).

Mammals were surveyed using three approaches: 1) 'general' wildlife surveys, including winter visits; 2) incidental observations during other field surveys; and 3) targeted surveys for American Badger (*Taxidea taxus*), a species that is listed as *Endangered* both provincially and federally.

Additional details are provided in the MESP NES report.

6.4.1.2 2014 - 2015 and Collector Road Network EA Surveys

General

Incidental observations of mammals were recorded during 2014 - 2015 fieldwork, and fieldwork conducted as part of the Collector Road Network EA, where noted.

Bats

A habitat assessment was completed for potential hibernacula and maternal roosting habitat, via walking transects through potentially suitable habitat in the Study Area on three dates: June 13, 2015; November 25, 2015; and May 16, 2017.

Those surveys focused on treed areas (both woodland and individual trees / clusters) adjacent to the Subject Property. Survey findings were assessed against criteria specified in the "Maternal Roost Surveys (Forests / Woodlands)" section of the Technical Note, Species at Risk (SAR) Bats (MNRF 2015).

6.4.1.3 2019 - 2020 Surveys

General

Incidental observations of mammals were recorded during 2019 - 2020 fieldwork, where noted.

6.4.2 Results

General

The Study Area provides habitat for large and small mammals. In total, seven mammal species were detected in the General Study Area during the 2008 - 2011 MESP: Eastern Chipmunk (*Tamias striatus*); Raccoon (*Procyon lotor*); Deer Mouse (*Peromyscus maniculatus*); White-footed Mouse (*Peromyscus leucopus*); Meadow Vole (*Microtus pennsylvanicus*); Shrew (unknown species); and White-tailed Deer (*Odocoileus virginianus*).

During the 2014 - 2015 and 2019 - 2020 surveys, seven additional species were recorded in the Study Area based on visual observations of individuals or evidence such as tracks, scat, etc., including: American Mink (*Mustela vison*); Bat (unknown species); Beaver (*Castor canadensis*); Coyote (*Canis latrans*); Grey Squirrel (*Sciurus carolinensis*); Muskrat (*Ondatra zibethicus*); and Red Fox (*Vulpes vulpes*).

Furthermore, although not confirmed within the Study Area, the treed ecosites (forest/swamp), wetlands and edge habitats within the local landscape provide suitable habitat opportunities for a variety of other mammals including Groundhog (*Marmota monax*), Virginia Opossum (*Didelphis virginiana*), Striped Skunk (*Mephitis mephitis*), other Mustelids (*Mustelidae*) and small rodent species.

American Badger

Targeted American Badger habitat assessment surveys were undertaken as part of the MESP study, with a methodology based on Ontario Regulation 437/09 and MNRF input on multiple occasions.

In total, 27 burrows were recorded in the MESP General Study Area. Most were located between Blenheim Road and the CPR line (field edge abutting Vegetation Unit 23 and along the Blenheim Road berm) and several were found along forest/wetland – field interfaces.

Based on a lack of consistent characteristics indicative of badger dens, none of the burrows were determined to likely be badger burrows, and only two showed evidence of recent use. As such it was WSP's assessment that there is no evidence of Badger use in the MESP General Study Area. Additional survey details and results are provided in the MESP NES report.

During subsequent field surveys, no burrows with definitive Badger characteristics were recorded.

Bats

Suitable habitat for SAR bats is present in the woodlands within the MESP General Study Area (i.e., within WSU 1 and WSU 4) as these communities maintain trees >10cm dbh (per MNRF 2017); these woodlands will be retained in full, with development setbacks and other mitigation measures.

Based on the 2014, 2015 and 2017 bat habitat suitability field surveys, and vegetation no hibernacula are present and no suitable SAR bat habitat (i.e., cavity and snag trees with suitable loose bark conditions or buildings) is present within areas directly impacted by the proposed development.

6.5 Wildlife Movement Opportunities

Based on the multi-year, comprehensive suite of surveys completed for the MESP study, combined with secondary source information and general knowledge of the area, the MESP NES characterized wildlife movement opportunities within the MESP General Study Area.

A key outcome of that study was the identification of key areas for wildlife movement and recommended locations for linkages and wildlife passage structures to support those functions. The intent is for these linkages to provide connections between natural areas / critical life cycle habitats and contribute to broader landscape scale function and connectivity, via three categories: Maintain, Enhance or Restore. Based on survey results and habitat in the areas to be connected, the primary target group for corridor design is herpetofauna (including Ambystomid salamanders, anurans, turtles, and snakes).

With respect to the Subject Property, one linkage area was identified in the MESP NES: Linkage 8a[17] between WSU 3 and WSU 6.

As noted in the MESP NES, the objective of Ecological Linkage 8a / 8b is to restore connectivity between the currently isolated Central Wetland to the adjacent larger existing natural features to the west and east. They will facilitate wildlife movement between herpetofaunal breeding habitat (WSU 3, WSU 6), overwintering habitat (WSU 1, WSU 3 and WSU 6), and foraging and juvenile dispersal areas (existing wetland / woodland and future buffer zones in WSU 1, WSU 3 and WSU 6). In addition, they will provide supplemental movement areas for other wildlife taxa and a suitable corridor for plant propagule exchange between wetland / woodland areas. Conceptual design details for these linkages were provided in the MESP NES.

The MESP NES also identified additional linkages in the Study Area and on adjacent lands: Linkages 1, 2, 6, 7a, 7b, 8b and 9.

Linkages 1 and 2, within WSU 2 and WSU 3, were identified in the MESP NES as connections to be 'enhanced' via the establishment of naturalized buffers in current active croplands – to increase width of natural areas, provide additional habitat diversity, visually screen internal (core) areas from open /

[17] Linkage 8b extends east from the Central Wetland (WSU6) to the Devil's Creek valleylands (WSU1).

developed lands and reduce potential for edge effect and drying of soils (for species requiring moist - wet habitat), all of which improve opportunity for wildlife movement – all taxa / guilds.

Linkages 6, 7a and 7b are recommended crossings of Blenheim Road to the south of the Subject Property, with associated eco-passages / wildlife fencing. It is our understanding that two eco-passages and associated wildlife fencing was installed on Blenheim Road north of Barrie's Lake in 2020 between Linkage 6 and 7a. Implementation of any additional linkages in this area would be subject to confirmation and additional design as part of a separate process and undertaken by others. No further discussion is provided herein.

Implementation of Linkage 8b is currently underway as part of the approved Plans of Subdivision in the City lands to the east (30T-16103 and 30T-16104).

Linkage 9, an area of active cropland and degraded wetland between WSU 2 and WSU 3, was identified in the MESP NES as a connection to be 'restored', with specific measures dependent on whether a road crossing was identified. Since approval of the MESP, alternate road connections have been confirmed and a crossing at this location is no longer being contemplated. Section 7.3.3.2 of the MESP NES concluded that, if a road crossing was not identified, "the proposed setbacks and buffer management measures will retain and enhance existing wildlife movement opportunities between WSU 2 and WSU 3 (with voluntary landowner adoption of buffers and management measures in areas outside of the DSA encouraged)".

Wildlife passage monitoring will primarily target herpetofauna but other wildlife encountered will be recorded. See Section 13 for further discussion regarding future monitoring requirements for wildlife passage monitoring.

7.0 AQUATIC RESOURCES

No defined watercourses are present on the Subject Property. Diffuse and defined channels associated with Cruickston Creek are located on adjacent lands to the north. Several wetland areas are that may provide habitat for aquatic species are present within and adjacent to the Subject Property (i.e., WSU 2, WSU 3, WSU 6 and Barrie's Lake (WSU 8). All are located outside of lands proposed for development.

The largest of these wetland areas, Barrie's Lake (~ 21.7 ha) is a permanent pond / wetland (PSW) dominated by open water, fen and marsh communities. Depths in and along the edge average 0.3 m with mainly soft substrates consisting of muck and organics. Morphology is characterized as stagnant water with emergent / floating / submergent vegetation (75:25, open water: vegetation ratio), comprised of water lilies / duckweed in open water, with Leatherleaf and graminoids on the islands. Along the

perimeter of the lake, emergent vegetation consisted of Reed-canary Grass and cattails, in addition to abundant duckweed. Barrie's Lake provides areas of deep (>2 m) open water, with large areas of wetland/aquatic vegetation. Based on LIO database information, Barrie's Lake provides habitat for at least one fish species; Brown Bullhead (*Ameiurus nebulosus*), with the potential for other fish species to be present.

The remaining wetland areas associated with WSU's 2, 3 and 6 are all permanent wetland features that support areas of open water. No defined surface water features drain to or from any of these features and each of them are similar in their physical characteristics as it relates to potential aquatic habitat. Substrates in each consist generally of silt, organics and muck, with depths in the middle that are likely able to sustain fish populations year-round, at least during some years. Morphology in each is characterized as stagnant water with emergent vegetation, generally composed of graminoids and cattails. In each wetland, fish use is unknown and though there is potential for permanent fish populations to exist, no fish have been observed by WSP staff during any of the survey years (2008 – 2020). Furthermore, the presence of Ambystomid salamanders suggest that fish are less likely to be present.

8.0 DEVELOPMENT PROPOSAL

8.1 Proposed Land Uses

The Hallman Construction Limited and Brian Domm Consolidated Draft Plan of Subdivision for Westwood Phase 2 (February 4, 2021) encompass approximately 25 ha of active agricultural lands and will include:

- Single detached residential dwellings;
- Multiple residential dwellings;
- Neighbourhood parks and open space network;
- Walkways and emergency accesses;
- Municipal right-of-ways (ROW) with widths of 18.5m and 20.0m; and
- A wildlife corridor block.

Refer to the Consolidated Draft Plan of Subdivision (MHBC, February 4, 2021), shown on Figure 6 and included in Appendix H, for additional details.

As input to the development of the Draft Plan, natural heritage limits were delineated. Setback and buffer requirements were then determined based on the features and functions of these adjacent features (as discussed in following sections).

8.2 Development Setbacks and Buffers

8.2.1 Natural Heritage System

A detailed constraints analysis was undertaken as part of the MESP study. It included a qualitative assessment of wildlife habitat significance and/or sensitivity, based on habitat rarity or uniqueness in the local landscape, presence of SAR and SCC, floral and faunal richness, species composition, presence of sensitive or habitat-specific species and level of anthropogenic disturbance / influence (e.g., presence and abundance of urban-tolerant or urban-adapted species). That assessment also considered representation of habitat types and context / importance within the local landscape. Refer to the MESP NES report for additional details.

From that analysis, the primary areas of constraint within the study area associated with natural heritage features and functions were identified. The primary constraint areas within or immediately adjacent to the study area, summarized below, form part of the *Natural Heritage System*, as recommended and approved in the MESP study (as shown on Figure 2).

- Lands designated as part of the Blair-Bechtel-Cruickston ESL, including portions of the Barrie's Lake - Bauman Creek PSW, Barrie's Lake ESPA to the south-west, and the rare Charitable Research *Reserve ('rare')* lands to the north-west.
- The 'Central Wetland' feature (part of the Barrie's Lake – Bauman Creek PSW).

Field surveys and analyses subsequent to the MESP confirm findings and recommendations therein. No changes are proposed to the MESP-recommend *Natural Heritage System*.

8.2.2 Development Setbacks

One of the key mitigation and protection measures for natural heritage features is the establishment of development buffers, which includes not only physical development setback distances, but other buffer management measures. Often, other mitigation measures can be as important as the physical setback distance in an integrated buffer management approach.

Buffers and development setbacks from natural features were developed through the MESP study process to mitigate potential impacts from future development and provide enhancement opportunities. As part of the MESP process, natural heritage feature boundaries (including wetland, woodland and CEFs) were first delineated by WSP staff, then verified in the field by City, Region and GRCA staff (see Section 5.3). Approved boundaries were then surveyed, as shown on Figure 5 and Draft Plans.

A comprehensive analysis was then undertaken in the determination of buffers and development setbacks, as discussed in Section 7.2 of the MESP NES report. Development setbacks, as shown on MESP Figure 14 (updated, as shown on Figure 5 herein), are the greater of:

- 50m from the PSW wetland boundary (marsh / pond habitat to the west): Vegetation Units 1B, 11A, 11B and 12
- 30m from the PSW wetland boundary (treed swamp habitats to the west and north): Vegetation Units 4 and 5
- 15m from woodland driplines (non-wetland areas to the west and north): Vegetation Units 1A, 2 and 3

These recommended setbacks were used to delineate the limits of the proposed subdivisions.

8.2.3 Buffer Management

The following provides a summary of key ecological management objectives of the buffer areas:

- Vegetation and tree root protection.
- Protection of surface water quality from potential effects of sedimentation / erosion, nutrient loading, contaminants and thermal impacts.
- Reducing potential for physical edge effects via establishment of a more robust and dense edge vegetation community.
- Protection and enhancement of woodland and forest interior habitat (including habitat for forest interior or forest-associated birds and woodland-breeding amphibians), via increased functional setbacks from 'core' areas and increased woodland size – relative to agricultural use.
- Protection and enhancement of herpetofauna breeding and foraging habitat.
- Protection and enhancement of Lepidoptera/Odonata breeding and foraging habitat.
- Reducing potential occupancy-related activities (e.g., encroachment, dumping, noise / lighting, etc.), via physical separation and buffer management measures – along with other mitigation measures.
- Enhancement of ecological corridors, via development setbacks and buffer zone enhancements (See Section 10.1.2).
- The Draft Plan and Servicing Strategy respects the setback limit, with grading in the buffer restricted to one area, as shown on MTE Figure AG1.1.

Recommended setbacks and buffer management as discussed above have been confirmed through analysis in support of the current submission. No changes are proposed.

All plans, including the Consolidated Draft Plan of Subdivision, respect the identified development setbacks.

8.3 Stormwater Management

8.3.1 SWM History, Objectives & Criteria

The MESP outlined a preliminary municipal servicing strategy for the broader MESP area, which included: sanitary, storm, and watermain servicing, along with a stormwater management (SWM) strategy. The recommended SWM solution was designed to maximize the use of existing storm drainage infrastructure, maintain current levels of infiltration into the ground, maintain surface water inputs into local wetland features, and mitigate the potential for stream erosion. The recommended solution consisted of multiple types of stormwater management infrastructure, including lot-level and conveyance infiltration facilities, along with several extended detention end-of-pipe stormwater management facilities.

As part of final design for the adjacent Hallman and Cachet Subdivisions in the City of Cambridge, a Final SWM Report (FSWMR) was submitted by MTE in August 2019 (and revised April 15, 2020). The SWM approach for the entire Westwood Village Community has been developed in Westwood Village Phase 2 Preliminary SWM Report (MTE; 2021) to be consistent with the conceptual solution recommended within the MESP. The additional Township land (i.e. the Subject Property) was included as part of the overall SWM strategy, to ensure that adequate SWM infrastructure has been planned for eventual development of these lands.

Stormwater Management Facility 2 (SWMF 2) within the Cachet Subdivision has been designed to service the majority of the Subject Property. A small drainage area of the Domm lands, of approximately 3.6ha, was proposed to drain to a future SWM facility within the Domm lands. However, as part of the pre-consultation process for the current submission, it was requested that MTE revisit the SWM strategy and determine if this drainage area could be serviced by SWMF 2.

An Environmental Compliance Approval was issued for SWMF 2 by MECP (formerly known as MOE) in November 2020; SWMF 2 is within the Cachet Subdivision adjacent to the central wetland. To facilitate the servicing of the Subject Property by SWMF 2, the storm sewer system within the Cachet Subdivision has been designed to accommodate the ultimate build-out of the Subject Property. A roof water collection system was also recommended to collect clean roof water from a portion of the Subject Property to provide surface water inputs into Wetland 2 (the central wetland), which is located to adjacent to SWMF 2.

Key objectives of the SWM strategy for the Subject Property (MTE 2021) have considered natural heritage input. They are as follows:

- Include the necessary controls to protect the hydrology and water quality of the receiving water systems.

- Document criteria for the management of stormwater runoff from the Subject Property
- Recommend a comprehensive plan for controlling the quality and quantity of stormwater runoff from the Subject Property
- Verify the capacity of SWMF 2 to provide sufficient quality and quantity controls for the Subject Property
- Recommend a comprehensive plan for balancing infiltration to groundwater and surface water inputs to existing features
- Ensure that the final engineering of the downstream SWM infrastructure incorporates the recommendations of the Preliminary SWM Report (MTE 2021)

The following SWM criteria were established in the Preliminary SWM Report (MTE 2021):

- **Water Quality** – Provide an *Enhanced* (MOE, 2003) level of stormwater quality treatment prior to discharge to surface or groundwater systems.
- **Water Quantity** – Control peak flow rates to creek systems to existing levels, to minimize flooding and preserve hydraulic and hydrologic functions.
- **Water Balance**
    - *Infiltration* – Maintain or enhance existing recharge rates across the development area.
    - *Surface Water* – Maintain existing surface water volume and hydro-period inputs into environmental features to the east (Wetland 2) and west/north (Wetlands 1, 4, 5 and 6).

8.3.2 SWM Strategy for the Subject Property

The proposed SWM strategy for the Subject Property, as presented in the Preliminary SWM Report (MTE April 2021), includes the following key elements:

- **Use of an existing SWM Facility for surface water quality and quantity control** , conveyed by a storm sewer network in the road right-of-ways
    - **Quality control**. SWMF2, in the adjacent Westwood Village Phase 1 lands, will provide *Enhanced* quality control from the contributing drainage area for storms up to and including the Regional storm event. SWMF2 is a wetland facility that incorporates a permanent pool and two sediment forebays which provide dilution and settling. Native plantings around the SWM facility will stabilize the banks and help to mitigate temperature increases.
    - **Quantity control**. All flows up to and including the Regional storm event will be controlled to the capacity of the proposed storm connection to the Princess Street storm sewer. SWMF 2 also utilizes the adjacent Wetland 2 for storage (above the 5-

year storm). Capacity in SWMF2 was confirmed through the SWM analysis (MTE 2021). Emergency overflow is provided with two spill points: southeast to the wildlife crossing beneath Bismark Drive; and southwest toward Wetland 4 via the ecological corridor.

    - No new SWM facilities are proposed on the Subject Property

- **Implementation of at-source roof infiltration facilities** throughout the property

    - At the lot level, infiltration facilities are proposed to be connected to the majority of roof areas within the development. All lot level infiltration systems for single family lots will be located in the backyards and have been designed to accept 25mm of runoff.

- **Implementation of a conveyance infiltration facility**

    - A conveyance infiltration facility (infiltration facility located along the conveyance route) will also be provided to infiltrate treated 'non-roof' (road, front/rear yard) runoff. The conveyance facility within the subject lands has been designed to infiltrate 25mm of contributing runoff. The area contributing to the conveyance infiltration facility is illustrated in **Figure 4.2**. of the Preliminary SWM Report (MTE 2021; included in Appendix I)

- **Water Balance.** See Section 8.3.3. Infiltration targets will be met and surface water inputs to the adjacent natural areas will be maintained post-development

- **Future SWM Analysis**

    - Note that some Blocks within the Draft Plan lands that will be developed through a future Site Plan Approval process. As part of that process, a *Stormwater Management Brief* will be prepared identifying the stormwater management criteria for the Block and how the stormwater control measures will adhere to the Subdivision SWM criteria as established in the Preliminary SWM Report (MTE 2021).

- A preliminary **Erosion & Sediment Control** (ESC) strategy, as discussed in Section 8 of the Preliminary SWM Report (MTE 2021).

- A During-construction and Post-construction **Surface Water and Groundwater Monitoring Plan,** as discussed in Section 7 of the Preliminary SWM Report (MTE 2021).

8.3.3 Water Balance

A Water Balance analysis has been completed, as discussed in Section 5.5 of the Preliminary SWM Report (MTE 2021). The MESP established that both existing infiltration rates and existing surface water inputs to key natural features were to be maintained post-development as described below.

8.3.3.1 Infiltration

The infiltration strategy includes lot level and conveyance controls, which will meet or exceed pre-development average annual volumes (i.e., average annual infiltration depth of 262.8mm, which slightly exceeds the pre-development value of 256.4mm).

- **Lot level infiltration** facilities will include direct connections to roof leaders on residential lots and a series of independent infiltration galleries on condominium blocks. All residential blocks will have infiltration galleries, except for those reserved for the surface water balance to the wetlands – as discussed below.

- A **conveyance control** will include an infiltration gallery and an upstream oil and grit separator to treat stormwater prior to entering the facility. The proposed SWM strategy includes a conveyance infiltration facility (CIF), located within the central park block (Block 16-Stage 1, Domm) of the proposed development. The Prelim SWM Report Figure 4.2 illustrates the drainage area of the conveyance facility which serves to infiltrate 'non-roof' runoff in order to provide a distributed infiltration balance to pre-development levels. The overflows from the CIF will discharge to the proposed storm sewer system in the subject lands.

8.3.3.2 Surface Water Inputs to Wetlands

The proposed SWM plan demonstrates that pre-development surface water volume inputs into the wetland features surrounding the development will be maintained post-development, by a combination of inputs from the rear yards/roof areas of lots adjacent to the wetlands and contributions from a roof drainage collection system ('third-pipe' system). The areas designated as contributing to the wetland surface water balance are shown on Figure 2.1, Figure 4.2, Figure F.1 and Figure F. 2 of the Preliminary SWM Report (MTE 2021), with detailed water balance assessments in Appendix F of the that report.

In the lots with roofs draining to Wetland 2, the proposed 'third pipe' system will replace the roof infiltration galleries. For the residential lots (in the Cachet Subdivision) adjacent to Wetland 2, runoff from the roofs will be directed to Wetland 2 through downspouts and overland routing.

Wetland 2

Wetland 2 (hydrogaph 5312), in the Cachet Subdivision adjacent to SWMF 2, receives a pre-development runoff volume of 23,800m^3 (MESP, 2013). In the post-development condition, Wetland 2 receives a direct runoff volume of 6,442m^3, which is supplemented by directing clean roof water year round via a 'third-pipe' system, to achieve an annual post-development runoff volume of 24,349m^3.

Wetland 2 primarily receives surface balance inputs from the contributing roof areas, rather than runoff from SWMF 2. All SWMF 2 discharge up to and including the 5 year storm event, which would include all winter month melts and events, outlets to the Princess Street storm sewer. In this manner, SWMF 2 has an inherent wetland winter bypass, which functions passively, avoiding ecological impacts associated with chloride loading.

Wetland 3

Wetland 3 (hydrograph 1402) is located south of the Subject Property and receives a pre-development runoff volume of 37,300m^3, a very small portion of which is on the Subject Property In the post-development condition, it receives post-development non-winter runoff from Facility 1 outlet totaling 6,860m^3, runoff from the undeveloped buffer (catchment 402), proposed Blenheim Road, and the rear yard/roof areas of the Subject Property (catchment 712) for a total post-development runoff volume of 38,842m^3 - a very small (4%) surface water runoff surplus.

Wetland 4 and 5

Wetland 4 and 5 (hydrograph 1405), which are hydraulically connected, are located west of the Subject Property and receive a pre-development runoff volume of 55,000m^3. In the post-development condition, they receive surface water input from the undeveloped buffer and the rear yard/roof areas of the subject lands (catchment 708 and 712) for a total post-development runoff volume of 54,681m^3, a very slight reduction of less than 1%.

West Wetland (VP1)

Vernal Pond 1 is located west of the Subject Property. It receives a pre-development runoff volume of 3,802m^3. In the post-development condition, it receives surface water input from the undeveloped buffer and the rear yard/roof areas of the Subject Property, for a total post-development runoff volume of 3,850m^3, a very slight increase of less than 1% relative to pre-development.

East Wetland (VP7)

Vernal Pond 7 is located in the *rare* 'hogsback' north of the Subject Property. It receives a pre-development runoff volume of 9,135m^3. In the post-development condition, it will receive surface water input from the undeveloped buffer and the rear yard/roof areas of the adjacent lots and additional roof drainage collected through a third pipe system within the Subject Property. A total of 9,301m^3 of post-development runoff will be contributed to this wetland, a slight increase of less than 2%.

Wetland 6 / Cruickston Creek

Cruickston Creek, downstream of the proposed development area (hydrograph 1110), receives a pre-development runoff volume of 46,300m^3, via concentration of diffuse drainage through the surrounding

'hogsback' swamp into a channel toward the north end of that feature. It will receive a total post-development runoff volume of 46,368m^3, matching pre-development.

All residential blocks will have infiltration galleries, except for those reserved for the surface water balance to the wetlands. In the lots with roofs draining to Wetland 2, the proposed 'third pipe' system will replace the roof infiltration galleries. For the residential lots (in the Cachet Subdivision) adjacent to Wetland 2, runoff from the roofs will be directed to Wetland 2 through downspouts and overland routing. It is estimated that drainage from a total roof area of 1.51ha within the Subject Property will be directed to Wetland 2 via a 'third-pipe' system, and 2.70ha will be directed to lot level infiltration galleries. Downspouts will be directly connected to the 'third-pipe' storm sewer system via a separate storm sewer connection. The drainage from a total roof area of 0.14ha within catchment 712 will be directed to lot level infiltration galleries. The total roof areas of 0.12ha, 0.81ha, 1.00 ha, 0.02 ha and 0.08 ha will drain from the subject lands to Wetland 3, Wetland 4 and 5, VP7, VP1 and Wetland 6, respectively, to maintain surface water inputs.

8.3.4 Surface Water Quality Management

The primary mechanism for surface water quality management is provided via control in SWMF 2, which has been designed to meet *Enhanced* (Level 1) water quality protection.

As part of the MESP study, a water quality management strategy was developed to address two key water quality parameters; chlorides and nutrients. Details of the strategy are provided in the MESP study report. Key strategies have been refined for the development lands as discussed below.

8.3.4.1 Chlorides

Based on groundwater chemistry analysis, as described in the Hydrogeological Assessment (MTE 2021), there appear to be minimal sodium, chloride or nitrate impacts on the Subject Property in the pre-development condition.

To mitigate potential impacts from chloride loading into the receiving wetlands, an option for a winter by-pass was considered for SWM Facilities 1 and 2. As noted above, SWMF 2 has an effective wetland winter bypass, which functions passively, avoiding ecological impacts associated with chloride loading.

A *Chloride Impact Assessment* was undertaken, as discussed in Section 6 of the Preliminary SWM Report (MTE 2021). That included the calculation of salt loading from de-icing operations to groundwater to ensure that groundwater chloride concentrations will remain within *Reasonable Use Guidelines* established by MECP (previously MOE).

Per that analysis, the estimated post-development groundwater chloride concentration of 36mg/L is below the corresponding RUC limit of 126mg/L. For the multiple residential blocks, it is likely that snow removal and ice control will be undertaken by a private winter maintenance service provider. As such, it is recommended that site specific *Salt Management Plans* be implemented as part of the future development of these sites. The purpose of these *Salt Management Plans* will be to reduce the impact of all winter maintenance activities involving salting practices on the surface water and groundwater resources. The *Salt Management Plans* should outline operational practices and strategies for three main areas of concern: general salt use, salt storage, and snow storage/disposal. With respect to snow storage, it is recommended that the snow be stored on impervious surfaces that are connected to a storm sewer system, to prevent chloride impacted water from infiltrating directly into the groundwater system.

8.3.4.2 Nutrients

Under previous agricultural conditions, application of agricultural crop fertilizer likely contributed to nutrient loading in wetlands within the Study Area.

It is anticipated that nutrient inputs to natural features within the development lands will decline under proposed conditions via several mechanisms: 1) reduced application of fertilizers as the lands transition from agricultural to urban land use; 2) increased effectiveness of filtration / uptake through enhanced and much larger vegetated buffer areas; 3) implementation of SWM strategies; and 4) stewardship initiatives to reduce fertilizer application on residential lots / blocks.

8.3.4.3 Erosion & Sediment Control

Erosion & Sediment Control (ESC) measures are identified in Section 8 of the Preliminary SWM Report (MTE 2021). Guidance regarding sequence of activities, soil storage, fencing, access and inspection are provided, with final ESC Plans to be prepared at detailed design in consideration of these elements.

8.4 Functional Servicing

Grading and servicing are addressed in the Cambridge West Community. Westwood Village Phase 2. Brian Domm Subdivision, Hallman Subdivision. Functional Servicing Report (MTE; January 2021). Key findings are as follows:

1. The subdivisions have been designed to implement the Cambridge West Community Master Environmental Servicing Plan (November, 2013).
2. Proposed grading – The roadworks and lot grading within the proposed development can be completed in compliance with the City of Cambridge's Design Standards while maintaining the

minimum required cover over the proposed sewers, maximizing the allowable flows to existing infrastructure, minimizing the need for retaining walls.

Overall grading is excluded from the buffer, except for a small area (4123 m^2) at the south end of the site, where the road profile/elevation, steep slopes (3:1 maximum) and servicing constraints necessitate this minor incursion. Refer to MTE Figure AG1.1 for the location (Appendix I).

3. Streets within the subdivisions will be constructed to the City of Cambridge's Design Standards;
4. Sanitary and storm sewage collection – The proposed development can be adequately serviced through the extension of the existing gravity sewers along the future extension of Newman Drive.
5. There is adequate capacity in the Galt Wastewater Treatment Plant to accommodate sanitary flow from the proposed subdivisions.
6. Water Distribution – Water supply for the proposed development can satisfactorily meet the pressure and flow demands through connections to extensions of the existing municipal water distribution system.
7. Stormwater management for the development can be accommodated by directing runoff from the subject lands to SWMF 2 within the Cachet subdivision, as outlined in the Preliminary SWM Report (January 2021).
8. The proposed development can be adequately serviced through the extension of existing utilities, including hydro, gas, cable TV, and telephone.
9. Based on a review of the proposed servicing invert elevations, some dewatering may be required in areas that have deeper servicing, such as Street G and Newman Drive, Street A and Newman Drive and Street F and Street A. No interruption to groundwater contributions to natural areas are anticipated, but a dewatering assessment should be completed during the detailed design stage to confirm potential dewatering requirements. In addition, seasonal high groundwater levels should be compared to the underside of footings to confirm adequate groundwater separation is achieved from the seasonal high water table.

9.0 POLICY ASSESSMENT

Relevant planning legislation and policy pertinent are summarized in the following sections. An overview of key policies and implications is provided along with an assessment of the policy as it relates to natural heritage features within the Study Area.

9.1 Fisheries Act (1985)

9.1.1 Overview of Key Policies

The Canadian Fisheries Act provides provisions for the protection of fish and fish habitat. In 2015, the Government of Canada set about updating and modernizing the Fisheries Act. Updates to the Fisheries Act were included in Bill C-68, which came into effect on August 28, 2019. Fish and fish habitat protection provisions of the Fisheries Act are also detailed on the Fish and fish habitat policy protection statement, August 2019[18] on DFO's website. Specifically, these provisions state:

> **Section 34.4 (1)**: "No person shall carry on any work, undertaking or activity, other than fishing that results in the death of fish."; and
>
> **Section 35 (1)**: "No person shall carry on any work, undertaking or activity that results in harmful alteration, disruption or destruction of fish habitat."

Proponents that plan to undertake activities in or near water have the potential to negatively affect fisheries, and as such, are responsible for avoiding, mitigating and possibly offsetting potential negative effects. Avoidance is achieved by undertaking measures which avoid the potential for the project to cause the death of fish or otherwise alter, disrupt or destroy fish habitat. These measures include project design considerations, location of activity, and timing of works. Mitigation is implemented by following best practices such as those described in the 'Measures to protect fish and fish habitat on DFO's Projects Near Water Website[19].

Any negative residual impacts to fish and fish habitat that remain following the implementation of avoidance and mitigation measures, is considered to have the potential to negatively affect the fishery. This potential for negative effects has to be reviewed by DFO under the Fisheries Act. If DFO determines that negative effects are likely as a result of the project, then a *Fisheries Act Authorization* (FAA) will be required.

9.1.2 Study Assessment

9.1.2.1 Applicability

There are no watercourses within the Subject Property that are subject to the Fisheries Act. Waterbodies within the study area that have confirmed fish use (i.e., Barrie's Lake), and potential fish

[18] https://www.dfo-mpo.gc.ca/pnw-ppe/policy-politique-eng.html

[19] https://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html

use (i.e., wetlands associated with WSU's 2, 3 and 6) and Cruickston Creek are all outside of the development envelope and will not be directly impacted by the development.

9.1.2.2 Conclusion

Potential impacts to fish and fish habitat associated with the proposed development are limited to downstream indirect or secondary impacts of the construction and alteration of nutrient and allochthonous inputs due to the change in land use. With maintenance of hydrogeological inputs to receiving areas, the proper installation and operation of standard mitigation measures (specifically ESC measures), and mitigation proposed via the SWM strategy, potential impacts on aquatic habitat will be mitigated such that the project complies with the Fisheries Act.

9.2 Migratory Birds Convention Act (1994)

9.2.1 Overview of Key Policies

The Migratory Birds Convention Act, MBCA (1994) and Migratory Birds Regulations, MBR (2014) protect most species of migratory birds anywhere they are found in Canada, including surrounding ocean waters, regardless of ownership. General prohibitions under the MBCA and MBR protect migratory birds, their nests and eggs and prohibit the deposit of harmful substances in waters / areas frequented by them.

The MBR includes an additional prohibition against incidental take, defined by Environment and Climate Change Canada (ECCC) as:

> *"The inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs."*

The Government of Canada communicates policies and guidelines to protect migratory birds, their eggs and their nests. There is guidance on the Government of Canada website to minimize the risk of incidental take effects on migratory birds, achieve compliance with the law and maintain sustainable populations of migratory birds[20].

Compliance with the MBCA and MBR is best achieved through a due diligence approach, which identifies potential risk, based on a site-specific analysis in consideration of the Avoidance Guidelines and Best Management Practices information on the Government of Canada website.

[20] https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/guidelines.html

9.2.2 Study Assessment

9.2.2.1 Applicability

Potential MBCA compliance implications may occur during the construction phase of development projects when the land is cleared and grubbed of vegetation, potentially removing nests of migratory birds.

9.2.2.2 Results and Conclusions

Seventy-nine migratory bird species subject to the MBCA were recorded with some level of breeding evidence within WSUs 2, 3, 4, 6 and 8. None of these species is solely dependent on the habitat to be directly impacted by proposed development (i.e., almost entirely active croplands) and there is no suitable nesting habitat for several species in areas of proposed development (Bank Swallow, Barn Swallow, Chimney Swift and Great-blue Heron). Most are generalist and/or urban-adapted species and no habitat unique in the local landscape will be impacted by proposed works. Compliance with the MBCA will be achieved using the following due diligence approach:

- Proponent awareness of the MBCA, the potential for nesting in the area and potential for impacts to migratory birds, nests and eggs. The adjacent areas provide suitable habitat for nesting of woodland, wetland and generalist species.
- Implementation of the following avoidance and mitigation measures, where possible:
    - Avoiding works (i.e., vegetation / potential nesting habitat removal) within the "regional nesting period" for this area – which for most species extends from early April through late August[21];
    - Avoiding works in key sensitive locations;
        - The proposed development area is entirely outside of the Natural Heritage System, as identified in the MESP and confirmed in the current study. The footprint of proposed works is primarily active crop lands
    - Minimizing vegetation removals;
        - No removal or disturbance of sensitive natural vegetation areas is required .
    - Implementing post-construction habitat creation / restoration;
        - See Section 10.1. To be finalized following draft plan approval

[21] https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods/nesting-periods.html

- Recommending Best Management Practices (BMPs) during construction to minimize potential indirect impacts to vegetation / potential nesting habitat outside of the direct footprint.
    - See Section 10.1.

9.3 Species at Risk Act (2002)

9.3.1 Overview of Key Policies

The federal Species at Risk Act (SARA) incorporates a number of prohibitions to protect individuals of listed threatened, endangered or extirpated species at risk – as designed by the Committee on the Status of Endangered Wildlife In Canada (COSEWIC), including:

- **Section 32(1).** *No person shall kill, harm, harass, capture or take an individual of a threatened, endangered or extirpated species.*
- **Section 32(2).** *No person shall possess, collect, buy, sell or trade an individual of a threatened, endangered or extirpated species, or any part or derivative of such an individual.*
- **Section 33.** *No person shall damage or destroy the residence of one or more individuals of a threatened or endangered species, or of an extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada.*
- **Section 58**. *No person shall destroy any part of the critical habitat[22] of any listed endangered species or of any listed threatened species — or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada.*

Per Section 34, Section 58 and Section 61, these prohibitions apply to:

- aquatic species - on any lands
- species of migratory birds protected by the Migratory Birds Convention Act - on any lands
- any listed wildlife species - when on federal lands
- any listed wildlife species - when on non-federal lands, if ordered by the Minister of the Environment to the Governor in Council.

[22] *"critical habitat" means the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species.*

On the recommendation of Ministers, the Governor in Council may also apply these prohibitions on federal lands to species that are not protected under SARA but are designated Endangered or Threatened by a provincial or territorial minister.

SARA also includes provisions to protect *critical habitat*; these are complex and vary according to the species in question and the location of the critical habitat. SARA's provisions also permit certain Ministers broad discretionary powers to implement (or not) prohibitions to protect critical habitat. Generally, critical habitat protection applies to Threatened, Endangered and Extirpated species.

9.3.2 Study Assessment

9.3.2.1 Applicability

The project is on non-federal (private / municipal) lands and there is no order by Governor in Council; hence SARA only applies to aquatic and migratory bird species / habitat. There is potential habitat for migratory birds subject to SARA on the Subject Property and adjacent natural features. Habitat suitability and presence / use were evaluated through field inventories and habitat assessments as described in Sections 5-7.

9.3.2.2 Results and Conclusions

Individuals and Residences:

Six SARA-listed migratory bird species were recorded in the study area:

- **Bank Swallow** (Threatened, Schedule 1): Foraging visitants (up to 40 individuals) recorded on various dates foraging over wetlands and agricultural fields. No suitable nesting habitat is present within the development envelope. No impacts to Bank Swallow habitat are anticipated with retention of wetlands and application of development setbacks and buffer enhancements.
- **Barn Swallow** (Threatened, Schedule 1): Foraging visitants (up to 40 individuals) recorded on various dates foraging over wetlands and agricultural fields. Confirmed nesting habitat is present within the barn at 1034 Roseville Road. No suitable nesting habitat is present within the development envelope. No impacts to Barn Swallow habitat are anticipated with retention of barn, wetlands and application of development setbacks and buffer enhancements.
- **Bobolink** (Threatened, Schedule 1): One individual (possible breeder) recorded in 2014 within pasture fronting 1034 Roseville Road. No suitable nesting habitat is present within the development envelope. No impacts to Bobolink habitat are anticipated with retention of pasture and application of development setbacks and buffer enhancements.
- **Canada Warbler** (Threatened, Schedule 1): Two individuals recorded in WSU 2 in 2012 (probable migrants). No breeding evidence recorded. No suitable nesting habitat is present

within the development envelope. No impacts to Canada Warbler habitat are anticipated with retention of natural habitats and application of development setbacks and buffer enhancements.

- **Chimney Swift** (Threatened, Schedule 1): Foraging visitants recorded in low numbers (2-4 individuals) on various dates foraging over wetlands and agricultural fields. No suitable nesting habitat is present within the development envelope. No impacts to Chimney Swift habitat are anticipated with retention of wetlands and application of development setbacks and buffer enhancements.
- **Least Bittern** (Threatened, Schedule 1): Two individuals recorded in WSU 3 wetland in 2011 (possible breeders) and one individual recorded in WSU 6 wetland in 2019 (probable breeder). No suitable nesting habitat is present within the development envelope. No impacts to Least Bittern habitat are anticipated with retention of wetlands and application of development setbacks and buffer enhancements.

No downstream critical habitat for aquatic SAR species will be impacted by the proposed activities with the proper implementation of recommended mitigation and protection measures.

Critical Habitat:

No critical habitat for SARA-listed aquatic or migratory bird species is present within the proposed area of works and none is known on adjacent lands where there is potential for indirect impact.

Recommendations:

Implement all recommended during-construction measures / best-management practices to mitigate potential impact to SAR individuals and recommended SWM measures to mitigate potential impact to downstream aquatic habitat.

9.4 Endangered Species Act (2007)

9.4.1 Overview of Key Policies

Species designated as *Threatened or Endangered* by the Committee on the Status of Species at Risk in Ontario (COSSARO), otherwise known as Species at Risk in Ontario (SARO), and their habitats (e.g. areas essential for breeding, rearing, feeding, hibernation and migration) are automatically afforded legal protection under the Endangered Species Act (ESA) (Government of Ontario 2007). ESA Subsection 9(1) states that:

"No person shall,

(a) kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species;

(b) possess, transport, collect, buy, sell, lease, trade or offer to buy, sell, lease or trade,

(i) a living or dead member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species,

(ii) any part of a living or dead member of a species referred to in subclause (i),

(iii) anything derived from a living or dead member of a species referred to in subclause (i); or

(c) sell, lease, trade or offer to sell, lease or trade anything that the person represents to be a thing described in subclause (b) (i), (ii) or (iii).

Clause 10(1) (a) of the ESA states that:

"No person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario list as an endangered or threatened species"

The ESA also calls for the development of species-specific Recovery Strategies and Habitat Regulations. Unlike the *general habitat* of a species, *regulated habitat* may include areas that are currently unoccupied by the species. These areas are commonly referred to as "recovery habitat."

To balance social and economic considerations with protection and recovery goals, the ESA also enables the MECP to issue permits or enter into agreements with proponents to authorize activities that would otherwise be prohibited by subsections 9(1) or 10(1) of the Act provided the legal requirements of the Act are met.

9.4.2 Study Assessment

9.4.2.1 Applicability

Species afforded protection under the ESA (2007) and their habitats have been reviewed within the current EIS Study Area. Confirmed and potentially suitable habitat is present for species afforded protection under the ESA (2007).

9.4.2.2 Habitat Assessment / Screening

A SAR habitat suitability evaluation ('screening') for the Study Area was undertaken in advance of fieldwork. This screening was based on a list of SAR known to occur within the region from a review of

various sources including: species indicated by MNRF through correspondence as part of the Cambridge West MESP process; NHIC website; MNRF Species at Risk list for Waterloo Region; Ebird website; Ontario Reptile and Amphibian Atlas website; and DFO aquatic species at risk mapping.

The screening is summarized in Appendix E, Table E.1. In that process, we assessed 'potential for species presence in the Study Area based on the 'key habitats used by species' (based on SARO website habitat descriptions and MNRF input). Considering findings of surveys and habitat suitability, we then assessed 'potential for impacts to species and/or habitats'.

9.4.2.3 Results and Conclusions

We concluded that for many of the listed species, potential presence within the Study Area was 'none' or 'unlikely' given a lack of suitable or preferred habitat and/or rarity of the species. This was confirmed through field survey results. For these species, the likelihood of impacts was also 'none'.

For 33 species, there is some potential for use based on one or more of the following factors: the presence of potentially suitable habitat in the vicinity of the Study Area; the relative commonness of species; known records from the local area; and/or habitat requirements are not specific (i.e., they are 'generalists' that use a wide variety of natural and semi-natural habitat types). In addition, eight species were confirmed within the Study Area through field surveys. For these potential / confirmed species, we assessed the likelihood of impacts based on field survey results, known records and the proposed activity / development.

Key conclusions are as follows:

- One *Endangered* SAR species was recorded during field surveys, a single Butternut. However, this tree is located more than 50 m from the woodland edge, within a woodland to be protected (WSU 4). No impacts are anticipated.
- Potential maternity roosting habitat for *Endangered* SAR bats is present in the woodland habitat within WSU 4. No impacts to potential bat habitat is anticipated with the retention of woodland habitats and implementation of development setbacks and buffer enhancements.
- Five *Threatened* SAR were recorded during surveys in the Study Area: Bank Swallow; Barn Swallow; Bobolink; Chimney Swift; and Least Bittern
    - See Section 9.3.2 for details and commentary. No impacts are anticipated.
- Although not subject to the provisions of the ESA, four *Special Concern* species were recorded in the Study Area:
    - **Canada Warbler**: Two individuals recorded in WSU 2 in May 2009 (probable migrants). No breeding evidence was recorded. No impacts to potential Canada Warbler habitat

are anticipated with retention of natural habitats and implementation of development setbacks and buffer enhancements.

- **Eastern Wood Pewee**: Probable breeders recorded in low numbers (1-4 individuals) across various dates within WSU 4. No impacts to Eastern Wood Pewee habitat are anticipated with retention of woodland habitats and implementation of development setbacks and buffer enhancements.
- **Monarch**: Recorded in low numbers in WSU 2, 3 and 8. No impacts to Monarch habitat are anticipated with retention of natural habitats and implementation of development setbacks and buffer enhancements.
- **Snapping Turtle**: Recorded in low numbers in WSU 2, 3, 6 and 8. No impacts to Snapping Turtle habitat are anticipated with retention of wetland habitat and implementation of development setbacks, enhancement/creation of ecological linkages and wildlife passages and other mitigation measures.

- For other SAR species with some potentially suitable habitat in or adjacent to the development envelope, but not recorded during field surveys, no impacts are anticipated, based on one or more of the following factors (Appendix E):
  - all sensitive natural features with potential SAR habitat (i.e., wetlands and natural vegetation communities) are being retained, with development setbacks and a future naturalized and enhanced buffer;
  - the small size and/or marginal quality of potentially suitable habitat;
  - potential impacts are restricted to non-critical habitat (e.g., non-specific foraging habitat for breeding birds, but not breeding / nesting habitat);
  - presence of abundant and generally much larger / higher quality habitat in the local landscape;
  - low likelihood of occurrence; and
  - implementation of mitigation / protection measures such as retention of suitable habitat, encounter protocols, exclusion fencing or timing windows to avoid sensitive periods.

9.5 Provincial Policy Statement (2020)

9.5.1 Overview of Key Policies

The Ontario Provincial Policy Statement (PPS) was issued under Section 3 of the Ontario Planning Act and identifies natural heritage provisions that restrict development and site alteration in and/or adjacent to certain natural heritage features (e.g., significant woodlands, wetlands, valleylands, wildlife habitat,

habitat of endangered or threatened species, and fish habitat). The current PPS came into effect May 1, 2020. Section 3 of the Planning Act requires that decisions affecting planning matters "shall be consistent with" policy statements issued under the Act (OMMAH 1990). The PPS provides policy direction on land use planning and development matters that are of provincial interest which protect the natural environment as well as public health and safety.

Per Section 2.1.4 of the PPS, development and site alteration shall not be permitted in:

1. Significant Wetlands in Ecoregions 5E, 6E, and 7E1; and
2. Significant Coastal Wetlands.

Per Section 2.1.5 of the PPS, development and site alteration shall not be permitted in:

3. Significant Wetlands in the Canadian Shield north of Ecoregions 5E, 6E, and 7E.
4. Significant Woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
5. Significant Valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
6. Significant Wildlife Habitat;
7. Significant Areas of Natural and Scientific Interest; and
8. Coastal Wetlands in Ecoregions 5E, 6E, and 7E1 that are not subject to policy 2.1.4(b)

unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

Per Section 2.1.6 of the PPS, "Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements."

Per Section 2.1.7 of the PPS, "Development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements."

Per Section 2.1.8 of the PPS, "Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions."

9.5.2 Study Assessment

9.5.2.1 Applicability

An assessment of PPS natural heritage policies undertaken as part of the MESP identified the presence of fish habitat, significant wildlife habitat (SWH), significant woodlands (regionally significant), significant valleylands, habitat of *Endangered* and *Threatened* species, and provincially significant wetlands in the MESP General Study Area. That assessment generally remains applicable to the current study, with updates and refinements related to the development proposal, as summarized below.

- **Significant Wetlands** in Ecoregions 5E, 6E, and 7E1.
    - Portions of the *Barrie's Lake – Bauman Creek Wetland Complex* PSW are present within the Study Area. PSW limits, features, and functions were identified in the MESP; wetland delineation limits were updated in 2019 with no substantive changes (Section 5.3)
    - No PSW is present within the Subject Property. All PSW wetlands are to be retained in full, with minimum development setbacks of 30 - 50 m and enhanced / naturalized buffers.
    - Conclusion: no impact to feature or function with implementation of recommended protection, mitigation and enhancement measures.
- **Significant Coastal Wetlands**
    - Not applicable.
- **Significant Wetlands** in the Canadian Shield north of Ecoregions 5E, 6E, and 7E1.
    - Not applicable.
- **Significant Woodlands** in Ecoregions 6E and 7E.
    - Significant Woodland (per Policy 7.C.6 of the Region Official Plan) is present: Vegetation Units 2, 3 and 5. Woodland limits, features and functions were identified in the MESP; functions and attributes were confirmed through the current study and woodland limits were updated in 2019 with no substantive changes (Section 5.3).
    - Conclusion: no development within woodland; no impact to feature or function, with implementation of recommended protection, mitigation and enhancement measures.
- **Significant Valleylands** in Ecoregions 6E and 7E.
    - None present on Subject Property or within the Study Area.

- Conclusion: no development within significant valleyland; no impact to feature or function.

- **Significant Wildlife Habitat.**
  - All of the larger habitat blocks within the MESP General Study Area (WSU 1-8) were assessed to meet criteria for *Significant Wildlife Habitat* in the MESP, based on direction / guidance provided in the Significant Wildlife Habitat Technical Guide ('SWHTG', OMNR 2000) and the *Draft* Ecoregion 6E Criteria Schedule, Addendum to the Significant Wildlife Habitat Technical Guide (OMNR 2012).
  - Within the MESP General Study Area, four areas of confirmed SWH were identified: WSU 1 (woodland); WSU 2 (wetland); the movement area between WSU2/3 and WSU 6; and the movement area between WSU 1 and WSU 6.
  - Subsequent to the MESP submission, updated SWH schedules were issued: Significant Wildlife Habitat Criterion Schedules for Ecoregion 6E (MNRF 2015). In consideration of additional data collected through 2014 - 2015 and 2019 - 2020, we have re-evaluated the SWH analysis using the updated SWH Criterion Schedules (2015). See Appendix F for the full evaluation.
  - The ten confirmed and one candidate SWH criteria within the MESP General Study Area as identified in the MESP study have been reconfirmed, with no proposed changes to SWH area limits. Within the current Study Area, these SWH habitat features include the following:
    - Candidate SWH:
      - Bat Maternity Colonies (WSU 4)
    - Confirmed SWH:
      - Turtle Wintering Areas (WSU 2, 3, 6 and 8)
      - Waterfowl Nesting Area (WSU 2, 3, 4, 6 and 8)
      - Turtle Nesting Areas (WSU 3, 6 and 8)
      - Seeps and Springs (WSU 4)
      - Amphibian Breeding Habitat – Woodland (WSU 3, 4 and 8)
      - Amphibian Breeding Habitat – Wetland (WSU 2, 3, 6 and 8)
      - Woodland Area Sensitive Breeding Bird Habitat (WSU 4)
      - Marsh Breeding Bird Habitat (WSU 2, 3, 6 and 8)
      - Habitat for Special Concern and Rare Species (WSU 2, 3, 4, 6 and 8)

- Amphibian Movement Corridors (between WSU 2 and WSU 6; between WSU 2 and WSU 6; between WSU 3 and 6; between WSU 3 and 8)

    - Conclusion: with the exception of amphibian movement corridors, there is no development proposed within candidate/confirmed SWH areas. Further, no impact to SWM features or functions (including SCC habitat recorded in these areas) are anticipated, with implementation of recommended protection, mitigation and enhancement measures identified herein (including implementation of a wildlife movement corridor and eco-passage).

- **ANSI.**
    - No ANSIs are present within the Study Area.
    - Conclusion: no development within ANSIs; no impact to feature or function.
- **Coastal wetlands** in Ecoregions 5E, 6E, and 7E1 that are not subject to policy 2.1.4(b).
    - Not applicable.
- **Fish Habitat**.
    - See Section 7.0 for an assessment of aquatic features and fish habitat. Barrie's Lake provides confirmed fish habitat and other open water wetlands within the Study Area may provide fish habitat, though this has not been confirmed.
    - Conclusion: no development within confirmed or potential fish habitat; no impacts to features or functions, with implementation of recommended protection, mitigation and enhancement measures.
- **Habitat of Endangered and Threatened Species**.
    - See discussion in Section 9.4.2.
    - Conclusion: no development within confirmed and/or critical habitat; no impact to feature or function with implementation of recommended protection, mitigation and enhancement measures.
- **Development on Adjacent Lands**.
    - Lands adjacent to features identified in Policies 2.1.4, 2.1.5 and 2.1.6 have been considered in the current study, with mitigation / potential impacts to their ecological features and functions addressed in Section 10 of the current report.
    - Conclusion: With recommended retention / protection, mitigation and enhancement measures identified herein, we conclude that development on the Subject Property adjacent to identified natural heritage features can be undertaken with no negative impacts to those features or their ecological and hydrogeological functions.

9.5.2.2 Conclusions

With recommended mitigation and protection measures, including commitments to future work, the proposed development is consistent with the natural heritage policies of the PPS.

9.6 Growth Plan (2020)

9.6.1 Overview

Policies of the Growth Plan for the Greater Golden Horseshoe (the 'Growth Plan'; August 2020) apply to the subject property and proposed development. The Growth Plan includes a *Natural Heritage System* (NHS) intended to protect the region's natural heritage and biodiversity.

Key Natural Heritage Features (KNHFs) of the Growth Plan NHS include: Habitat of endangered species and threatened species; fish habitat; wetlands; life science Areas of Natural and Scientific Interest (ANSIs); significant valleylands; significant woodlands; significant wildlife habitat (including habitat of special concern species); sand barrens, savannahs, and tallgrass prairies; and alvars.

*Key Hydrologic Feature*s (KHFs) of the Growth Plan NHS include: Permanent streams; intermittent streams; inland lakes and their littoral zones; seepage areas and springs, and wetlands.

9.6.2 Assessment

The subject property is within a settlement area (as of June 18, 2015); per Policy 4.2.2 (1), the Growth Plan NHS excludes the subject property.

Outside of the subject property, *KNHFs* and *KHFs* are present on adjacent lands to the west (outside of the settlement area). As such, those adjacent lands would be considered part of the Growth Plan NHS, with limits defined by specific features (e.g., woodland, wetland etc.) as discussed in preceding sections of this report. The following summarizes *KNHFs* and *KHFs* on adjacent lands, with commentary on potential impacts.

9.6.2.1 KNHFs

- Habitat of *endangered* species and *threatened* species

- Confirmed or potential habitat for *endangered* and *threatened* SAR is present on adjacent lands, as discussed in Sections 9.3 and 9.4[23].
- No development / alteration or direct impacts to confirmed or potential habitat for *endangered* or *threatened* species on adjacent lands. Those habitats will be retained in full, with development setbacks, buffers and other mitigation / enhancement measures.

- Fish Habitat
  - Confirmed fish habitat in Barrie's Lake. Potential fish habitat in Cruickston Creek and open water wetland habitats in WSU 2, WSU 3 and WSU 6)
  - Conclusion: No development within confirmed or potential fish habitat. No SWM discharge to confirmed or potential fish habitat. No direct impacts to features or functions. Potential indirect impacts to be mitigated through implementation of recommended protection, mitigation and enhancement measures.
- Wetlands
  - Portions of the *Barrie's Lake – Bauman Creek Wetland Complex* PSW are present on lands adjacent to the Subject Property. PSW limits, features, and functions were identified in the MESP; wetland delineation limits were updated in 2019 with no substantive changes (Section 5.3). As noted, Vegetation Unit 18 is no longer included as part of the PSW.
  - Conclusion: No direct intrusion and no impacts to feature or function with implementation of recommended protection, mitigation and enhancement measures.
- *Significant Woodlands*
  - Significant Woodland (per Policy 7.C.6 of the Region of Waterloo Official Plan) is present: Vegetation Units 2, 3 and 5. Woodland limits, features and functions were identified in the MESP; functions and attributes were confirmed through the current study and woodland limits were updated in 2019 with no substantive changes (Section 5.3).
  - Conclusion: no development within woodland; no impact to feature or function, with implementation of recommended protection, mitigation and enhancement measures.

[23] Note that threatened avian species have been recorded flying over the subject property, but no breeding habitat or mapped habitat is present on the subject property. See Sections 9.3 and 9.4 for additional details.

- *Significant Wildlife Habitat* (including habitat of special concern species); and
    - *Significant Wildlife Habitat* is present in WSUs 2, 3, 4, 6 and 8. See Section 9.5.2.1 for details
    - Conclusion: with the exception of amphibian movement corridors, there is no development proposed within candidate/confirmed SWH areas; no impact to SWH features and functions with implementation of recommended protection, mitigation and enhancement measures identified herein (including linkage establishment or enhancement).

9.6.2.2 KHFs

- Seepage areas and springs
    - Forested areas with groundwater seepage / springs are present in the headwater treed area of Cruickston Creek (WSU 4).
    - Conclusion: no development within seepage areas; no impact to feature or function, with implementation of recommended protection, mitigation and enhancement measures.
- Wetlands. See Section 9.6.2.1

9.6.3 Conclusions

No direct impacts to the NHS for the Growth Plan (on adjacent lands to the west) will result from the proposed development on the Subject Property, with implementation of the proposed mitigation and enhancement measures discussed herein:

- There will be no adverse impacts to *Key Natural Heritage Features* or *Key Hydrologic Features* or their functions
- Connectivity within the NHS on lands to the west will be maintained and enhanced with implementation of the large naturalized buffer area. Connectivity between the NHS to the west and the central wetland to the east will be enhanced with implementation of the naturalized ecological corridor, all of which will be a net benefit to wildlife movement across the landscape.
- No other natural features will be removed, expect for the very small, highly altered and degraded wetland (Vegetation Unit 18), which is no longer part of the PSW and meets criteria for removal under GRCA policy (see Section 9.9). The removal of this feature will facilitate implementation of the ecological corridor, a net ecological benefit for the NHS.

9.7 Region of Waterloo Official Plan (2015)

9.7.1 Overview of Key Policies

The Regional Official Plan (ROP; 2015) identifies a 'Greenlands Network' of environmental features and linkages, with policies intended to maintain, enhance, or where feasible, restore the Greenlands Network. The Greenlands Network is comprised of Landscape Leve Systems (including *Environmentally Significant Landscapes*), *Core Environmental Features* (CEF), Fish Habitat, *Supporting Environmental Features*, and the linkages between them. These features are shown on ROP Map 4 - Greenlands Network and Figure 1 herein.

As per policies of the ROP, development and site alteration proposed adjacent to the above noted features requires the completion of an Environmental Impact Statement to evaluate potential impacts. Development or site alteration will not be permitted within fish habitat, except in accordance with Provincial and Federal requirements to the satisfaction of the DFO.

9.7.2 Study Assessment

An assessment of ROP Greenlands Network features was undertaken as part of the MESP; that included minor modification to feature boundaries. For details, refer to the MESP – NES (Ecoplans 2013). Feature limits were updated in 2019, with no substantive changes.

The following provides a summary of ROP designated natural features within or immediately adjacent to the Subject Property (but outside the proposed development envelope):

- *Environmentally Significant Landscape* (ESL):
    - *Blair-Bechtel-Cruikston Environmentally Sensitive Landscape*. This will be retained in full, with development setbacks, buffer enhancements and other mitigation measures.
- *Core Environmental Features* (CEF), which include:
    - Lands designated as part of the Blair-Bechtel-Cruickston ESL, including the Barrie's Lake - Bauman Creek PSW, Barrie's Lake ESPA to the south-west, and the *rare* lands to the north-west (PSW and Significant Woodland).
    - The 'Central Wetland' feature (part of the Barrie's Lake – Bauman Creek PSW)

    All of these areas will be retained in full, with development setbacks, buffer enhancements and other mitigation measures.
- **Supporting Environmental Features (SEFs),** to be identified by Area Municipalities:

- *Environmentally Significant Recharge Areas & Environmentally Significant Discharge Areas*.
    - The Subject Property is within a mapped *Significant Groundwater Recharge Area* (SGRA)[24] with mapped vulnerability scores ranging between 2 to 4, but outside of mapped wellhead water quantity zones and a Highly Vulnerable Aquifer (HVA) designation.
    - A small portion of the Subject Property along the eastern boundary is within a mapped *Groundwater Under Direct Influence* (GUDI) vulnerability area with an associated vulnerability score of 8.1.
    - The subject property is not within an identified Regional Recharge Area (per ROP Map 6g)
    - Potential impacts will be mitigated by maintaining infiltration across the site
- Areas that are regulated by the GRCA under the Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 150/06).
    - One regulated wetland feature is present on the subject property: Vegetation Unit 18. As discussed above, this is no longer part of the PSW and, per the assessment in Section 9.9, it is recommended for removal, in accordance with GRCA policy and consistent with MESP and adjacent lands EIS (WSP 2016) recommendations.
    - Lands adjacent to regulated PSW wetland are present on the subject property.
- **Linkages**. Several areas of existing or proposed ecological linkages were identified in the MESP: between WSU 2/3 (outside of the Subject Property); between the Central Wetland (WSU 6) and the Barrie's Lake (WSU 8) – Bauman Creek PSW (WSU 2/3); and between the Central Wetland (WSU 6) and the Gilholm-Salisbury PSW (outside the Subject Property). See Figure 6.
    - These linkages were confirmed through updated work completed in 2014 - 2020 and no changes are proposed as part of the current study. The linkage from WSU 3 to WSU 6 has been identified on the Draft Plan, with an eco-passage proposed at the Newman Drive crossing. The east portion of that linkage is under construction on adjacent City lands to the east.

[24] GRCA 'GRIN' mapping; LIO Source Protection Atlas

9.7.3 Conclusion

With recommended protection, mitigation and enhancement measures, including commitments to future work, the proposed development is consistent with the natural heritage policies of the ROP.

9.8 Township of North Dumfries Official Plan

9.8.1 Overview of Key Policies

The Township of North Dumfries Official Plan was approved by the Region of Waterloo in 2014 and consolidated in November 2018, with only a few policies currently under appeal. Within the Official Plan, a *Natural Heritage System* consisting of *Landscape Level Systems* (LSLs), CEF's, *Fish Habitat*, *Supporting Environmental Features*, and linkages has been identified. LSLs and CEFs are designated by the Region (ROP 2015). Township policy in regard to infrastructure within and adjacent to these features generally aligns with the Region.

Key policies associated with the *Natural Heritage System* designation with respect to development and site alteration are consistent with those in the ROP (2015) and include the requirement for the completion of an EIS that demonstrates no adverse ecological effects. .

9.8.2 Study Assessment

As described in the ROP assessment (Section 9.7), all features within the *Natural Heritage System* will be retained in full, with development setbacks, buffer enhancements and other mitigation measures.

9.8.3 Conclusion

With recommended mitigation and protection measures, including commitments to future work, the proposed development is consistent with the natural heritage policies of the Township OP.

9.9 Grand River Conservation Authority

9.9.1 Overview of Key Policies & Regulated Areas

The Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 150/06), is a regulation issued under the Conservation Authorities Act, R.S.O. 1990 (GRCA 2015). Through this, GRCA has the responsibility to regulate activities in natural and hazardous areas (e.g., areas in and near rivers, streams, floodplains, wetlands, slopes and shorelines).

Portions of the Subject Property are Regulated by the GRCA under Ontario Regulation 150/06 of the Conservation Authorities Act. Per GRCA online mapping (accessed January 2021), and as confirmed through WSP field work, the following *Regulated Areas* are present in the Study Area:

- **Regulated Watercourse** and **Estimated Floodplain:**
    - None is present within the Subject Property
    - Cruickston Creek is present on adjacent lands to the northwest
- **Steep Slopes**
    - None is present within the Subject Property
    - Present on adjacent lands in WSU 3 and WSU 4
- **Wetlands**.
    - Several large wetlands are present on adjacent lands (in WSU 2, 3, 4, 6 and 8). Limits were confirmed by GRCA during the MESP and updated / confirmed as part of the current study; surveyed limits are included on mapping herein and respected in the Draft Plan.
    - One small (0.07 ha) evaluated wetland is located on the Subject Property (Vegetation Unit 18). As part of the MESP, Vegetation Unit 18 was evaluated. It was concluded that the feature did not satisfy the OWES "50% wetland vegetation" rule and should therefore be reclassified to non-wetland status and removed from the Barrie's Lake - Bauman Creek PSW Complex. It was also concluded that Unit 18 met criteria for 'development' (i.e., removal) per Policy 8.4.4 of the Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation. Ontario Regulation 150/06 (GRCA 2015).

      As part of the current study, an updated evaluation of wetland status was undertaken by WSP (Appendix G) and submitted to MNRF on September 15, 2020. That analysis was consistent with the MESP NES; it recommended that VU18 should be declassified to non-wetland status and removed from the Barrie's Lake – Bauman Creek PSW.

      As noted in an email dated January 18, 2021, MNRF agrees that this wetland should be removed from the PSW.
    - Based on updated field work and analysis, Vegetation Unit 18 under current conditions, meets criteria for 'development' (i.e., removal) per GRCA Policy 8.4.4.
- **Adjacent Areas**
    - Lands adjacent to the Regulated wetlands, watercourse and steep slopes are present on the subject property

9.9.2 Conclusions

The proposed development will retain all PSW wetland (and other regulated features – slopes, watercourse) on adjacent lands - with substantial development setbacks, a large enhanced / naturalized buffer and other mitigation measures as described herein. This EIS demonstrates that there will be no negative impacts on those natural features or their ecological functions. As such, the proposed development is in compliance with relevant GRCA policies.

A permit will be required from the GRCA under the Reg. 150/06 to proceed with any future site alteration within regulated areas.

10.0 IMPACTS & MITIGATION

As part of the MESP NES, an assessment was undertaken to identify potential impacts of alterations to land uses adjacent to natural heritage features (i.e. from agricultural to urban developed lands) and recommend mitigation measures. That assessment has been refined as part of the current EIS for the Consolidated Draft Plan of Subdivision, based on updated site-specific fieldwork / analyses and other supporting technical studies.

10.1 Mitigation Measures

10.1.1 Overview of Key Recommendations

To mitigate potential impacts to natural features on adjacent lands and their ecological functions, a number of key measures are recommended: retention of those features in full; implementation of development setbacks and enhanced buffer areas; establishment of a formal ecological linkage between WSU 3 and WSU 6; and a suite of additional measures as discussed below.

Pre-Construction

The following measures are to be prepared, confirmed / finalized and installed prior to any site disturbance.

1. **Finalize the SWM strategy at detailed design.** The *Preliminary SWM Strategy* includes the following key elements:
    - **Use of an existing SWM Facility** to provide *Enhanced* surface water quality and quantity control for all flows up to and including the Regional storm event - conveyed by a storm sewer network in the road right-of-ways. No new SWM facilities are proposed on the Subject Property

- **Implementation of at-source roof infiltration facilities** throughout the property
- **Implementation of a conveyance infiltration facility**
- **Water Balance.** Infiltration targets will be met and surface water inputs to the adjacent natural areas will be maintained post-development

2. Implement the **natural area setbacks** that form the development limit (Section 8.2.2)
3. Incorporate **building design considerations** to mitigate impacts to wildlife
    a. **Lighting:** strategies to minimize light pollution and 'lightshed' of light (i.e., distribution and coverage) into the natural areas (i.e., through use of bird and bat-friendly lighting technologies and minimizing lighting adjacent to buffers / natural areas.
    b. **Bird friendly building design:** Integrate specific building design elements to mitigate the risk of bird collisions (e.g., window glass type / treatments, visual markers, awnings, internal and external lighting operation). The *Fatal Light Awareness Program* (FLAP) Canada provides guidelines for design.[25]
4. Develop **Salt Management Plans** for the private multiple blocks. In addition, salt application should be restricted to the extent possible. Refer to Section 6 of the Preliminary SWM Report (MTE 2021) for additional discussion. Information regarding chlorides and the importance and sensitivity of the adjacent natural features should be included in a Stewardship Brochure provided to residents.
5. Prepare a **Tree Management Plan**, per the Tree Management Policies and Guidelines for New Developments (City of Cambridge, 2002).
6. Implement **Best Management Practices**: to be finalized at detailed design, and included on construction drawings, as relevant:
    a. Finalize the **Erosion & Sediment Control** (ESC) Plan; implement any required ESC measures (e.g., install fencing) prior to and throughout construction. This strategy will mitigate impacts on vegetation, wildlife (including wildlife habitat) and aquatic resources by implementing ESC fencing at grading limits (consisting of filter fabric and page wire fencing); preventing sedimentation in adjacent natural features; erosion blankets on steep slopes, where required; temporary rock check dams in swales; timely re-vegetation of exposed soils; and regular site inspection, maintenance and reporting to ensure the controls are working properly.

[25] https://flap.org/

b. Prepare a **Spills Management Plan** to reduce potential for contamination of groundwater, receiving watercourses and adjacent vegetation. Implement relevant measures, as required.

c. Follow **Guidelines for heavy equipment use** to reduce potential for damage to natural areas (mechanical damage to trees, soils compaction etc.)

d. Implement / follow recommended measures in the **Clean Equipment Protocol for Industry** (Holloran, 2013)

e. Implement and follow applicable guidance, and incorporate relevant information in engineering drawings / tenders as found in the following documents regarding **Jefferson Salamander and wildlife encounters** (Appendix J)

- Jefferson Salamander Awareness Information. Westwood Village, Cambridge West (WSP; April 2020)
- Cambridge West Lands – Jefferson Salamander (*Ambystoma jeffersonianum*) Encounter Response Plan (WSP; December 2016)

f. Install vegetation protection fencing / temporary wildlife fencing, coincident with the ESC fencing **prior to construction or site alteration**.

- Note that this was installed at the grading limits in advance of preliminary site grading/filling undertaken in 2020 (May-June 2020).

7. Confirm / finalize **Biological Monitoring Program** and monitoring locations

a. Undertake pre-construction monitoring; prepare annual reports. Note that biological monitoring, as specified in Section 11, was undertaken in 2019 and 2020. Annual reports will be submitted under separate cover.

b. Address recommendations, where required

8. Prepare **Buffer Planting Plan and SWM Planting Plan**

a. Install recommended plantings / seeding per approved plans, if required (note this could be completed during construction)

9. Implement / Install additional **Vegetation Protection Measures**, as specified in the future Tree Management Plan

10. **Tree and Vegetation Protection** - Temporary tree and vegetation protection fencing, which can be combined with ESC fencing, is recommended to prevent damage to adjacent natural areas during construction (i.e., mechanical damage, soil compaction). This detail will be provided in the Tree Management Plan.

- Note that the ESC fencing installed in May-June 2020 also functions as vegetation protection fencing.

11. **Stewardship measures**

    a. Prepare '*Sensitive Features Limit*' **Signage.** Install signage at regular intervals along the natural heritage feature limits, as shown on Figure 6.

    b. Prepare a **Homeowner Stewardship Brochure.** The brochure is intended to inform residents and/or property managers about adjacent natural areas and how they can be responsible stewards of these natural resources. Topics to address include: proper handling of yard waste and composting; potential impacts and control / disposal of fertilizers and herbicides / pesticides, de-icing salts, driveway and automotive cleaning residues; protection of soil and vegetation in the natural areas; explanation of the importance of saplings and native ground flora; pet implications and control; and invasive plant spread from yards. It is recommended that the brochure be provided to all landowners / property managers and made available at the sales trailer or at the Township office. The brochure should be part of the property sale documentation, to ensure that next generation purchasers are informed about environmental stewardship.

12. Install **Temporary Wildlife Exclusion Fencing** at the grading limit. Fencing should consider recommended design installation guidelines in the *Best Management Practices – Reptile and Amphibian Exclusion Fencing Version 1.1* (MNR; July 2013), including:

    a. **Design / Type**. Heavy-duty geotextile fencing installed on post and paige wire fencing, wire side facing the development area, and the geotextile side facing the Natural Heritage Conservation Zone (to prevent turtles from using the wire to climb the fence).

        - Height of 60 cm aboveground
        - Buried 10 - 20 cm below ground

    b. **Timing.** Installed outside of the turtle active season (i.e., installed between October to May)

    c. **Inspection and Maintenance.** Regularly inspect and maintain in good condition to ensure functionality (e.g., after spring thaw and heavy rains)

    Note that this fencing was installed at the grading limits in advance of preliminary site grading/filling undertaken in 2020. The fencing serves both as ESC, temporary wildlife exclusion fencing and vegetation protection fencing.

    The installed fencing meets specifications noted above and is being inspected regularly and maintained throughout ongoing construction.

During Construction

The following measures are to be implemented or continued throughout the construction period.

1. Implement / install outstanding **SWM measures**
2. Implement any outstanding ESC measures. Regularly inspect **ESC fencing**
    a. Implement repairs to maintain fencing in good condition
3. Continue with during-construction **Biological Monitoring**; prepare annual reports
    a. Address recommendations, as required
4. Implement / install outstanding **Buffer Planting Plan** and **SWM Planting Plan** elements (e.g., planting, seeding, wildlife habitat elements)
5. Regularly inspect **Vegetation Protection Fencing**
    a. Implement repairs to maintain fencing in good condition
6. Regularly inspect **Temporary Wildlife Exclusion Fencing**
    a. Implement repairs to maintain fencing in good condition
7. Implement applicable **Best Management Practices**
8. Implement applicable guidance re: **Jefferson Salamander / wildlife encounters** (Appendix J)
9. Install **Permanent Fencing** (e.g., chain-link) to minimize human access and disturbance in the retained areas to the west and north. See Figure 6 for location.
    a. Implement repairs to maintain fencing in good condition

Post-Construction

The following measures are to be implemented post-construction.

1. Remove ESC fencing
2. Continue with post-construction **Biological Monitoring** per approved program duration; prepare annual reports
    a. Address recommendations, as required
3. Implement / install outstanding **Buffer Planting Plan** and **SWM Planting Plan** elements (e.g., replacement plantings)
4. Remove **temporary Vegetation Protection Fencing**
5. Remove **temporary Wildlife Exclusion Fencing**
6. Implement applicable guidance re: **Jefferson Salamander and wildlife encounters**

10.1.2 Ecological Enhancement Plan

10.1.2.1 Enhancement Strategies

Objectives for ecological enhancement and restoration were identified in the MESP NES. These have been carried forward in the development of the Ecological Enhancement Plan for the Subject Property / current submission, as part of two key strategies:

1. Improved linkage / connectivity between natural areas, particularly habitats for critical life-cycle components (e.g., breeding ponds / overwintering areas).
    - A formal ecological corridor to be installed between WSU3 and WSU6, including an eco-passage at the Newman Drive crossing. This will directly connect to the portion of the ecological corridor under construction on lands to the east
    - Connectivity within adjacent lands to the west / north (WSU 2 / 3 / 4) to be enhanced via enhanced buffering and restricted access
2. Implementation of a naturalized 15 m to 50 m buffer area to achieve the following:
    - Improved core habitat buffering / protection
    - Increased core area functional size (in total, this will provide an additional 6+ha of natural habitat contiguous with the ESL / CEF)
    - Increased successional habitat area / diversity via planting and seeding
    - Enhancement of foraging habitat for herpetofauna, Lepidoptera / Odonata and avifauna
    - Turtle nesting habitat creation / enhancement
    - Waterfowl nesting habitat creation / enhancement
    - Provision of wildlife passage at the Newman Drive crossing

One additional enhancement strategy is recommended: **Invasive Species Control.**

- Based on field work findings, and consistent with recommendations for the adjacent developments to the east (30T-16103 and 30T-16104), control measures for Phragmites (*Phragmites australis ssp. australis*), a highly invasive perennial grass species, are recommended.
- Experts at the Invasive Phragmites Control Centre (IPCC) were engaged in 2017 for the adjacent developments in the City to: assess the existing stands; provide input to the determination of priority control areas; develop a control program; and undertake control measures. A control program using stem cutting and herbicides was identified as the recommended approach.

- Control measures and monitoring were undertaken by IPCC in 2017, 2018 and 2019; see Figure 6 for locations. Supplemental monitoring of Phragmites has been undertaken by WSP during other biological monitoring surveys. For further information regarding existing Phragmites conditions on site, control plans, control measures, and recommendations, refer to Appendix F.

10.1.2.2 Design Considerations

The following design considerations are provided for the enhancement strategy elements, to be finalized at detailed design following Draft Plan approval.

Ecological Corridor

Consistent with the design of the ecological corridor currently under installation on lands to the east, the following objectives and design elements are recommended:

- The **objective** is to restore connectivity between the currently isolated Central Wetland (WSU 6) on lands to the east to WSU 3 (on lands to the west of subject property), providing a long-term viable connection between critical life cycle habitats (wildlife movement between breeding, foraging and overwintering areas, plant dispersal, juvenile wildlife dispersal) and contributing to broader landscape scale function and connectivity. The primary target group is herpetofauna.
- Minimum **Width** of 30 m
- **Funnel / Exclusion Walls**. A continuous low 'funnel/exclusion wall' will be incorporated at corridor limits and extending north and south of the corridor at the interface with adjacent natural areas to the west (see Figure 6 for location and MTE Figures XS1.3 and XS1.4 for details). This is intended to direct wildlife movement between natural areas and exclude wildlife from future developed areas. Exclusion wall specifications to consider:
    - Continuous, with no gaps;
    - Vertical face, with top overhang / lip (if feasible) to discourage wildlife climbing and movement over fence top;
    - Average height of 0.6 m to restrict climbing and reduce potential for sediment accumulation in the adjacent corridor (range of 45 to 60 cm high, 'field fit' based on soils/grades at installation).
    - Long-term durability and low maintenance (e.g., resistant to frost heave, breakdown).
- **Wildlife Crossing Structure**. A culvert will be installed at the Newman Drive crossing location to accommodate herpetofaunal / small mammal passage, with the following design attributes (see MTE Figures XS1.3 and XS1.4 in Appendix K):
    - The (0.9 m height x 3.6 m width x 25.0 m length) dimensions are suitable for herpetofaunal/small mammal passage with an *Openness Ratio* (OR) of 0.13 (Newman Drive), meeting the target OR of 0.10 identified in the MESP. The length of the

structure (wildlife travel distance) was minimized through design measures, including wing walls and retaining walls.

    - The culverts will be a concrete box design, embedded 30 cm in native substrates, to provide suitable conditions for migrating herpetofauna.

- **Planting Strategy.** A conceptual planting strategy was identified as part of the MESP NES, consisting primarily of dense, low growing shrubs (particularly tolerant and/or dense and thorn-producing species), with some taller shrubs and trees in 'nodes' or 'clusters'. These general recommendations have been carried forward and expanded upon as part of the Ecological Enhancement Plan, as summarized in Section 10.1.2.

  A Tree Management Plan (TMP) will be prepared at detailed design; this will include additional planting details.

- **Wildlife Cover Elements**. In addition to native plantings, other 'hard' cover elements to shelter and protect smaller / more sensitive wildlife will be included (e.g., rootwads, vegetation and rock piles). Conceptual design elements are summarized in Table 13 and shown on Figure 6; to be finalized at final design.

- **Restricted Access**. Permanent continuous fencing along the length of the corridor will be installed as to prevent uncontrolled access / dumping etc. See Figure 6.

- **Signage / Stewardship**. Natural areas signage is proposed along the corridor and interpretive signage at the Newman Drive crossing is recommended for consideration. The homeowner brochure should include discussion of the corridor.

Buffer Areas

The MESP NES recommended two key elements for buffer enhancement: native species plantings and targeted wildlife habitat creation. These have been incorporated into the current plan as follows:

- **Native Species Plantings and/or Managed Succession**. Recommended plantings within the buffer areas are consistent with the ecological corridor, consisting primarily of dense, low growing shrubs (particularly tolerant and/or dense and thorn-producing species), with some taller shrubs and trees in 'nodes' or 'clusters'.

  Specific species recommended include: Dogwoods, Willows, Prickly-ash, Nannyberry and Elderberry. The plantings would form a mix of successional habitats (meadow, thicket) with some denser thicket / screening areas. A Detailed Vegetation Management Plan will be required to be prepared at detailed design and will include all planting details.

- **Targeted Habitat Creation.** Consistent with MESP recommendations, four specialized habitat types are proposed for consideration with within the buffer areas (with preliminary locations shown of Figure 6):

    - Lepidoptera / Odonata Foraging and Breeding Habitat, considering:

- Location. Ideally concentrated at south-facing or leeward sites
- Open areas for thermal basking and foraging (e.g., bare soil or sand, rock piles or flat rocks on the ground or piles of logs)
- A mix of moist and dry meadow habitats – to augment breeding and foraging habitat (greater habitat diversity, increased use by prey insects).
- Seeding and/or planting butterfly-attracting plants, both host plant species as well as potential nectar source species (e.g., Hackberry [host plant for Tawny Emperor]; Prickly-Ash [host plant for Giant Swallowtail]; *Carex* spp. [host plants for several Skipper spp.]).
- Ongoing management to maintain early successional / open habitat and manage succession (e.g., periodic mowing and Invasive species control)

○ Turtle Nesting Habitat, considering:

- Location. South or west-facing sites adjacent to WSU 2/3, locations that have attributes consistent with the MESP (e.g., warmth and light for basking, away from roads and increased activity, and in close proximity to wetland/aquatic habitat).
- Size. Minimum size of 6 m x 10 m for each nesting area.
- Construction methods:
    - Remove vegetation layer (using backhoe or rakes) to expose soil.
    - Lay geo-textile cloth across the excavated area to minimize vegetation establishment (note: the cloth must be buried well below nesting depth [12”]).
    - Dump a well-mixed substrate composed of ~30% gravel to 70% sand atop the geo-textile cloth to a depth of at least 14”.
    - Create different slopes and depths of substrate throughout the site to give turtles a variety of micro-habitat conditions to select from.
    - Create a 30% slope towards the water’s edge.

○ Waterfowl Nesting Habitat

- Location. Adjacent to WSU 2/3, areas of waterfowl use
- Habitat Attributes. A mix of dense native grasses, forbs and small shrubs is recommended, along with interspersed areas of target habitats for turtles and insects and habitat cover elements. The detailed planting plan will include different types of vegetation (structural, species composition), as well as different

densities / configurations, which will increase potential diversity of species using the buffers as nesting sites.

- Herpetofauna and Avifauna Habitat
  - The recommended buffer management measures for turtle nesting, Lepidoptera / Odonata habitat creation and waterfowl nesting habitat will also provide enhancements to herpetofaunal and avifaunal foraging and breeding habitat.
  - Increased floristic and vegetation community diversity and inclusion of other habitat elements (e.g., cover) in the buffers will provide increased area and habitat diversity for both herpetofauna and avifauna, supplementing the core habitat in retained wetland/ponds and woodland areas.

- **Additional recommendations regarding herpetofauna** have been identified based on the decision of the (Ministry of Environment and Climate Change (MOECC)[26] in response to the MESP Part II Order Requests for the MESP (in a letter to the City of Cambridge dated October 2, 2015). In that letter, MOECC notes that individual environmental assessments for the EA are not required, subject to several conditions, two of which are of relevance to the current EIS:

  1. In consultation with the MNRF, the City will prepare a response plan for Jefferson Salamander, in the event that it is discovered in the Plan area.

     Regarding Condition #1, WSP prepared a Response Plan for Jefferson Salamander; refer to Appendix J. This plan was provided to MNRF on February 11, 2016 and finalized based on an MNRF response on February 16, 2016.

  2. The City will examine additional enhancement measures for habitat suitable for Western Chorus Frog during detailed design of the Projects.

     Regarding Condition #2, Western Chorus Frog (*Pseudacris triseriata*), listed as *Special Concern* provincially, has been recorded breeding in wetland habitats in and adjacent to the subject property (i.e., WSU 2, WSU 3 and WSU 6). Consistent with recommendations for adjacent development in City lands to the east, *Typha* spp., *Glyceria grandis, Poa palustris*, and *Carex* spp., along with a mix of other herbaceous plants, will be included in the planting plans prepared at detailed design, along with the other targeted and general habitat enhancements identified for other wildlife.

[26] MOECC is now named "Ministry of the Environment, Conservation and Parks" (MECP)

10.2 Impacts

As part of the MESP NES, a preliminary assessment was undertaken to identify potential impacts associated with alterations to land uses adjacent to natural heritage features (i.e., from agricultural to urban developed lands) and to recommend mitigation measures. That assessment has been updated and refined as part of this EIS based on updated fieldwork / analyses and site-specific details of the draft Plan of Subdivision and supporting studies.

Potential impacts are discussed in two categories:

- Direct Impacts – associated with the direct removal of natural features/habitats, caused by the actual "footprint" of the undertaking (e.g., clearing and grading of subject lands, direct alteration of surface water features)

- Indirect Impacts – associated with; 1) site alteration (e.g., alterations to surface water and groundwater quality/quantity), 2) temporary disruption of features/habitats or displacement of species with active construction activities (e.g., impact to water quantity / quality, temporary physical disturbance, erosion, etc.), and 3) post-development occupancy activities (e.g., occupancy activities such as dumping of waste material, creation of indiscriminate trails).

A summary of the analysis of potential impacts, recommended mitigation measures and the overall residual effect after mitigation has been applied is provided in Table 7. An overview of key recommended mitigation measures and strategies is provided in Section 10.1. The Consolidated Draft Plan of Subdivision layout is shown in relation to existing natural features on Figure 6, with the full plan (MHBC Feb 4, 2021) also included in Appendix H.

As noted, the Subject Property was formerly under active agricultural use for many years; as of 2020, the lands have undergone preliminary grading[27]. Natural heritage limits were delineated and setbacks were identified in the MESP and confirmed herein. The proposed draft Plan was developed in respect of these limits. As such, development will be restricted to the lands that have been area-graded.

[27] Note: per conditions of Permit No. 690/19, the subject property will be returned to interim agricultural use

Table 7. Potential Natural Heritage Impacts and Proposed Mitigation Measures

FEATURE SIGNIFICANCE & SENSITIVITY	NATURAL ENVIRONMENT IMPACTS	RECOMMENDED MITIGATION MEASURES	RESIDUAL EFFECTS
Aquatic Resources			
Subject Property • No watercourses or waterbodies within the proposed development envelope **Study Area / Adjacent Lands** • Barrie's Lake (WSU 8) provides direct fish habitat (based on secondary source information) • Other adjacent wetland features (i.e., open water wetland habitat within WSU 2, WSU 3 and WSU 6, as well as drainage features within WSU 4) may provide fish habitat, though no fish have been observed in any of these areas across the many years of survey. Additionally, note that the presence of Ambystomid salamanders in the wetlands suggests that fish are less likely to be present in these areas.	**Direct Impacts** • None **Indirect Impacts** There is potential for indirect impacts to wetlands that may support fish populations as a result of construction, changes in adjacent land use, changes to hydrology and hydrogeology and occupancy-related impacts • **Water quality**. Potential impacts to receiving areas as the result of SWM discharge • **Construction-related Impacts (short-term).** These include: erosion and sedimentation; spills of contaminants/fuels; removal of riparian vegetation; short term impacts related to dewatering. • **Hydrogeology and Hydrology**. Wetlands could potentially be impacted by changes to groundwater and surface water inputs as a result of changes to adjacent land use. • **Occupancy-related Impacts**. These may include: refuse dumping; effects of salt spray from road maintenance or water quality effects related to residential uses (i.e. chlorides, pesticides).	**Indirect Impacts to be mitigated as follows:** • **Water Quality** ○ SWM strategy will provide Enhanced treatment, reducing potential for agriculture related impacts (fertilizer, herbicide / pesticides) an improvement over the current / historic untreated condition ○ No SWM facilities will outlet to confirmed fish habitat (Barrie's Lake) or potential fish habitat ○ Minimizing direct SWM outletting to aquatic features. No new SWM facilities are proposed. SWMF2 on adjacent lands will treat flows from the subject property, minimizing potential for impact to sensitive natural areas to the west and north (including Ambystomid salamander breeding habitat) • **Water Balance.** Surface and groundwater inputs to adjacent natural areas will be maintained post-development per analysis in the Preliminary SWM Report and Hydrogeological Assessment (MTE 2021). • **Erosion & Sediment Control (ESC) Plan.** Guidance is provided in the Preliminary SWM Report (MTE 2021); to be finalized at detailed design. Considerations: ○ ESC fencing will be installed prior to site grading to prevent entry of sediment into retained natural areas ○ Any temporarily stockpiled soil, debris or other excess materials, and any construction-related materials, will be properly contained (e.g. with ESC fencing) in areas separated at least 30 m from retained natural areas. ○ All construction materials, excess materials and debris will be removed and appropriately disposed of following construction. • **Spills Prevention and Emergency Response Plan.** All construction-related activities will be controlled to prevent entry of any petroleum products, debris or other potential contaminants/deleterious substances to retained natural areas in accordance with a Spills Prevention and Emergency Response Plan. The Plan, as well as appropriate emergency response materials, will be kept on site throughout construction and all employees made aware of its requirements and response protocols. • **Dewatering Management.** A dewatering assessment at final design will include measures to ensure discharge to retained natural areas from dewatering will not impact receiving water quality via: water quality targets and use of treatment methods such as filtering; dissipation of discharge to prevent erosion and scouring; a mitigation plan for potential draw down of water levels from adjacent dewatering activities; and a monitoring plan to assess impacts and effectiveness of mitigation plan. Details to be determined through application of a PTTW. • **Buffer Management.** The proposed buffer between the development limit and the retained natural areas will be managed to provide a more protective edge to the adjacent natural areas and reduce potential for occupancy-related impacts such as uncontrolled access to the retained natural areas and rear lot spread.	No residual negative effects of the proposed development to aquatic resources are anticipated, with proper implementation of the recommended mitigation measures. • No SWM discharge to fish habitat • No SWM discharge to watercourses • No new SWM facilities or discharge to adjacent sensitive natural areas to the north and west • Residual long-term effects to hydrogeology and surface water quality in adjacent aquatic resources bodies are not anticipated, considering: ○ Groundwater inputs will be maintained ○ Surface water inputs will be maintained • Enhanced / larger buffer will provide improved nutrient filtering. Long-term impacts to groundwater quality are not anticipated, with implementation of proposed infiltration strategies: • Residual impacts from construction are not anticipated, with implementation of recommended ESC and spills management plan.

FEATURE SIGNIFICANCE & SENSITIVITY	NATURAL ENVIRONMENT IMPACTS	RECOMMENDED MITIGATION MEASURES	RESIDUAL EFFECTS
Vegetation and Flora			
Subject Property • **Vegetation**. None. Formerly active agricultural use (row crops) with one small anthropogenic wetland (VU18) • **Designated Areas**. none • **Species at Risk:** none • **Species of Conservation Concern**: none • **Flora significance and sensitivity**: low **Study Area / Adjacent Lands** • **Vegetation.** Wetlands (Veg. Units 1b, 4, 5, 10a, 11a, 11b, 12 and 18), deciduous forest (Veg. Units 1a, 2 and 3) and upland cultural habitats (Veg. Units 1a and 10b; inclusions). • **Designated Areas**. Wetlands to the east, west, and south are included within the *Barrie's Lake - Bauman Creek* PSW. Several of these wetlands plus the woodland to the north have several overlapping provincial and regional designations (CEF, ESPA, and ESL). • **Species at Risk and Species of Conservation Concern**: 72 SCC recorded, including SAR and Regionally significant species. See Section 5.2 for details • **Flora significance and sensitivity**: High. Diverse mix of treed and non-treed habitats; PSW wetland and upland vegetation.	**Direct Impacts** • **Minimal.** Removal of a very small area of anthropogenic vegetation in Vegetation Unit 18 (0.07 ha) **Indirect Impacts** There is potential for indirect impacts to vegetation as the result of construction, changes in adjacent land use, changes to hydrology and occupancy related activities. • **Surface Water quality impacts to wetlands (long-term)**. Potential for increased sedimentation / erosion, contamination and salt loading. • **Hydrology**. Potential changes to the hydrological regime in the wetlands resulting from increases in impervious surfaces and reduction of run-off inputs to the wetlands. • **Hydrogeology.** Potential impacts to the groundwater regime (decreased recharge / infiltration) and subsequent impacts to the wetlands. Potential for contamination of groundwater. • **Construction-related Impacts (short-term)**. These include: damage to vegetation outside the work zone; sedimentation; spills of contaminants/fuels; soil compaction; short term impacts related to dewatering. • **Occupancy-related Impacts**. These may include: woodland and wetland edge effects (e.g. invasive species proliferation); unofficial trail creation; vandalism; refuse / vegetation dumping; effects of salt from road maintenance or water quality effects related to residential uses (i.e. chlorides, pesticides). • **Trails**. Though no trails are proposed within or adjacent to the natural areas, impacts to nearby natural areas may result from informal trail creation. Mitigated via fencing and stewardship.	**Direct Impacts to be mitigated by:** • Avoiding sensitive natural areas • Installing temporary **Vegetation Protection Fencing** prior to site grading to delineate the work zone and prevent direct damage to adjacent retained vegetation (i.e., mechanical damage, root damage, soil compaction). • Maintain ESC fencing in working condition throughout construction. Note that ESC fencing was installed in May-June 2020 (see Figure XX) **Indirect Impacts to be mitigated by:** • **Surface Water quality (long-term).** Mitigated by implementing: SWM measures (per final SWM report); development setbacks and fencing / restricted access (to reduce potential for direct impact / contamination); stewardship measures; and BMPs during construction (ESC plan, Spills Management Plan, Clean Equipment Protocol etc.). The buffer between the wetland/woodland and future homes will provide a net improvement over the historic condition (i.e., active agriculture, with pesticide / herbicide applications). Potential for chloride impacts to wetlands mitigated through: the SWM strategy (no new SWM facilities, winter by-pass for SWMF); improved buffering; stewardship measures; and preparation of future Salt Management Plans, where required. • **Surface Water Inputs (long-term)**: Surface water inputs to adjacent wetlands (Wetlands 2, 3, 4, 5, 6, VP1, VP7) from the Subject Property will be maintained in the post-development condition via direct runoff from rear yards / buffer area and a third-pipe system collecting clean roof runoff • **Groundwater quality (long-term).** Addressed by the same measures for surface water quality protection (i.e., E&S Plan, SWM strategy, chloride management, BMPs and stewardship). • **Groundwater inputs**. Groundwater inputs will be maintained across the Subject Property post-development (MTE 2021). • **Permanent Fencing**. To be installed along the natural area / development interface to reduce intrusion, uncontrolled dumping and rear lot 'spreading'. • **Buffer Management**. The buffer adjacent to retained wetlands / woodlands will be enhanced to provide a more protective edge, greater diversity and reduced potential for uncontrolled access and lot spread. • **Erosion & Sediment Control (ESC) Plan.** To prevent sedimentation of off-site retained natural areas. ESC fencing was installed prior to site grading (May-June 2020. • **Stewardship**. An integrated stewardship approach is recommended, including: signage at the natural feature limits; and a homeowner brochure. • **Invasive Species Management**: continuation of the ongoing Phragmites control program initiated in 2017, with consideration for one additional location per Figure 6 • **Monitoring**. Potential long-term impacts to retained natural areas will be assessed using the annual biological monitoring program per Section 11.0 of this report.	Residual impacts to vegetation are not anticipated, with proper implementation of recommended mitigation and protection measures. • All NHS natural areas will be retained in full and protected with development setbacks – which will dripline and root zone protection (well beyond the current state). These setbacks, coupled with buffer zone management measures, will help to maintain or improve edge integrity by establishing a thicker, more diverse edge zone. • Exotic and invasive species are prevalent at the edges of the forest, and present but typically not abundant in the forest. Given development in the broader landscape, some increase in exotic species is likely. The intent is to reduce this to the extent possible. Additional mitigation achieved through ongoing / expanded *Phragmites* control. Future potential management to be informed by monitoring. • Permanent fencing and stewardship measures will help to reduce secondary effects on forest / wetland integrity following development and occupancy. • Residual long-term effects to hydrogeology and surface water quality in the PSW are not anticipated based on maintenance of groundwater and surface water inputs and improved runoff treatment via buffering and SWM strategy • Long-term impacts to groundwater quality are not anticipated with implementation of proposed infiltration strategies and potential future work (e.g., Salt Management Plans) • Residual impacts from construction are not anticipated with implementation of vegetation protection fencing, ESC fencing, and other BMPs.

FEATURE SIGNIFICANCE & SENSITIVITY	NATURAL ENVIRONMENT IMPACTS	RECOMMENDED MITIGATION MEASURES	RESIDUAL EFFECTS
Wildlife			

Subject Property
• **Habitat**. Pre-graded as of 2020. Formerly, the Subject Property was under active agricultural use (row crops). Provides limited foraging opportunity for wildlife species.
• **Species at Risk and Species of Conservation Concern**: None that is restricted to or dependent on the subject property.
• **Significance and sensitivity**: Very low. Formerly common, tolerant anthropogenic or culturally influenced habitats. No specialized or significant wildlife habitat.
Study Area / Adjacent Lands
• **Habitat**. Mosaic of forest, swamp, marsh and cultural habitats.
• **Species at Risk and of Conservation Concern**: Several SAR and SCC were recorded in the adjacent natural features.
• **Significance and sensitivity**: High. Good habitat diversity, sensitive and specialized habitat types (e.g., riparian / aquatic, wetlands for amphibian breeding).
	Potential impacts on wildlife habitat are similar vegetation (i.e., direct / indirect impacts to habitat – removals, fragmentation, occupancy related effects etc.). Some additional occupancy-related effects are specific to wildlife.
	Direct Impacts
	• Potential for impacts to wildlife during and post-construction
	Loss of wildlife habitat is restricted to one small anthropogenic feature (VU18). No direct impact to habitat in the NHS. Crop fields, formerly present on the property, are widespread / abundant in the local landscape.
	• **Movement opportunities.** None across the subject property; former agricultural fields may have provided some potential for movement, but there were no defined movement areas and the lack of natural vegetation cover would have been a barrier for more sensitive species. Opportunities to restore and enhance movement have been identified herein.
	Indirect Impacts
	There is potential for indirect impacts to wildlife habitats on adjacent lands as a result of construction, changes to hydrology and occupancy related activities.
	• **Construction-related impacts.** These are generally limited to temporary disturbances during construction. Potential for sedimentation and contamination are addressed by ESC controls, SWM measures and BMPs.
	• **Surface Water quality impacts (long-term)**. Potential for increased sedimentation / erosion, contamination and salt loading, particularly for sensitive habitats (e.g., amphibian breeding ponds)
	• **Hydrology**. Potential changes to the hydrological regime in the wetlands resulting from increases in impervious surfaces and reduction of run-off inputs to the wetlands.
	• **Hydrogeology.** Potential impacts to the groundwater regime (decreased recharge / infiltration) and subsequent impacts to the wetlands. Potential for contamination of groundwater.
	• **Occupancy-related impacts.** e.g., pet predation; woodland edge effects; and other degradation of wildlife habitat.
	• **Potential for light impacts** which may negatively impact nocturnal wildlife,
		Direct Impacts
		• Potential for impacts to wildlife during and post-construction mitigated by: temporary and permanent wildlife exclusion measures; establishment of the ecological corridor; following awareness and encounter protocols; and stewardship measures.
		Indirect Impacts to be mitigated by: Retention and protection of vegetation resources in adjacent natural areas (as discussed above) will also protect wildlife habitat. Specific mitigation measures are as follows:
		• **Linkages / movement opportunities**. Local wildlife movement opportunities will be enhanced through the creation of the formal wildlife linkage / corridor between WSU 3 and WSU6 and improvements to movement opportunities between WSU2/3/4 via buffer enhancements
		• **Habitat for wildlife species of concern.** Habitat for woodland species (including potential SAR bat habitat) to be retained in full, with setbacks and buffer enhancements. Additional measures are proposed to protect wildlife habitat, including: ESC measures; maintenance of hydrological inputs; fencing / restricted access; and stewardship initiatives (e.g., signage, homeowner brochures).
		• **ESC Controls / SWM Strategy:** designed to reduce the potential for sedimentation or contamination of adjacent areas and maintain inputs to receiving areas, with additional chloride mitigation as discussed above.
		• **Surface water and groundwater inputs** to receiving areas, including sensitive wildlife habitat, will be maintained post-construction (MTE 2021).
		• **Occupancy-related impacts** to wildlife / habitat will be mitigated by: permanent fencing at lot / block limits to restrict access and prevent rear lot 'spreading'; wildlife exclusion fencing at the development / natural area interface; and stewardship initiatives (signage, homeowner brochure). The intent is to direct wildlife movement to the corridor / out of the developed area, restrict occupant access to sensitive areas and inform local residents about the sensitivity of adjacent natural areas.
		• Incorporate building design / operation considerations to mitigate impacts to wildlife:
		  ○ Lighting: strategies to minimize light pollution and 'lightshed' (i.e., distribution and coverage) into the natural areas (i.e., through use of bird and bat-friendly lighting tech and minimizing lighting adjacent to buffers / natural areas.
		  ○ Bird friendly building design: Integrate specific building design elements to mitigate the risk of bird collisions (e.g., window glass type / treatments, visual markers, awnings, internal and external lighting operation). The Fatal Light Awareness Program (FLAP) Canada provides guidelines for design.
		• **Surface Water quality of wetland habitats (long term).** Mitigated by: development setbacks and fencing / restricted access (to reduce potential for direct impact / contamination); enhanced buffer; stewardship; and SWM strategy.
		• **Monitoring**. Potential impacts to wildlife / wildlife habitats will be assessed using the annual biological monitoring program discussed in Section 11.0 of this report.
			Residual impacts to wildlife and wildlife habitat resulting from development on the subject property are not anticipated, considering the existing condition (pre-graded) and former condition (active croplands) - which provide habitat primarily for common, tolerant wildlife species.
			All NHS natural areas will be retained in full and protected with development setbacks. Potential impacts will be further mitigated by improved natural area buffering and enhancements.
			Additional measures are proposed to reduce potential for indirect impacts to offsite wildlife habitat (i.e., ESC, SWM treatment of contaminants, maintenance of hydrological inputs to dependent features, buffering of sensitive areas). Stewardship measures are proposed to raise awareness of the sensitivity of adjacent natural areas and further reduce potential for indirect (occupancy-related) impacts.
			It is acknowledged that in any populated area there is potential for unauthorized intrusion and damage to natural areas, and less tangible but inferred effects of occupancy on breeding bird activity. Population changes in breeding birds are inevitably related to the approved transformation of the broader landscape in the Region. Changes can also be affected by factors outside the Region, such as alteration / loss of wintering habitat, severe climatic conditions during migration activity, and changes in migratory stopover habitat. Hence, it must be recognized that shifts in wildlife species composition may be inevitable in this area over time, and in fact have probably already occurred with changes in the regional landscape.

11.0 BIOLOGICAL MONITORING

11.1 Overview of Monitoring

A comprehensive monitoring program was developed as part of the MESP study, including hydrological, groundwater, and biological components. In addition to biological monitoring, surface water and groundwater monitoring were undertaken by MTE Consultants as part of the MESP, including: climate monitoring (weather station); stream temperature monitoring; water quality (wetland and stream) sampling; wetland water level monitoring; baseflow rate sampling; continuous streamflow rate monitoring; and ambient air temperature monitoring. Proposed monitoring by MTE is discussed in Section 7 of the Preliminary SWM Report (MTE 2021). It includes the following elements: Surface Water Quality; Groundwater Quality; Groundwater Level; Wetland Level; ESC; and SWM Facility operation. Locations are shown on Figure 7.2 of the Preliminary SWM Report (MTE 2021). Biological and hydrogeological data and analyses will be undertaken and considered in an integrated manner, with relevant information included in reports.

This section outlines the recommended biological monitoring program for the proposed development on the Subject Property. The comprehensive and detailed monitoring program identified in the approved MESP was used as the basis for the recommended monitoring program for the current proposal, with refinements to specific field survey locations. Note that this is also consistent with monitoring being undertaken on City lands to the east.

Monitoring is recommended in three stages, as follows:

1. Pre-construction: for two years prior to any site grading or construction (initiated in 2014 for some sites and 2019 for others – described below).
2. During-construction: throughout the duration of construction to 90% build-out.
3. Post-construction: to take place for two years following the substantial completion of the development (90% of building permits having been issued).

Refer to Figure 2 for biological monitoring locations. Note that 2019 and 2020 monitoring was undertaken and will be discussed in reports to be submitted under separate cover.

11.2 Biological Monitoring Components

Recommended biological monitoring components, including timing and methodology, are detailed in Table 8. Monitoring locations related to development of the Subject Property are shown in Figure 2. Note that some monitoring locations are ‘shared’ with adjacent lands (e.g., monitoring within WSU 6).

Table 8. Recommended Biological Monitoring Components

TYPE OF MONITORING	DEVELOPMENT PHASE	LOCATION(S)	METHODOLOGY / TIMING
Vegetation – Quantitative Photo Plot Monitoring	All	• Eleven permanent plots, V3 to V10 and V16 to V20, have seen set up to address the vegetation community diversity within the Study Area (i.e., wetland and upland habitats, all major ELC types). Locations are shown in Figure 2. • In 2014 and 2015, permanent plots V3 to V8 were monitored by WSP. In 2019, plots V9, V10 and V16 to V20 were established and continued in 2020	Twice annual monitoring (June and September). Each plot consists of two stakes spaced 10 m apart; one stake is the photo reference point, the other is the endpoint of the 10 m transect. Four 0.5 m square quadrats are established along the plot line (at 1 m, 3 m, 5 m and 8 m). Each quadrat consists of nine sub-plots. Each quadrat is inventoried for plant species (presence / absence, frequency of occurrence) and additional measurements and observations are made, including the dominant vegetation between the photo and reference points; the depth and location of any standing water between the photo and reference points; and general notes on community health and site disturbance. Inventoried plant species are characterized by their *Coefficient of Conservatism* (CC) and *Coefficient of Wetness* (CW), with mean CC and CW values calculated and compared over time.
Vegetation – General Habitat Inspection	All	• Areas in the general vicinity of the permanent vegetation plots (Figure 2) and a general once-over to look for new infestations of invasive non-indigenous species which may be facilitated by disturbance related to the development of new subdivisions	General habitat inspection, recording general biophysical conditions, noting site changes (e.g., trails, rubbish, dumping, establishment / proliferation of invasive non-indigenous species, vandalism etc.) and taking photographs. General inspection of Invasive Phragmites abundance in areas of proposed control.
Avifauna – Breeding Bird Surveys	All	• WSU 2, WSU3, WSU 4, WSU 6, and WSU 8 (west end) • Five areas (WSU 1, WSU 2, WSU3, WSU 6 and WSU 8 (east end)) were monitored in 2014, 2015, 2019, and 2020.	Two rounds of spring surveys (late May through July). Areas are thoroughly covered by walking random transects (or surveying from pond edges) recording presence, abundance and level of breeding evidence (using Ontario Breeding Bird Atlas [OBBA] protocols
Avifauna – Migrant Waterfowl Supplemental Surveys	All	• WSU 2, WSU 3, WSU 6 and WSU 8 (west end) • WSU 2, WSU3, WSU 6 and WSU 8 (east end) were monitored in 2014, 2015, 2019, and 2020.	In conjunction with other spring surveys (i.e., amphibian breeding, turtle basking, wildlife passage monitoring). Pond / wetland areas are incidentally surveyed during other surveys, recording species, presence and abundance
Avifauna – Marsh Bird Surveys	All	• WSU 2, WSU 3, WSU 6 and WSU 8 (west end) • WSU 2, WSU 3, WSU 6 and WSU 8 (east end) were monitored in 2014, 2015, 2019, and 2020.	At least two early morning or evening surveys from mid-May to early July (with at least 10 days between surveys), conducted at consistent point count stations. Following the Marsh Monitoring Program (MMP) (Bird Studies Canada) survey methodology. The MMP methodology has the following key elements: at least two surveys; early am timing (30 minutes before sunrise to 10 am) or evening (four hours before sunset to onset of darkness); stationary counts at stations at least 250 m apart; conducted when weather conditions are warm and dry with little wind; 15-minute call response broadcasts at each station, with 5 minutes of passive listening, 5 minutes of call broadcasts and 5 minutes of passive listening; recording numbers, species and location of marsh birds and habitat characteristics; use standardized field data sheets
Avifauna – Least Bittern Surveys	All	• WSU 2, WSU 3, WSU 6, and WSU 8 (west end) • WSU 2, WSU 3, WSU 6 and WSU 8 (east end) were monitored in 2014, 2015, 2019, and 2020.	At least three early morning surveys from early May to mid-July (with at least 10 days between surveys), conducted at consistent point count stations. Following the National Least Bittern Survey Protocol (Environment Canada 2011) or other suitable survey methodology. The Environment Canada methodology has the following key elements: at least 3 surveys; early am timing (30 minutes before sunrise to 10 am); stationary counts at stations at least 250 m apart; not conducted under adverse weather conditions (e.g., rain, fog, extreme heat or winds exceeding 19 km/h); 13-minute call response broadcasts at each station, with 5 minutes of passive listening, 5 minutes of call broadcasts and 3 minutes of passive listening; recording numbers, call type and distance of recorded Least Bitterns; recording other marsh birds and habitat characteristics; use standardized field datasheets.
Herpetofauna – Spring Amphibian Breeding Surveys	All	• Six monitoring stations in WSU 3, WSU 4, WSU 6, and WSU 8 • All areas were monitored in 2014, 2015, 2019, and 2020.	Three rounds of spring survey (April to June). Spring amphibian breeding activity is assessed using the Marsh Monitoring Program (MMP) amphibian calling survey protocol (Bird Studies Canada 2008, revised 2009). Three rounds of the survey are undertaken during the spring and early summer, generally at least 10 days apart, with the suitability of timing confirmed by referencing other local sites with known amphibian populations and/or liaison with other researchers. Following guidelines of the MMP, nighttime air temperatures are ideally greater than 5°C for the first survey, 10°C for the second survey, and 17°C for the third survey. Each calling station is surveyed for three minutes, between one-half hour after sunset and midnight. Using the MMP, amphibian calling activity is rated using three levels: Level 1 (individual calls can be counted with no overlap), Level 2 (some calls can be counted or estimated, some overlap) or Level 3 (calls continuous and overlapping, individuals not distinguishable).

TYPE OF MONITORING	DEVELOPMENT PHASE	LOCATION(S)	METHODOLOGY / TIMING
Herpetofauna – Turtle Basking Surveys	All	• WSU 3, WSU 6, and WSU 8 (west end) • WSU 2, WSU 3, WSU 6, and WSU 8 (east end) were monitored in 2014, 2015, 2019, and 2020.	Five spring surveys (mid-April to mid-June) – when turtle species recorded during the current study or potentially present in the area are actively basking and moving. This survey period also partially overlaps with the nesting season for expected turtle species. Ponds / wetlands (WSU 3, 6, and 8) and adjacent areas including roads are carefully scanned with binoculars or spotting scopes for evidence of turtle basking, movement or nesting. Surveyors record absence or presence, species and incidental observations of other wildlife. Surveys start early to late morning and end early to late afternoon, with start times dependent on previous overnight temperatures and projected temperatures for the day of the survey (e.g., if overnight temperatures are cooler than normal, surveys should start later in the morning to allow for daytime temperatures to increase, to improve chances of observing basking turtles). Surveys are generally be conducted on warm, sunny or partly sunny days with air temperatures between 10°C and 25°C. Observations include photographs, GPS coordinates for notable findings (e.g., turtle nesting evidence, road mortalities / crossings), the direction of movement and description of basking features. Survey time, air temperature, sky code and wind scale are recorded for each survey. For turtle observations, GPS location, the direction of movement and description of basking features being used are noted, as relevant.
Buffer Integrity and Functioning	Post Construction	• Permanent plots to be established within future buffer areas adjacent to WSU 3 and WSU 4. None has been established or monitored to date.	Twice annual monitoring in conjunction with vegetation plot monitoring in core areas (June and September). Quantitative photo-plot monitoring as described above.
Wildlife Passage Monitoring	During / Post Construction	• One future ecological linkage area between WSU 3 and WSU 6. • Other linkages are present on adjacent lands. None has been installed or monitoring to date.	Primarily targeting herpetofauna but other wildlife will be addressed with the recommended components. Effectiveness monitoring of mitigation and enhancement measures: (i.e., ensuring funnel / exclusion walls, wildlife passage measures, plantings / cover elements etc. are installed, in good health / condition and functioning as intended). Once annually in early spring (before March 15); supplemented by additional checks during other monitoring events. • • Exclusion areas / corridor monitoring (WSU 6 area only): ○ 5 suitable nights in March-April for spring amphibian movement (i.e., high relative humidity, fog, or light rain and anticipated overnight temperatures above 0^0C). ○ On suitable nights between 0.5 hr after sunset and 12 am complete multiple passes along the corridor (i.e., minimum of 2 passes or 1.5 hr search effort) slowly walking both sides of the exclusion fence conducting visual sweeps using flashlights and/or headlamps. Vegetation and potential cover objects along the exclusion measures are searched for amphibians and other wildlife. Record pertinent survey details such as date; start and end time; staff; weather conditions; general site conditions (e.g., vegetation cover - density, type, etc.; adjacent activities / land use). For wildlife observations, record: species and number of individuals observed; the direction of travel (inferred or as observed); location; representative photographs; evidence of movement (e.g. scat, tracks, etc.) without direct observation. • • Photo monitoring of crossing structures: ○ Continuous monitoring from April to July. ○ Photo monitoring of crossing structures, within the HCL/Domm lands (i.e., Newman Drive and Bismark Drive extensions), and other areas, where possible (i.e., Blenheim Road at the east end of Barrie's Lake and Devil's Creek). Timed shutter-release or movement-triggered camera systems are to be installed in the two (potentially four) crossing structures shown in Figure 2, using best available technology. Given that the primary target wildlife group is herpetofauna, it is recommended that cameras are installed prior to mid-March, then activated and checked / downloaded regularly through mid-July – this captures the core spring and summer movement period for amphibians and turtles. • • Post-construction monitoring should be undertaken to assess the condition of infrastructure / plantings and quantify wildlife use (i.e., monitoring to assess corridor, funnel wall “effectiveness” and use of wildlife structures).

12.0 CONCLUSIONS & RECOMMENDATIONS

12.1 Conclusions

With the proper implementation of the recommended protection, mitigation and enhancement measures identified herein, residual impacts to retained natural heritage features are anticipated to be minor or negligible, and the ecological and hydrogeological functions of those features will persist. This is based on the following considerations:

The broader environmental context has been considered in the following manner:

- The Draft Plan is consistent with and build on all recommendations in the MESP NES. Further, the plan was prepared with input from WSP ecologists and has had appropriate regard for environmental features. The Draft Plan accurately delineates the surveyed limits of features and the subdivision limits are based on recommended setbacks, with the intervening buffer area proposed to be zoned for open space purposes.
- The natural environment review and site investigations have fulfilled the role of addressing ecosystem features/functions and identifying opportunities, constraints, mitigation and enhancement strategies.
- Guidance documents such as Township Official Plan and Regional Official Plan recognize and anticipate that changes in the landscape matrix will occur. Most notably, this area is undergoing a shift in land use from agricultural to urban residential.
- The present work implements the Township and regional objectives, providing a detailed review and recommendations for the Subject Property and adjacent lands. This is consistent with the consideration of ecosystem function.

The areas to be retained (i.e., the NHS components) and recommended setbacks mitigate potential direct and indirect impacts to the features and functions, including the CEF (PSW or Significant Woodland), aquatic habitat and habitat for *Species of Conservation Concern*, including SAR.

- These NHS features will be retained in full and protected with setbacks, buffer enhancement, fencing, wildlife exclusion measures, signage, and stewardship measures.
- Feature and function of NHS natural areas will be maintained with implementation of the identified SWM strategy which includes Enhanced surface water quality control, quantity control and post-development maintenance of surface and groundwater inputs.
- Other recommended measures will enhance the ecological linkage, buffers and create specialized habitat. Native species plantings, with wildlife habitat structures / target habitat is

proposed in the buffer and corridor. These will add habitat diversity, increase the size of the natural features, increase the effectiveness of the buffer, and provide an overall net benefit.

Note that the conclusions and recommendations of the MESP NES have been confirmed and re-iterated as discussed herein. Updated fieldwork and analyses have been refined to address specifics of the development proposal for the Subject Property. No substantive changes to existing conditions, as reported in the MESP NES, were identified through 2014 - 2015 and 2019 – 2020 fieldwork.

12.2 Recommendations

To ensure that environmental protection and mitigation measures are properly managed during and after site development, the following recommendations/actions are identified (to be confirmed through conditions of Draft Plan approval):

- Implement all recommended protection, mitigation and enhancement measures
- Implement Best Management Practices during construction and carry out works in consideration of recommended timing.
- Continue the biological monitoring program to monitor the health of retained natural areas as development and occupancy proceeds.
- Identify Tree management / protection measures through a Detailed Vegetation Management Plan (DVMP) or Tree Management Plan (TMP).

REFERENCES

Bakowsky, W.D., 1996. Natural Heritage Resources of Southern Ontario: Vegetation Communities of Southern Ontario. Ontario Ministry of Natural Resources, Natural Heritage Information Centre.

Bird Studies Canada, Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists and Ontario Ministry of Natural Resources. 2001. Ontario Breeding Bird Atlas – Guide for Participants: https://www.birdsontario.org/atlas/download/obba_guide_en.pdf

Bird Studies Canada. 2003. The Marsh Monitoring Program – Training Kit and Instructions for Surveying Marsh Birds, Amphibians and Their Habitats 2008 Edition. Birds Studies Canada, Environment Canada and the U.S. Environmental Protection Agency.

Brouillet, L., F. Coursol, S.J. Meades, M. Favreau, M. Anions, P. Bélisle & P. Desmet. 2019. VASCAN, the Database of Vascular Plants of Canada Website: http://data.canadensys.net/vascan/

Township of North Dumfries. 2018. Township of North Dumfries Official Plan. Region approved 2014. https://www.northdumfries.ca/en/doing-business/resources/Documents/2018-Oct-North-Dumfries-Official-Plan.pdf

COSEWIC. 2020. Committee on the Status of Endangered Wildlife in Canada Website. http://www.cosewic.ca/index.php/en-ca/

Dobbyn, J. 1994. Atlas of the Mammals of Ontario. Federation of Ontario Naturalists. 120pp.

eBird. 2020. eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York. Available: http://www.ebird.org. (Accessed: August, 2020]).

Ecoplans. November 2013. Cambridge West MESP, Natural Environment Study. Final

Government of Canada. 1985.. Fisheries Act (Gov. of Canada 1985).

Government of Canada. 2002. Species At Risk Act, 2002 (S.C. 2002, c. 29) – Current to September 9, 2020, Last amended on December 18, 2019. Published by the Minister of Justice at the following address: https://laws.justice.gc.ca/eng/acts/S-15.3/

Government of Canada. 1994. Migratory Birds Convention Act, 1994 (S.C. 1994, c. 22) - Current to September 9, 2020, Last amended on December 12, 2017. Published by the Minister of Justice at the following address: https://laws-lois.justice.gc.ca/eng/acts/M-7.01/.

Government of Ontario. 2007. Ontario Endangered Species Act. Service Ontario e-Laws S.O. 2007, Chapter 6 – Current to July 21, 2020: https://www.ontario.ca/laws/statute/07e06

Government of Ontario. 2008. Ontario Regulation 242/08. Endangered Species Act. Service Ontario e-Laws – Current to June 29, 2020: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_080242_e.htm#BK33

Grand River Conservation Authority, 2015. Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation. Ontario Regulation 150/06.

Holloran, J., Anderson, H., and Tassie, D. 2013. Clean Equipment Protocol for Industry. Peterborough Stewardship Council and Ontario Invasive Plant Council. Peterborough, ON.

iNaturalist. Available from https://www.inaturalist.org. Accessed April 14, 2020.

Jefferson Salamander Recovery Team. 2010. Recovery strategy for the Jefferson Salamander (*Ambystoma jeffersonianum*) in Ontario. Ontario Recovery Strategy Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vi + 29 pp.

Land Information Ontario. 2019. Ministry of Natural Resources and Forestry, GIS database.

Lee, H.T, W.D. Bakowsky, J.L. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Region, Science Development and Transfer Branch. Technical Manual ELC-005.

MHBC et.al.; November 2010. Cambridge West Community, Master Environmental Servicing Plan and Community Master Plan. Technical Work Plan

MHBC. October 2015. Community Plan, Cambridge West Lands, City of Cambridge.

MHBC. April 2021. Planning Justification Report.

MHBC. February 4, 2021. Consolidated Draft Plan of Subdivision

Ministry of Municipal Affairs and Housing. 2020. Provincial Policy Statement. Queen's Printer for Ontario.

MMM Group Limited. October 2015. Cambridge West Collector Road Network Class Environmental Assessment. Technical Memorandum - Natural Heritage. Evaluation of Alternatives

MMM Group Limited. 2016. Cambridge West Lands – Hallman Construction Limited and Domm Farms Ltd. Draft Plan of Subdivisions, Cambridge, Ontario. Scoped Environmental Impact Study (EIS) Report.

MTE. January 2021. Cambridge West Community. Westwood Village Phase 2. Brian Domm Subdivision, Hallman Subdivision. Preliminary Stormwater Management Report.

MTE. January 2021. Cambridge West Community. Westwood Village Phase 2. Brian Domm Subdivision, Hallman Subdivision. Hydrogeological Assessment.

MTE. January 2021. Cambridge West Community. Westwood Village Phase 2. Brian Domm Subdivision, Hallman Subdivision. Functional Servicing Report.

Oldham, M. J., W. D. Bakowsky and D. A. Sutherland. 1995. Floristic Quality Assessment System for Southern Ontario. Natural Heritage Information Centre, Ministry of Natural Resources. Peterborough, Ontario. (Oldham 1995)

Oldham, Michael J. 2017. List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Carolinian Canada and Ontario Ministry of Natural Resources & Forestry.

Ontario Ministry of Environment, Conservation and Parks. 2020. Species at Risk in Ontario Website: https://www.ontario.ca/page/species-risk-ontario.

Ontario Ministry of Natural Resources and Forestry. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section. Science Development and Transfer Branch, Southcentral Sciences Section.

Ontario Ministry of Natural Resources and Forestry. 2010. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement.

Ontario Ministry of Natural Resources and Forestry. 2015a. Significant Wildlife Habitat Ecoregion Criteria Schedules – Ecoregion 6E. Addendum to Significant Wildlife Habitat Technical Guide.

Ontario Ministry of Natural Resources and Forestry. 2015b. Technical Note, Species at Risk (SAR) Bats. MNRF Regional Operations Division.

Ontario Ministry of Natural Resources and Forestry. 2020a. Make a Map: Natural Heritage Areas Website: http://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US

Ontario Ministry of Natural Resources and Forestry. 2020b. Land Information Ontario. Available at: https://www.ontario.ca/environment-and-energy/land-information-ontario

Ontario Nature. 2020. Reptile and Amphibian Atlas Website. https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas/species/.

Region of Waterloo. 1999. Revisions to Waterloo Region's Significant Species List: Vascular Plants Component. Report to Planning and Culture Committee PC-99-028.1. Approved by Council June 23, 1999.

Regional Municipality of Waterloo. 2015. Regional Official Plan.

Township of North Dumfries, 2014. Official Plan.

WSP. December 2016. Cambridge West Lands - Jefferson Salamander Encounter Response Plan - Revised

WSP. October 2017. Cambridge West Lands, Hallman Construction Limited & Brian Domm Ltd., Draft Plan of Subdivision, Cambridge, Ontario. Scoped Environmental Impact Study - Addendum 1

WSP. April 2018. Collector Road Network Class Environmental Assessment. Environmental Study Report. Cambridge West, City of Cambridge. Natural Heritage Summary Report

WSP (in process). Cambridge West Lands, Hallman Construction Limited & Brian Domm Ltd., Draft Plan of Subdivision, Cambridge, Ontario. Pre-Construction (2014 - 2015) Biological Monitoring Report

WSP (in process). Cambridge West Lands, Hallman Construction Limited & Brian Domm Ltd., Draft Plan of Subdivision, Cambridge, Ontario. Pre-Construction (2019) Biological Monitoring Report

WSP (in process). Westwood Village, Phase 2, Township of North Dumfries. Pre-Construction (2019) Biological Monitoring Report

WSP. August 2019. Cambridge West Lands, Hallman Construction & Cachet Developments (Cam West) Inc. Tree Management Plan (Cambridge West Lands), Cambridge Ontario

WSP. February 2020. Cambridge West Lands, Hallman Construction & Cachet Developments (Cam West) Inc. Tree Management Plan, Realigned Blenheim Road and Related Infrastructure, Cambridge Ontario

WSP. May 2020. Cambridge West Lands, Hallman Construction & Cachet Developments (Cam West) Inc. Blenheim Road Re-alignment and Devil's Creek Culvert Replacement Scoped Environmental Impact Study

FIGURES

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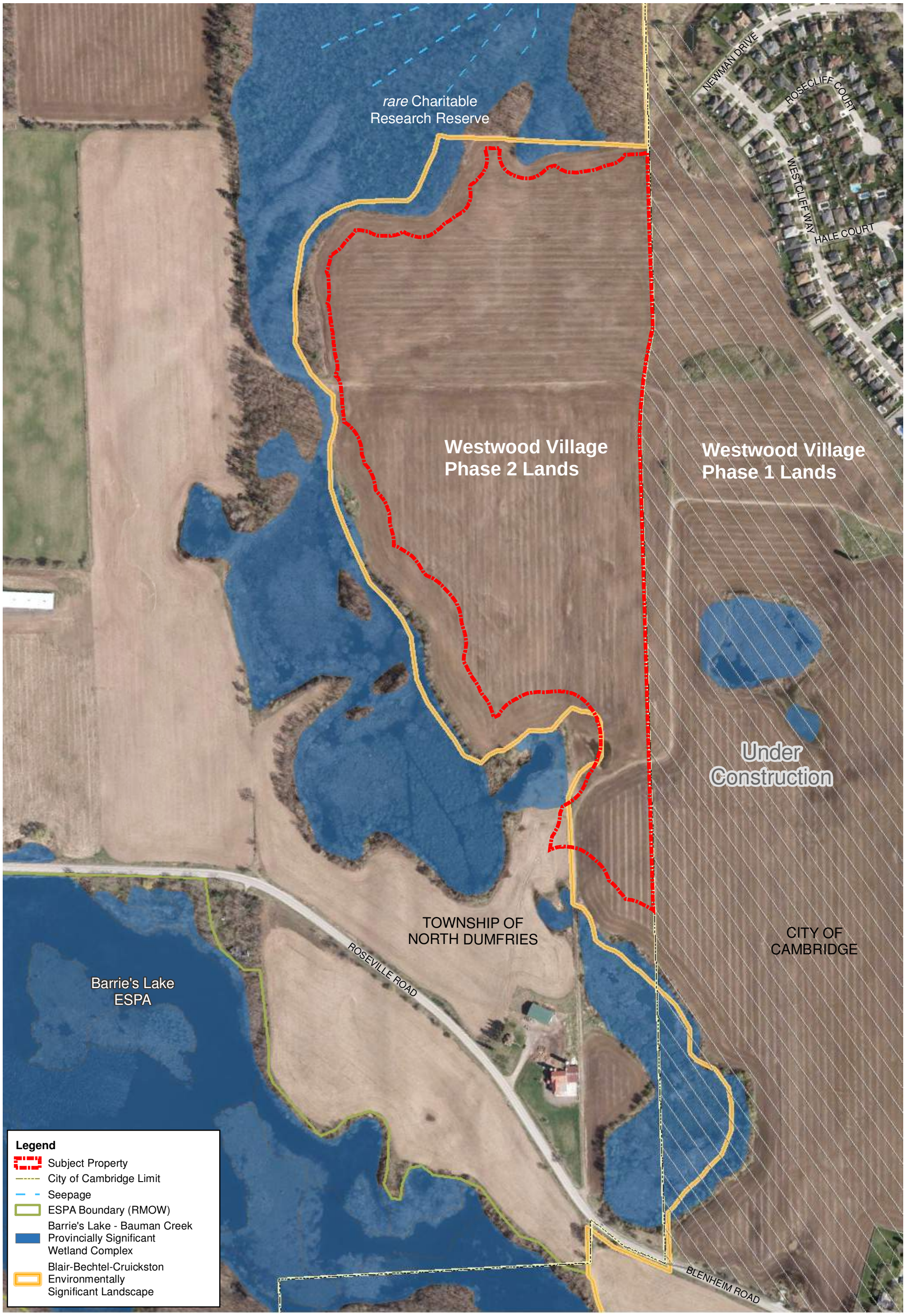

WESTWOOD VILLAGE, PHASE 2 - SCOPED EIS
Designated Natural Features

0 50 100
Metres
1:4,500

N

Date: February 2021
Project No: 18M-00047-01
Figure No: 1

D:\aProjects\18M-00047-01\Kit\00047_01_Figure2_Monitoring_20210208.mxd 2/8/2021

rare Charitable Research Reserve

Legend

- Subject Property
- City of Cambridge Limit
- Seepage

Pre/During/Post-Construction Monitoring

Vegetation

- Vegetation Monitoring Plot

Wildlife

- Spring Amphibian Survey Stations
- Turtle Basking Survey Locations
- Marsh Bird and Least Bittern Monitoring
- Breeding Bird Surveys
- Migrant Waterfowl
- Wildlife Corridor
- Wildlife Survey Unit (WSU)

During/Post-Construction Monitoring

- Wildlife Crossing / Structure Monitoring *
- Wildlife Passage Monitoring

* Completed as part of another study.

NEWMAN DRIVE
ROSECLIFF COURT
WESTCLIFF WAY
ROSEVILLE ROAD
BLENHEIM ROAD

WSU 2
WSU 3
WSU 4
WSU 6
WSU 8

V3 V4 V5 V6 V7 V8 V9 V10 V16 V17 V18 V19 V20

AM2 AM3 AM4 AM5 AM6 AM9 AM10 AM11 AM12

Under Construction

WSP

WESTWOOD VILLAGE, PHASE 2 - SCOPED EIS
Biological Monitoring Locations

0 50 100
Metres
1:4,500

N

Date: February 2021
Project No: 18M-00047-01
Figure No: 2

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ELC Vegetation Communities

Unit 1a	FOD1-4 Dry-Fresh Oak - Hardwood Deciduous Forest FOD3-1 Dry-Fresh Poplar Deciduous Forest CUM1-1 Dry-Moist Old Field Meadow
Unit 1b	SWT3-2 Willow Organic Thicket Swamp SWT3-7 Winterberry Organic Thicket Swamp MAM3-3 Reed-canary Grass Organic Meadow Marsh MAM3-9 Forb Organic Meadow Marsh MAS3-1 Cattail Organic Shallow Marsh SAF3-1 Duckweed Floating-leaved Shallow Aquatic
Unit 2	FOD5-3 Dry-Fresh Sugar Maple – Oak Deciduous Forest
Unit 3	FOD5-2 Dry-Fresh Sugar Maple – Beech Deciduous Forest
Unit 4	SAF3-1 Duckweed Floating-leaved Shallow Aquatic SWT3-7 Winterberry Organic Thicket Swamp
Unit 5	SWM6-1 Birch-Conifer Organic Mixed Swamp
Unit 10a	SAF3-1 Duckweed Floating-leaved Shallow Aquatic MAS3-1 Cattail Organic Shallow Marsh MAM3-3 Reed-canary Grass Organic Meadow Marsh
Unit 10b	CUM1-1 Dry-Moist Old Field Meadow
Unit 11a	SWT3-2 Willow Organic Thicket Swamp
Unit 11b	SAF3-1 Duckweed Floating-leaved Shallow Aquatic MAS3-1 Cattail Organic Shallow Marsh MAM3-3 Reed-canary Grass Organic Meadow Marsh Inclusions: CUM1-1 Dry-Moist Old Field Meadow CUW1 Mineral Cultural Woodland
Unit 12	SAF3-1 Duckweed Floating-leaved Shallow Aquatic MAM2-2 Reed-canary Grass Mineral Meadow Marsh
Unit 18	ELC not applicable

Legend

- Subject Property
- City of Cambridge Limit
- ELC Vegetation Communities

Provincially Significant Species

- Butternut
- Northern Pin Oak
- Black Ash (scattered throughout unit)

WESTWOOD VILLAGE, PHASE 2 - SCOPED EIS
Vegetation Communities

0 50 100
metres
1:4,500

N

Date: February 2021
Project No: 18M-00047-01
Figure No: 3

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Legend

- Subject Property
- City of Cambridge Limit
- Seepage

Wildlife

- Spring Amphibian Survey Stations
- Turtle Basking Survey Locations
- Marsh Bird and Least Bittern Monitoring
- Breeding Bird Surveys
- Migrant Waterfowl
- Wildlife Survey Unit (WSU)

rare Charitable Research Reserve

NEWMAN DRIVE

ROSECLIFF COURT

WESTCLIFF WAY

AM10

AM12

WSU 4

AM9

AM5

AM6

WSU 6

WSU 3

Under Construction

AM4

AM11

WSU 8

ROSEVILLE ROAD

Confirmed Barn Swallow Nesting

AM3

WSU 2

AM2

Bartie's Lake

CITY OF CAMBRIDGE

BLENHEIM ROAD

WESTWOOD VILLAGE, PHASE 2 - SCOPED EIS
Wildlife Survey Locations

0 50 100
Metres
1:4,500

N

Date: February 2021
Project No: 18M-00047-01
Figure No: 4

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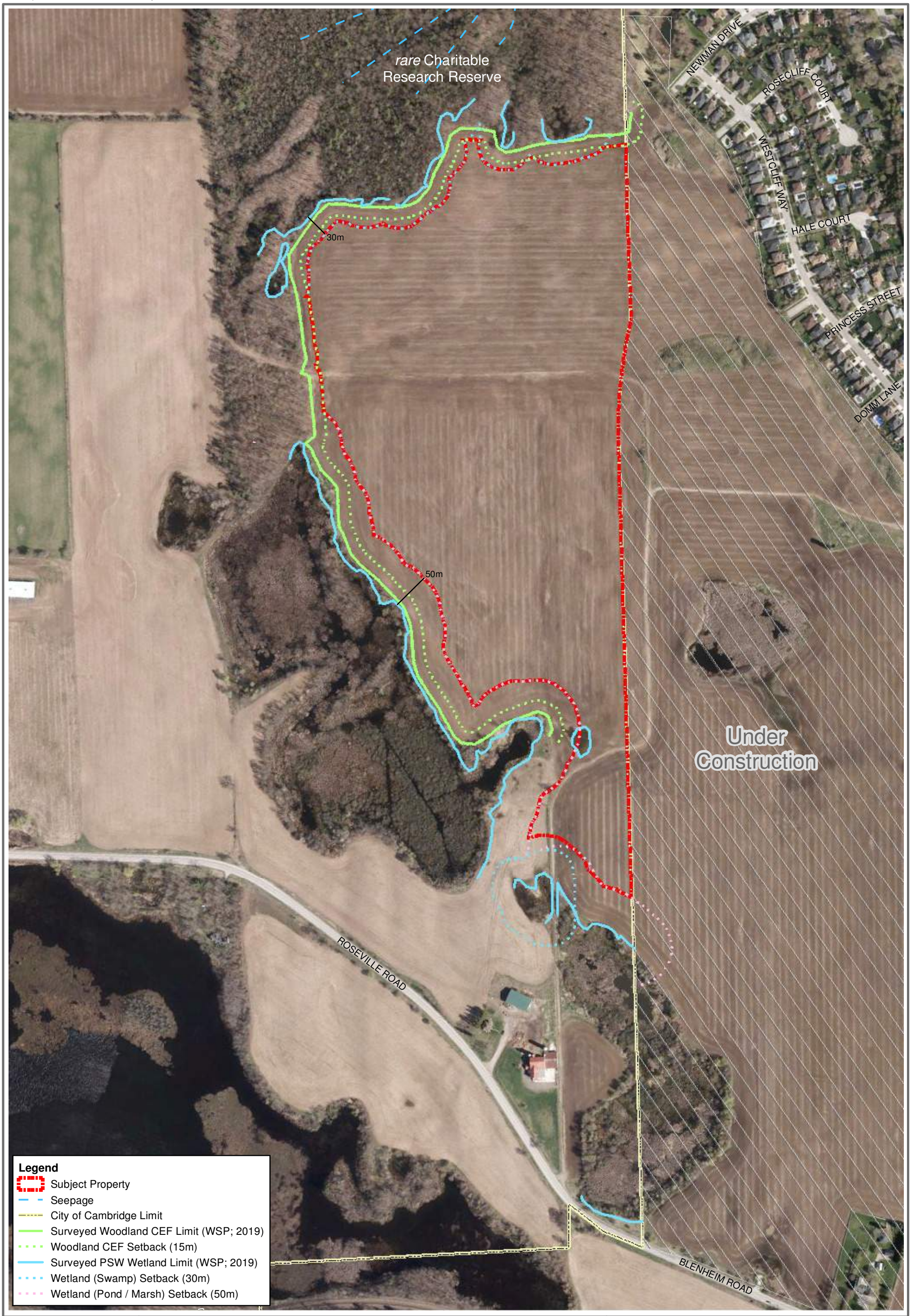

WESTWOOD VILLAGE, PHASE 2 - SCOPED EIS

Environmental Feature Limits and Setbacks

0 50 100

metres

1:4,500

N

Date: February 2021

Project No: 18M-00047-01

Figure No: 5

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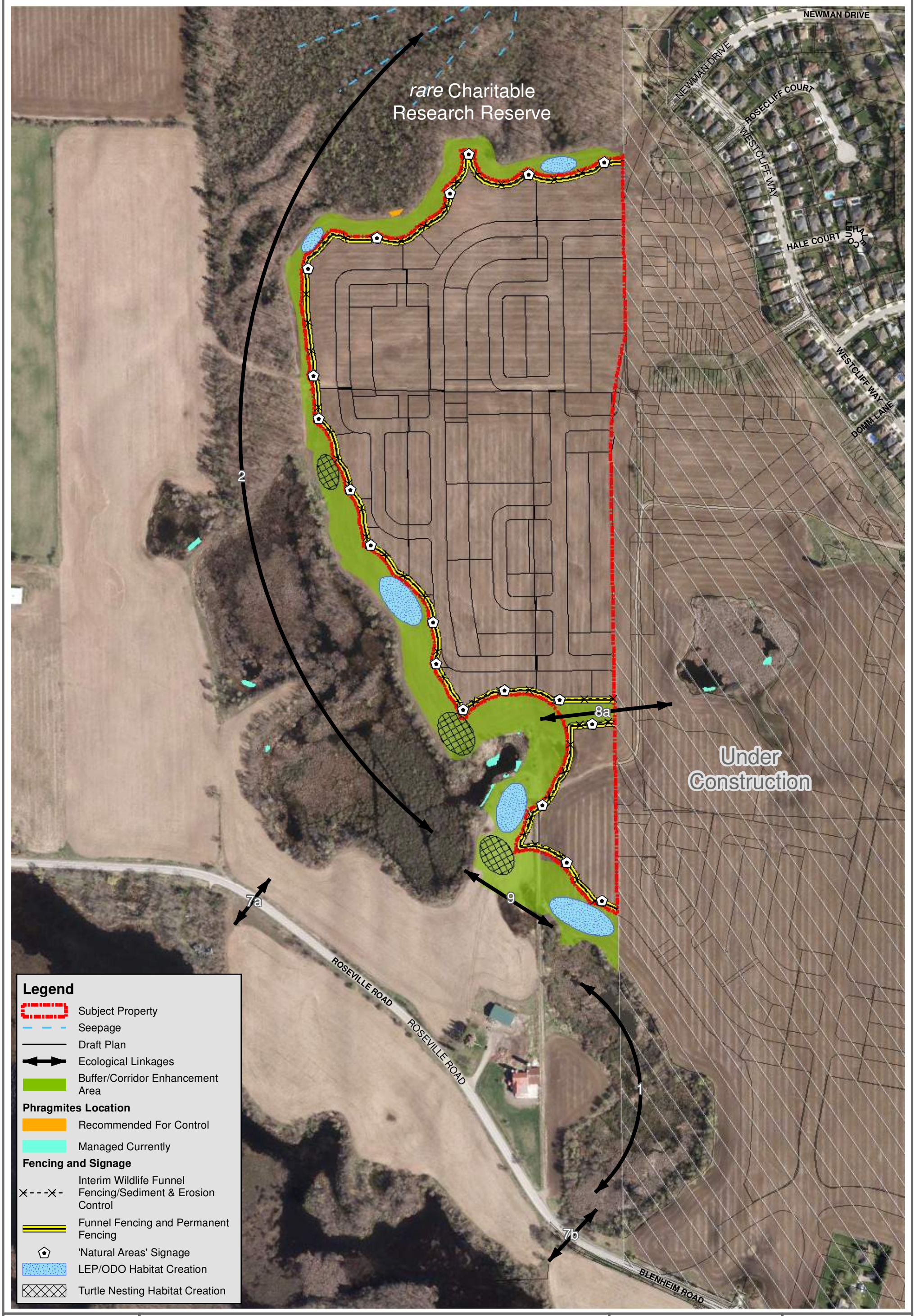


WESTWOOD VILLAGE, PHASE 2 - SCOPED EIS

Draft Plan and Environmental Management Recommendations

0 50 100
metres
1:4,500

N

Date: February 2021

Project No: 18M-00047-01

Figure No: 6

APPENDIX A

TERMS OF REFERENCE

WESTWOOD VILLAGE, PHASE 2
TOWNSHIP OF NORTH DUMFRIES

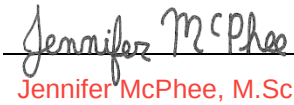
SCOPED ENVIRONMENTAL IMPACT STUDY

DRAFT TERMS OF REFERNCE

September 2020

SIGNATURES

Prepared by



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Ecology - Botanist and ISA Certified Arborist

August 20, 2020
Date

Reviewed and approved[1] by

Jeff Gross, M.Sc.
Senior Ecologist

September 16, 2020
Date

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1.0 INTRODUCTION

WSP Canada Group Limited (WSP) is pleased to submit these draft *Terms of Reference* (TOR) for a Scoped Environmental Impact Study (EIS) in support of a future development application for Phase 2 of Westwood Village located within the Township of North Dumfries (the 'Subject Property'). See attached Consolidated Draft Plan (Figure 1)(MHBC; September 10, 2020) for property location.

WSP (formerly MMM Group and Ecoplans) was retained in 2008 by Hallman Construction Limited and Brian Domm Farms Limited to undertake natural environment studies in support of planning and development applications for the Cambridge West lands, Cambridge, Ontario. To date, WSP has authored or provided natural heritage input to the following reports:

- Cambridge West Community, Master Environmental Servicing Plan and Community Master Plan. Technical Work Plan (MHBC et.al.; November 2010)
- Cambridge West MESP, Natural Environment Study. Final (Ecoplans; November 2013)
- Cambridge West Collector Road Network Class Environmental Assessment. Technical Memorandum - Natural Heritage. Evaluation of Alternatives (MMM; October 2015)
- Cambridge West Lands - Jefferson Salamander Encounter Response Plan - Revised (WSP/ MMM: December 2016)
- Cambridge West Lands, Hallman Construction Limited & Brian Domm Ltd., Draft Plan of Subdivisions, Cambridge, Ontario. Scoped Environmental Impact Study (MMM Group; December 2016)
- Cambridge West Lands, Hallman Construction Limited & Brian Domm Ltd., Draft Plan of Subdivision, Cambridge, Ontario. Scoped Environmental Impact Study - Addendum 1 (WSP; October 2017)
- Cambridge West Lands. Opinion re: Construction Timing for Migratory Birds and Bald Eagles (WSP; February 1, 2018)
- Collector Road Network Class Environmental Assessment. Environmental Study Report. Cambridge West, City of Cambridge. Natural Heritage Summary Report (WSP; April 2018)
- Cambridge West Lands, Hallman Construction Limited & Brian Domm Ltd., Draft Plan of Subdivision, Cambridge, Ontario. Pre-Construction (2014-2015) Biological Monitoring Report (WSP; 2020)
- Cambridge West Lands, Hallman Construction Limited & Brian Domm Ltd., Draft Plan of Subdivision, Cambridge, Ontario. Pre-Construction (2019) Biological Monitoring Report (WSP; 2020)

- Cambridge West Lands, Hallman Construction & Cachet Developments (Cam West) Inc. Tree Management Plan (Cambridge West Lands), Cambridge Ontario (WSP; August 2019)
- Cambridge West Lands, Hallman Construction & Cachet Developments (Cam West) Inc. Tree Management Plan, Realigned Blenheim Road and Related Infrastructure, Cambridge Ontario (WSP; February 2020)
- Cambridge West Lands, Hallman Construction & Cachet Developments (Cam West) Inc. Blenheim Road Re-alignment and Devil's Creek Culvert Replacement (WSP; April 2020)

2.0 SCOPE OF WORK

A substantial amount of fieldwork, analysis, reporting and agency liaison has occurred throughout the Cambridge West community planning process to date. It is important to note that fieldwork documented in the reports listed in Section 1.0 included comprehensive and detailed coverage of lands within the current study area (i.e., the Subject Property and other lands located in the Township collectively referred to as the "Township lands"[2]) and that previous studies considered the Township lands as part of the broader Cambridge West study area. See Appendix A for MESP figures that show relevant information. It is also important to note that ongoing fieldwork will be undertaken for the adjacent lands (Draft Plans of Subdivision 30T-16103 and 30T-16104) as part of biological monitoring; see Figure 9 of the Scoped EIS (MMM 2016) for biological monitoring locations on adjacent City lands.

The recommended scope of work discussed herein builds upon previous work, as documented in the MESP Natural Environment Study, NES (MMM; 2013), Scoped EIS (MMM; 2016) and Scoped EIS Addendum (WSP; 2017). The scope is also consistent with EIS requirements and guidelines from the City of Cambridge, Region of Waterloo and Grand River Conservation Authority (GRCA) and the *Technical Work Plan* implemented in the MESP.

It also incorporates input received at the following meetings and agency liaison:

- October 3, 2019. Pre-consultation Meeting. Attended by staff from Region of Waterloo, Township of North Dumfries, City of Cambridge, GRCA, Energy + Inc., and proponents / study team.

- October 18, 2019. Site meeting to review feature limits previously flagged by WSP. Attended by staff from Region of Waterloo, Township of North Dumfries, City of

[2] Although within the "General Study Area" boundaries as defined in the MESP, field work in the Township Lands was comprehensive and detailed, generally consistent within the field surveys completed in the "Development Study Area"

Cambridge, GRCA, MHBC and WSP.

- March 9, 2020. Meeting at Township. Attended by staff from Township of North Dumfries and City of Cambridge, as well as proponents / study team

Key elements of the work plan are discussed below.

Task 1: Existing Conditions Characterization

Existing conditions were characterized using background information, field survey results from MESP, from data collected in 2019 and 2020, and from related surveys

Natural heritage features and functions within and adjacent to the subject property are well understood, based on the comprehensive field surveys completed through the MESP and associated road network planning studies (see relevant MESP figures in Appendix A). However, to update and refine this understanding as input to the development planning process for the subject lands, the following field surveys were completed in 2019, primarily within WSU 2 / WSU 3 / WSU 4[3], with additional coverage in WSU 6 and WSU 8[4] (as applicable and pending access):

- **Aquatics**: reconnaissance level habitat update (no fish sampling or spawning surveys) in WSU 2 / WSU3 / WSU 4
- **Vegetation and Floristics Update** (WSU 2 / WSU3 / WSU 4):
    - Refinement of vegetation community description and mapping - per the Ecological Land Classification System for Southern Ontario (Lee et.al. 1998);
    - Vegetation community significance was evaluated using Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario (Bakowsky 1996) and vegetation community significance listed on the NHIC / Biodiversity Explorer website at the time of report preparation.
    - Three-season botanical inventory
    - Plant species status was evaluated using the Region of Waterloo Listing of Significant Vascular Plants (1999) for regional significance; the NHIC website for provincial rarity ranks (i.e. S-Ranks); the Species At Risk in Ontario list (MNR – current list at the time of report preparation) for provincial status designations; and the Canadian Species At Risk list (COSEWIC – current list at the time of report preparation) for national status designations.

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3 Survey locations / station labelling are consistent with previous work except where new / additional areas have been recommended.

4 Additional reconnaissance level surveys are recommended in WSU 8 (Barrie's Lake) to provide context. These will be conducted from Roseville Road with no entry into Barrie's Lake

- **Breeding Bird Survey**: Two early morning surveys between late May and early July in WSU 2 / WSU3 / WSU 4 / WSU 6 (transects) and WSU 8 (roadside station)
- **Turtle basking survey**: Five targeted spring surveys (early April-early June) in WSU 2 / WSU3 / WSU 4 / WSU 6 / WSU 8
- **Spring anuran breeding survey**: Three evening surveys at stations in WSU 2 / WSU3 / WSU 4 / WSU 6 / WSU 8 per the Marsh Monitoring Program (MMP) protocol
- **Marsh bird survey:** Two targeted early morning or evening surveys between May 20 and July 5 at stations in WSU 2 / WSU3 / WSU 4 / WSU 6 / WSU 8 - per the Marsh Monitoring Program (MMP) protocol (Bird Studies Canada; 2009)
- **Least Bittern Survey:** Three targeted early morning spring surveys from early May to mid-July at stations in WSU 2 / WSU3 / WSU 4 / WSU 6 / WSU 8 – per the National Least Bittern Survey Protocol (Environment Canada; 2011).
- **Verification of confirmed wetland and dripline limits,** based on in-season field surveys.
    - Wetland and dripline limits were previously determined in the MESP NES (Figure 4) using spring and summer field surveys, based on dominant vegetation, per ELC habitat classifications / Ontario Wetland Evaluation System (OWES) guidelines (2013) / Region of Waterloo's Greenlands Network Implementation Guidelines, 2nd Draft (2010). Preliminary wetland / dripline delineations by Ecoplans were completed on nine dates in 2010 and 2011 and confirmed by City / Region / GRCA staff during site walks in 2010 and 2011.
    - Wetland and dripline limits within the City of Cambridge were verified during 2014 / 2015 fieldwork, with no changes.
    - Limits were reviewed in the field based on existing conditions and updated guidelines (e.g., Final Greenlands Network Implementation Guidelines (2016)) in 2019 and confirmed with agencies on October 18, 2019. See Figure 2 for surveyed limits.

The following surveys were completed in 2020:

- **Breeding Bird Survey**: Two early morning surveys between late May and early July in WSU 2 / WSU3 / WSU 4 / WSU 6 (transects) and WSU 8 (roadside station)
- **Turtle basking survey**: Five targeted spring surveys (early April-early June) in WSU 2 / WSU3 / WSU 4 / WSU 6 / WSU 8
- **Spring anuran breeding survey**: Three evening surveys at stations in WSU 2 / WSU3 / WSU 4 / WSU 6 / WSU 8 per the Marsh Monitoring Program (MMP) protocol

- **Marsh bird survey:** Two targeted early morning or evening surveys between May 20 and July 5 at stations in WSU 2 / WSU3 / WSU 4 / WSU 6 / WSU 8 - per the Marsh Monitoring Program (MMP) protocol (Bird Studies Canada; 2009)
- **Least Bittern Survey:** Three targeted early morning spring surveys from early May to mid-July at stations in WSU 2 / WSU3 / WSU 4 / WSU 6 / WSU 8 – per the National Least Bittern Survey Protocol (Environment Canada; 2011).

Task 2: Data Analysis & Evaluation

Data analysis and presentation will include:

- Presentation of vegetation communities and other key results on current aerial photography
- Preparation of floristic and faunal inventories keyed to vegetation communities and/or wildlife survey units
- Identification / discussion of species and habitats of conservation concern (including Species at Risk (SAR) - based on relevant municipal, provincial and federal lists most current at the time of report preparation
- Discussion of terrestrial vegetation, wetlands and wildlife habitat significance and sensitivity, including consideration of the broader ecosystem
- Consideration of vegetation – hydrogeological interactions
- Consideration of available SAR Recovery Strategies, as relevant to the study.
- Natural System Linkages and Functions – update / confirmation of analysis presented in the MESP and Scoped EIS including:
    - Delineation of natural environment features and identification of ecological functions within the natural heritage system, including a description of contiguous natural areas and existing corridors and linkages and general comment on corridors and linkages in the broader landscape, based on secondary source information.
    - Confirmation and/or refinement of City and Regional Official Plan mapping designations
    - Confirming and/or refining previously recommended environmental setbacks, as shown on MESP NES Figure 14.
    - Confirmation of natural heritage constraint mapping, as shown on MESP NES Figure 15.
    - Confirming and/or refining previous recommendations for ecological enhancements, linkages or restoration and shown on MESP NES Figure 16 and Figure 17.

- Confirming previous evaluations of *Environmentally Sensitive Policy Areas* (ESPA) and *Locally Significant Natural Areas* (LSNA)

Task 3: Review, input to and Integration of other technical studies

WSP ecology will work as part of an integrated study team which includes MHBC (planning), MTE Consultants (engineering) and Paradigm Transportation Solutions Limited (transportation).

Information collected by other study team members as input to the draft planning process for the subject property will be reviewed by ecology staff and considered and integrated into the EIS, where relevant (e.g., hydrogeology, soils, grading etc.).

Task 4: Input to Development Proposal

Based on the confirmed / updated environmental constraint limits, consolidated data review, and consideration of other relevant technical information, WSP ecology staff will provide input to the development limits and proposed development plan.

Task 5: Impact and Mitigation Analysis

The details of the proposed development, including stormwater management plans etc., will be reviewed to identify potential impacts on ecological features and functions. Potential impacts will be determined based on the direct, indirect, and induced effects of the proposed development. Mitigation and enhancement recommendations will be identified, including consideration of previous MESP / EIS recommendations. A 'Net Effects Assessment' will be completed to identify any residual effects after recommended mitigation/compensation is employed.

Task 6: Reporting

The scoped EIS report will include characterization of the existing natural features and functions, assessment of applicable policy, details of the proposed undertaking, impact analysis, and mitigation / enhancement recommendations. The report will also include technical appendices, such as species lists, air photos, and representative photographs. Mapping of natural features will also be provided on an air photo base. A draft report will be submitted to the City of Cambridge, Region of Waterloo, Region of Waterloo Ecological and Environmental Advisory Committee (EEAC) and GRCA for review and comment. The report will subsequently be finalized based on agency and EEAC comments.

3.0 BIOLOGICAL MONITORING

3.1 OVERVIEW

This section outlines the recommended biological monitoring program for the proposed development on the subject property. Consistent with recommendations in the MESP Natural Environment Study and EIS reports for adjacent lands, we recommend undertaking pre-, during- and post-construction biological monitoring for the proposed development.

Since a comprehensive and detailed monitoring program was identified in the approved MESP, we have used that as the basis to determined monitoring for the current proposal, with refinements for specific field survey locations.

In addition to biological monitoring, surface water and groundwater monitoring were undertaken by MTE Consultants. Biological and hydrogeological data and analyses will be undertaken and considered in an integrated manner, with relevant information included in reports.

Monitoring is recommended in three stages, as follows:

1. Pre-construction: for two years prior to any site grading or construction (initiated in 2014 for some sites and 2019 for others – described below)

2. During-construction: throughout the duration of construction to 90% build-out

3. Post-construction: to take place for two years following the substantial completion of the development (90% of building permits having been issued)

3.2 BIOLOGICAL MONITORING COMPONENTS

Recommended biological monitoring components, including timing and methodology, are detailed in Table. Monitoring locations for the Subject Property are shown in Figure 3. Note that some monitoring locations are ‘shared’ between the subject property and adjacent lands (e.g., monitoring within WSU 6).

Table 1. Biological Monitoring Components

Type of Monitoring	Development Phase	Location(s)	Methodology / Timing
Vegetation – Quantitative Photo Plot Monitoring	All	Eleven permanent plots, V3 to V10 and V16 to V20, have seen set up to address the vegetation community diversity within the study area (i.e., wetland and upland habitats, all major ELC types). Locations are shown in Figure 3. In 2014 and 2015, permanent plots V3 to V8 were monitored by WSP. In 2019, plots V9, V 10 and V16 to V20 were established and continued in 2020	Twice annual monitoring (June and September). Each plot consists of two stakes spaced 10 m apart; one stake is the photo reference point, the other is the endpoint of the 10 m transect. Four 0.5 m square quadrats are established along the plot line (at 1 m, 3 m, 5 m and 8 m). Each quadrat consists of nine sub-plots. Each quadrat is inventoried for plant species (presence / absence, frequency of occurrence) and additional measurements and observations are made, including the dominant vegetation between the photo and reference points; the depth and location of any standing water between the photo and reference points; and general notes on community health and site disturbance. Inventoried plant species are characterized by their *Coefficient of Conservatism* (CC) and *Coefficient of Wetness* (CW), with mean CC and CW values calculated and compared over time.
Vegetation – General Habitat Inspection	All	Areas in the general vicinity of the permanent vegetation plots (Figure 3) and a general once-over to look for new infestations of invasive non-indigenous species which may be facilitated by disturbance related to the development of new subdivisions	General habitat inspection, recording general biophysical conditions, noting site changes (e.g., trails, rubbish, dumping, establishment / proliferation of invasive non-indigenous species, vandalism etc.) and taking photographs
Avifauna – Breeding Bird Surveys	All	WSU 2, WSU3, WSU 4, WSU 6 and WSU 8 (west end) Five areas (WSU 1, WSU 2, WSU3, WSU 6 and WSU 8 (east end)) were monitored in 2014, 2015, 2019, and 2020.	Two rounds of spring surveys (late May through July). Areas are thoroughly covered by walking random transects (or surveying from pond edges) recording presence, abundance and level of breeding evidence (using Ontario Breeding Bird Atlas [OBBA] protocols
Avifauna – Migrant Waterfowl Supplemental Surveys	All	WSU 2, WSU 3, WSU 6 and WSU 8 (west end) WSU 2, WSU3, WSU 6 and WSU 8 (east end) were monitored in 2014, 2015, 2019, and 2020.	In conjunction with other spring surveys (i.e., amphibian breeding, turtle basking, wildlife passage monitoring). Pond / wetland areas are incidentally surveyed during other surveys, recording species, presence and abundance
Avifauna – Marsh Bird Surveys	All	WSU 2, WSU 3, WSU 6 and WSU 8 (west end) WSU 2, WSU 3, WSU 6 and WSU 8 (east end) were monitored in 2014, 2015, 2019, and 2020.	At least two early morning or evening surveys from mid-May to early July (with at least 10 days between surveys), conducted at consistent point count stations. Following the Marsh Monitoring Program (MMP) (Bird Studies Canada) survey methodology. The MMP methodology has the following key elements: at least two surveys; early am timing (30 minutes before sunrise to 10 am) or evening (four hours before sunset to onset of darkness); stationary counts at stations at least 250 m apart; conducted when weather conditions are warm and dry with little wind; 15-minute call response broadcasts at each station, with 5 minutes of passive listening, 5 minutes of call broadcasts and 5 minutes of passive listening; recording numbers, species and location of marsh birds and habitat characteristics; use standardized field data sheets

Type of Monitoring	Development Phase	Location(s)	Methodology / Timing
Avifauna – Least Bittern Surveys	All	WSU 2, WSU 3, WSU 6, and WSU 8 (west end) WSU 2, WSU 3, WSU 6 and WSU 8 (east end) were monitored in 2014, 2015, 2019, and 2020.	At least three early morning surveys from early May to mid-July (with at least 10 days between surveys), conducted at consistent point count stations. Following the National Least Bittern Survey Protocol (Environment Canada 2011) or other suitable survey methodology. The Environment Canada methodology has the following key elements: at least 3 surveys; early am timing (30 minutes before sunrise to 10 am); stationary counts at stations at least 250 m apart; not conducted under adverse weather conditions (e.g., rain, fog, extreme heat or winds exceeding 19 km/h); 13-minute call response broadcasts at each station, with 5 minutes of passive listening, 5 minutes of call broadcasts and 3 minutes of passive listening; recording numbers, call type and distance of recorded Least Bitterns; recording other marsh birds and habitat characteristics; use standardized field datasheets.
Herpetofauna – Spring Amphibian Breeding Surveys	All	Six monitoring stations in WSU 3, WSU 4, WSU 6, and WSU 8 All areas were monitored in 2014, 2015, 2019, and 2020.	Three rounds of spring survey (April to June). Spring amphibian breeding activity is assessed using the Marsh Monitoring Program (MMP) amphibian calling survey protocol (Bird Studies Canada 2008, revised 2009). Three rounds of the survey are undertaken during the spring and early summer, generally at least 10 days apart, with the suitability of timing confirmed by referencing other local sites with known amphibian populations and/or liaison with other researchers. Following guidelines of the MMP, nighttime air temperatures are ideally greater than 5°C for the first survey, 10°C for the second survey, and 17°C for the third survey. Each calling station is surveyed for three minutes, between one-half hour after sunset and midnight. Using the MMP, amphibian calling activity is rated using three levels: Level 1 (individual calls can be counted with no overlap), Level 2 (some calls can be counted or estimated, some overlap) or Level 3 (calls continuous and overlapping, individuals not distinguishable).
Herpetofauna – Turtle Basking Surveys	All	WSU 3, WSU 6, and WSU 8 (west end) WSU 2, WSU 3, WSU 6, and WSU 8 (east end) were monitored in 2014, 2015, 2019, and 2020.	Five spring surveys (mid-April to mid-June) – when turtle species recorded during the current study or potentially present in the area are actively basking and moving. This survey period also partially overlaps with the nesting season for expected turtle species. Ponds / wetlands (WSU 3, 6, and 8) and adjacent areas including roads are carefully scanned with binoculars or spotting scopes for evidence of turtle basking, movement or nesting. Surveyors record absence or presence, species and incidental observations of other wildlife. Surveys start early to late morning and end early to late afternoon, with start times dependent on previous overnight temperatures and projected temperatures for the day of the survey (e.g., if overnight temperatures are cooler than normal, surveys should start later in the morning to allow for daytime temperatures to increase, to improve chances of observing basking turtles). Surveys are generally be conducted on warm, sunny or partly sunny days with air temperatures between 10°C and 25°C. Observations include photographs, GPS coordinates for notable findings (e.g., turtle nesting evidence, road mortalities / crossings), the direction of movement and description of basking features. Survey time, air temperature, sky code and wind scale are recorded for each survey. For turtle observations, GPS location, the direction of movement and description of basking features being used are noted, as relevant.

Type of Monitoring	Development Phase	Location(s)	Methodology / Timing
Buffer Integrity and Functioning	Post Construction	Permanent plots to be established within future buffer areas adjacent to WSU 3 and WSU 4. None has been established or monitored to date.	Twice annual monitoring in conjunction with vegetation plot monitoring in core areas (June and September). Quantitative photo-plot monitoring as described above.
Wildlife Passage Monitoring	During / Post Construction	One future ecological linkage area between WSU 3 and WSU 6. Other linkages are present on adjacent lands. None has been installed or monitoring to date.	Primarily targeting herpetofauna but other wildlife will be addressed with the recommended components. Effectiveness monitoring of mitigation and enhancement measures: (i.e., ensuring funnel / exclusion walls, wildlife passage measures, plantings / cover elements etc. are installed, in good health / condition and functioning as intended) Once annually in early spring (before March 15); supplemented by additional checks during other monitoring events. Exclusion areas / corridor monitoring (WSU 6 area only): 5 suitable nights in March-April for spring amphibian movement (i.e., high relative humidity, fog, or light rain and anticipated overnight temperatures above 0^0C). On suitable nights between 0.5 hr after sunset and 12 am complete multiple passes along the corridor (i.e., minimum of 2 passes or 1.5 hr search effort) slowly walking both sides of the exclusion fence conducting visual sweeps using flashlights and/or headlamps. Vegetation and potential cover objects along the exclusion measures are searched for amphibians and other wildlife. Record pertinent survey details such as date; start and end time; staff; weather conditions; general site conditions (e.g., vegetation cover - density, type, etc.; adjacent activities / land use). For wildlife observations, record: species and number of individuals observed; the direction of travel (inferred or as observed); location; representative photographs; evidence of movement (e.g. scat, tracks, etc.) without direct observation. Photo monitoring of crossing structures: Continuous monitoring from April to July. Photo monitoring of crossing structures, within the HCL/Domm lands (i.e., Newman Drive and Bismark Drive extensions), and other areas, where possible (i.e., Blenheim Road at the east end of Barrie's Lake and Devil's Creek). Timed shutter-release or movement-triggered camera systems are to be installed in the two (potentially four) crossing structures shown in Figure 3, using best available technology. Given that the primary target wildlife group is herpetofauna, it is recommended that cameras are installed prior to mid-March, then activated and checked / downloaded regularly through mid-July – this captures the core spring and summer movement period for amphibians and turtles. Post-construction monitoring should be undertaken to assess the condition of infrastructure / plantings and quantify wildlife use (i.e., monitoring to assess corridor, funnel wall “effectiveness” and use of wildlife structures).

3.3 ANALYSIS & REPORTING

Annual biological monitoring reports will be prepared and submitted for approval. Reports will include the status of activities, discussion of field survey results, recommendations for remedial actions if required, anticipated activities in the next year and recommendations for future monitoring (e.g., any changes to the program).

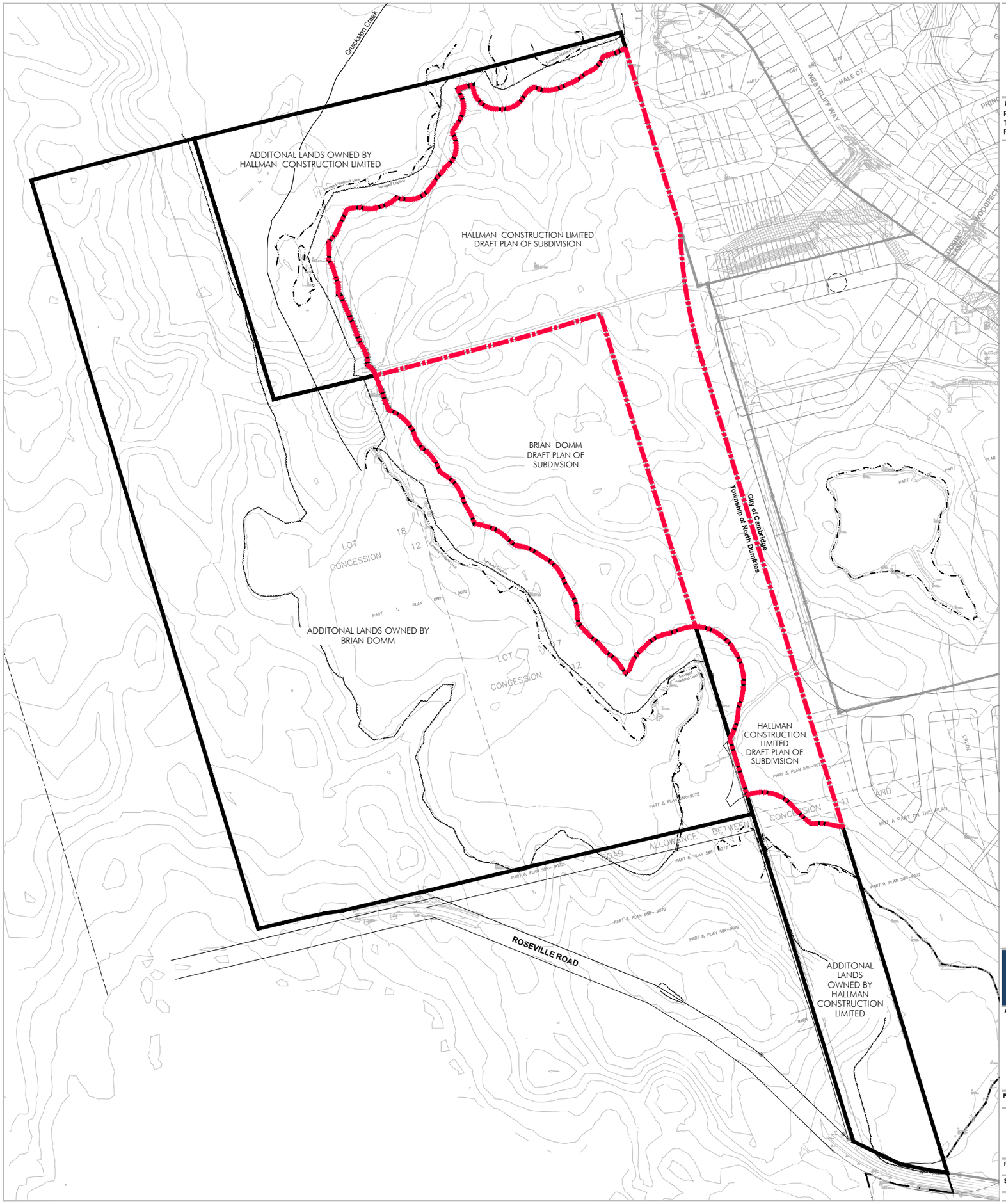
APPENDIX A

FIGURES - SUBJECT PROPERTY

Figure 1. Consolidated Draft Plan

Figure 2. Feature Limits & Setbacks

Figure 3. Biological Monitoring Locations



CONSOLIDATED DRAFT PLAN OF SUBDIVISION AND ADDITIONAL LANDS

Legal Description

PART OF LOTS 17 AND 18, CONCESSION 12
TOWNSHIP OF NORTH DUMFRIES
REGIONAL MUNICIPALITY OF WATERLOO

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR, KITCHENER, ON, N2B 3X9 | P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Approval Stamp	**Date** September 10, 2020
	File No. 0800C
	Plan Scale 1:1,250 (36x36)
	Drawn By D.G.S.
	Checked By P.B.
Project Westwood Phase 2	**Other**
	north
File Name DRAFT PLAN	**Dwg No.** 1 of 1
Scale Bar 0 5 10 25 50 100m	

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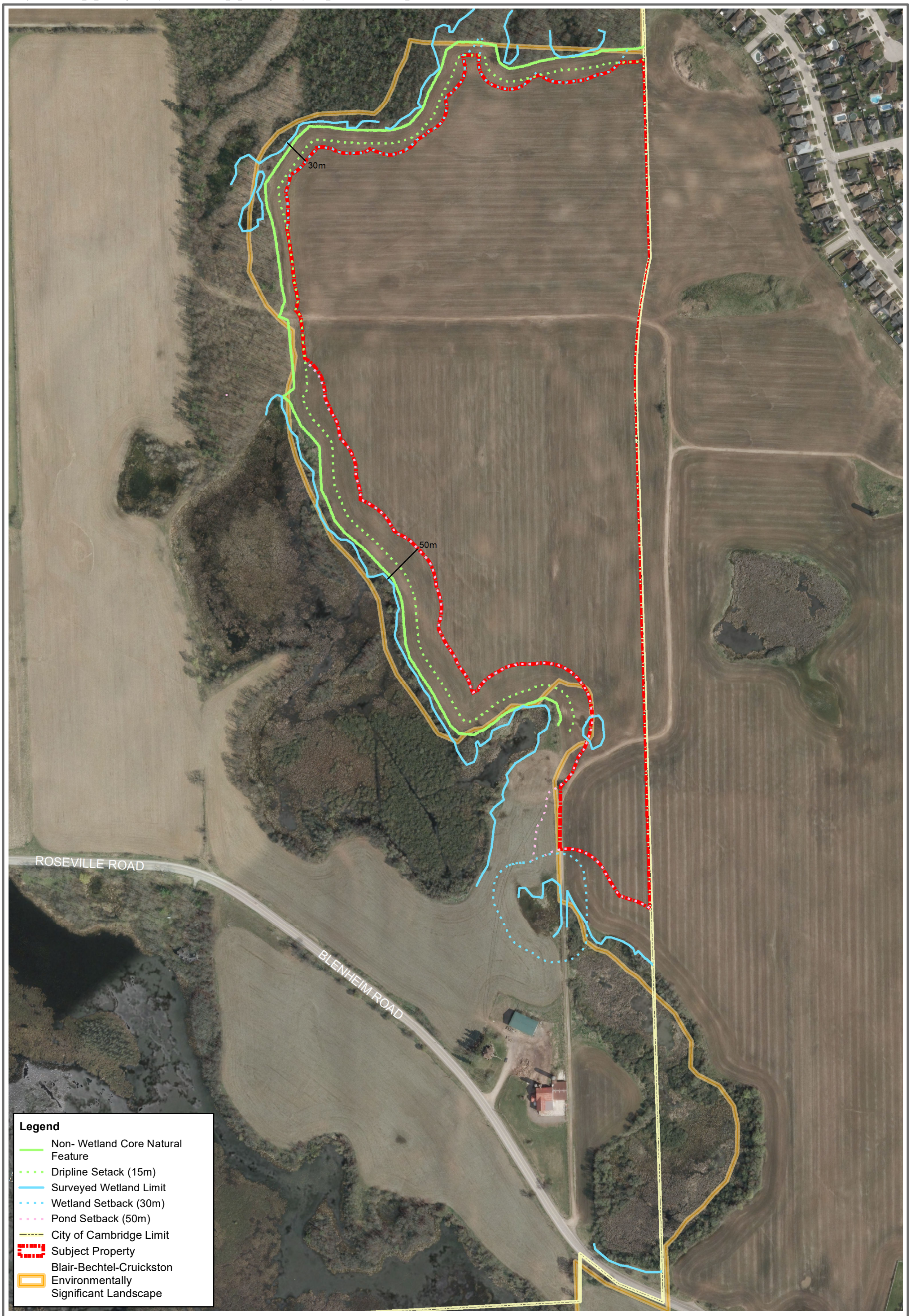

WESTWOOD VILLAGE, PHASE 2
TOWNSHIP OF NORTH DUMFRIES
SCOPED EIS TERMS OF REFERENCE
Environmental Feature Limits and Setbacks

0 50 100
metres
1:4,000

N

Date: September 2020
Project No: 18M-00047-00
Figure No: 2

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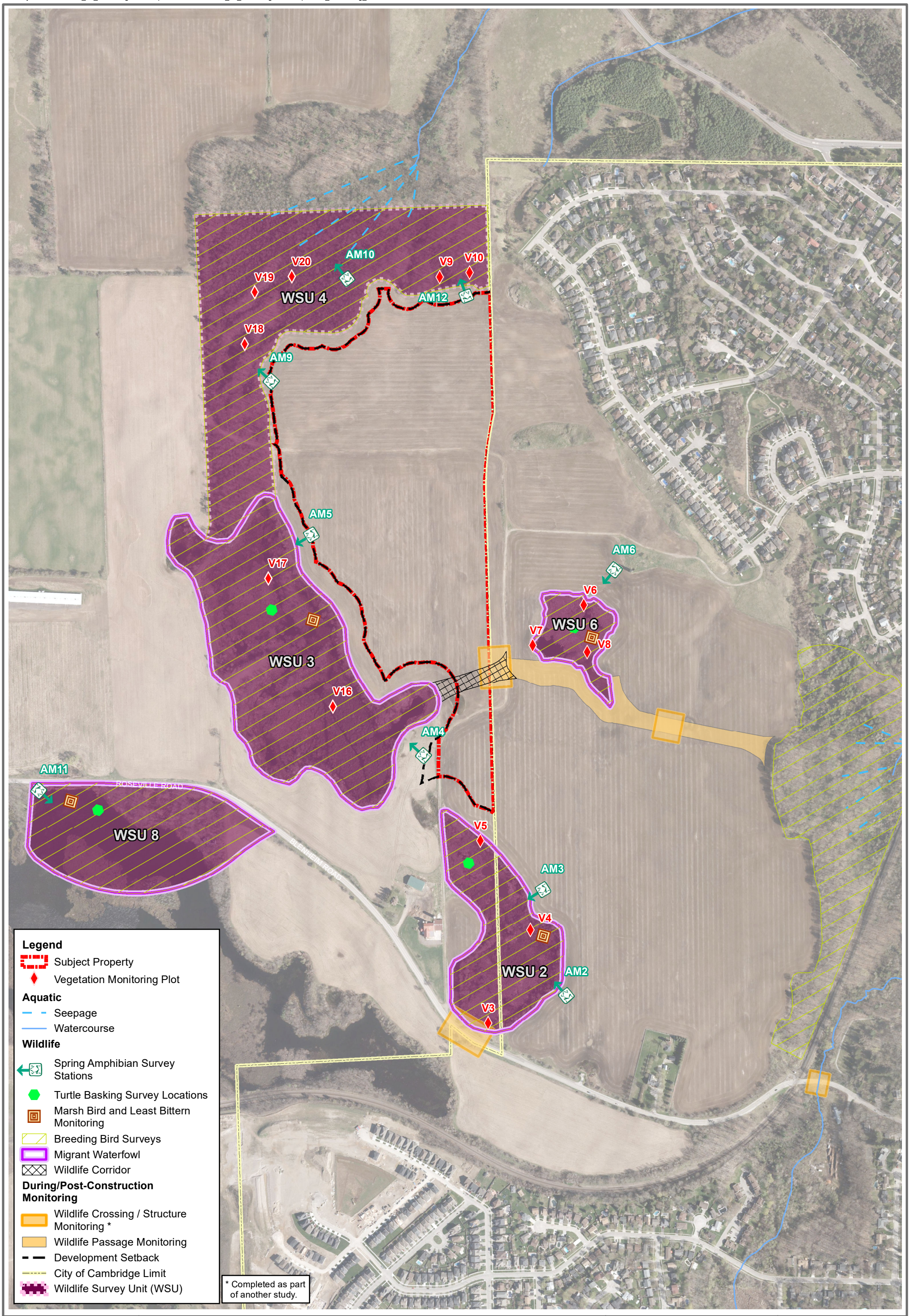

WESTWOOD VILLAGE, PHASE 2
TOWNSHIP OF NORTH DUMFRIES
SCOPED EIS TERMS OF REFERENCE
Pre-Consruction Biological Monitoring

0 50 100
metres
1:6,500

N

Date: September 2020
Project No: 18M-00047-01
Figure No: 3

APPENDIX B

MESP NES FIGURES (2013)

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 8

Figure 9

Figure 11

Figure 12

Figure 14

Figure 15

Figure 16

Figure 17

SCOPED EIS (2016)

Figure 7

Figure 8

Figure 9

APPENDIX B

FIELD CHRONOLOGY

Table B.1 Field work chronology for the Westwood Village Phase 2 Study Area

DATE	STAFF	TASK	RECONNAISSANCE	ELC / BOTANICAL	FEATURE DELINEATION	BREEDING BIRD	NOCTURNAL	MMP	SUPPLEMENTAL (INCL. MIGRANT)	AMPHIBIAN CALLING	TURTLE BASKING	GENERAL WILDLIFE	LEAST BITTERN
2019													
8-Apr	SL, LW	AC Survey (Round 1)								5		5	
5-May	TP	Turtle Basking (incl BLTU) surveys (Round 1), Migrant Waterfowl Surveys (WSU 2, 3, 6, 8 [West end]), General Wildlife							5.75		5.75	5.75	
15-May	TP	Turtle Basking (incl BLTU) surveys (Round 2), Migrant Waterfowl Surveys (WSU 2, 3, 6, 8 [West end]), General Wildlife							5.75		5.75	5.75	
21-May	TP	Turtle Basking (incl BLTU) surveys (Round 3), Migrant Waterfowl Surveys (WSU 2, 3, 6, 8 [West end]), General Wildlife							5		5	5	
29-May	SL, MD	AC Survey (Round 2); Marsh Bird Survey (Round 1)						3		4		7	
30-May	JM, CB	ELC and inventory visit 1		8									
31-May	TP	Turtle Basking (incl BLTU) surveys (Round 4), Least Bittern Surveys (Round 1: WSU 2, 3, 6, 8 [West end]), Breeding Bird Surveys (Round 1: WSU 2, 3, 4, 6, 8 [West end]), General Wildlife				4.5		1			3.5	9.25	1
18-Jun	TP	Turtle Basking (incl BLTU) surveys (Round 5), Least Bittern Surveys (Round 2: WSU 2, 3, 6, 8 [West end]), Breeding Bird Surveys (Round 2: WSU 2, 3, 4, 6, 8 [West end]), General Wildlife				4.75		1			2.25	8	1
24-Jun	JM, CB	Vegetation monitoring for wetland plots	7.5										
25-Jun	JM, CB	Vegetation monitoring for upland plots	5										
27-Jun	SL, MD	AC Survey (Round 3); Marsh Bird Survey (Round 2)					3			4		7	

DATE	STAFF	TASK	RECONNAISSANCE	ELC / BOTANICAL	FEATURE DELINEATION	BREEDING BIRD	NOCTURNAL	MMP	SUPPLEMENTAL (INCL. MIGRANT)	AMPHIBIAN CALLING	TURTLE BASKING	GENERAL WILDLIFE	LEAST BITTERN
28-Jun	TP	Least Bittern Survey #3 (WSU 2, 3, 6, 8), General Wildlife										1	1
17-Jul	JM	ELC and inventory visit 2	6										
23-Jul	JM	Wetland Delineation		7									
30-Jul	JM	Woodland Delineation Vegetation inventory visit 3		7									
23-Sep	JM, CB	Vegetation monitoring for wetland plots		7.5									
24-Sep	JM, CB	Vegetation monitoring for upland plots		5									
18-Oct	CB, JG	Feature Delineation site walk			12								
2020													
8-Apr	SL, MD	AC Survey (Round 1)								4			
27-Apr	TP	Turtle Basking (incl BLTU) surveys (Round 1) and Migrant Waterfowl Surveys (WSU 2, 3, 6, 8 [West end]), General Wildlife							5		5	5	
16-May	TP	Turtle Basking (incl BLTU) surveys (Round 2) and Migrant Waterfowl Surveys (WSU 2, 3, 6, 8 [West end]), General Wildlife							5.5		5.5	5.5	
21-May	TP	Turtle Basking (incl BLTU) surveys (Round 3) and Migrant Waterfowl Surveys (WSU 2, 3, 6, 8 [West end]), General Wildlife							5.5		5.5	5.5	
25-May	SL, MD	Marsh Bird Survey (Round 1), AC Survey (Round 2)						3		4			
27-May	TP	Least Bittern Surveys (Round 1: WSU 2, 3, 6, 8 [West end]), Breeding Bird Surveys (Round 1: WSU1, 2, 3, 4, 6, 8 [West end]), General Wildlife				4.5						5	1

DATE	STAFF	TASK	RECONNAISSANCE	ELC / BOTANICAL	FEATURE DELINEATION	BREEDING BIRD	NOCTURNAL	MMP	SUPPLEMENTAL (INCL. MIGRANT)	AMPHIBIAN CALLING	TURTLE BASKING	GENERAL WILDLIFE	LEAST BITTERN
1-Jun	TP	Turtle Basking (incl BLTU) surveys (Round 4)									4	4	
13-Jun	TP	Turtle Basking (incl BLTU) surveys (Round 5)									3.5	3.5	
17-Jun	SL, MD	Marsh Bird Survey (Round 2), AC Survey (Round 3)						4		4			
18-Jun	TP	Least Bittern Surveys (Round 2: WSU 2, 3, 6, 8 [West end]), Breeding Bird Surveys (Round 2: WSU1, 2, 3, 4, 6, 8 [West end]), General Wildlife				5.25						6	1
23-Jun	JM, CB	Vegetation monitoring for wetland plots (City / TWP)	15										
24-Jun	JM, CB	Vegetation monitoring for woodland plots (City / TWP)	15										
6-Jul	TP	Least Bittern Surveys (Round 3: WSU 2, 3, 6, 8 [West end])										2	1
23-Sep	JM, CP	Vegetation monitoring for wetland plots (City / TWP)	15										
24-Sep	JM	Vegetation monitoring for woodland plots (TWP)	5										
Total # field dates	62		**7**	**5**	**1**	**4**	**1**	**5**	**6**	**6**	**10**	**17**	**6**
Total # hours	342.5		**68.5**	**34.5**	**12**	**19**	**3**	**12**	**32.5**	**25**	**45.8**	**90.3**	**6**

APPENDIX C

VASCULAR PLANT SPECIES LIST

Table C.1. Vascular Plant Species List, Westwood Village Phase 2 Study Area

SCIENTIFIC NAME	COMMON NAME	CC [1]	CW[1]	WEEDINESS[1]	OWES WETLAND PLANT[2]	G RANK[3]	S RANK[4]	COSEWIC[5]	SARA[6]	SARO[7]	CAROLINIAN ZONE (OLDHAM 2017)[8]	WATERLOO REGION (1999)[8]	PHYSIOLOGY[1]	NATIVE STATUS[9]	UNIT 1A	UNIT 1B	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 10	UNIT 11	UNIT 12	UNIT 18
Abutilon theophrasti	Velvetleaf		3	-1		GNR	SNA				IC		Forb	I							X			X
Acer negundo	Manitoba Maple	0	0		X	G5	S5				C		Tree	N	X	X					X	X		
Acer rubrum	Red Maple	4	0		X	G5	S5				C		Tree	N		X			X	X		X		
Acer saccharum	Sugar Maple	4	3			G5	S5				C		Tree	N	X	X	X	X	X	X		X		
Acer spicatum	Mountain Maple	6	3		X	G5	S5				U		Tree	N						X				
Acer x freemanii	Freeman's Maple	6	-5		X	GNA	SNA				hyb		Tree	N						X		X		
Actaea pachypoda	White Baneberry	6	5			G5	S5				C		Forb	N			X	X						
Actaea rubra	Red Baneberry	6	3			G5	S5				C		Forb	N			X							
Aegopodium podagraria	Goutweed		0	-3		GNR	SNA				IU		Forb	I	X									
Agrimonia gryposepala	Hooked Agrimony	2	3			G5	S5				C		Forb	N			X	X		X				
Agrostis gigantea	Redtop		-3	-2		G4G5	SNA				IC		Grass	I							X			
Agrostis scabra	Rough Bentgrass	6	0		X	G5	S5				R		Grass	N					X					
Alisma triviale	Northern Water-plantain	1	-5		X	G5	S5				X		Forb	N		X				X	X	X	X	X
Alliaria petiolata	Garlic Mustard		0	-3		GNR	SNA				IC		Forb	I	X		X	X				X		
Allium tricoccum var. tricoccum	Wild Leek	7	3			G--T5	S4				C		Forb	N			X	X						
Amaranthus retroflexus	Redroot Amaranth		3	-1		G5	SNA				IC		Forb	I							X			
Ambrosia artemisiifolia	Common Ragweed	0	3			G5	S5				C		Forb	N	X						X	X	X	
Amelanchier arborea	Downy Serviceberry	5	3			G5	S5				C		Tree	N				X						
Amelanchier laevis	Smooth Serviceberry	5	5			G5	S5				C		Tree	N			X	X	X					
Amphicarpaea bracteata	American Hog Peanut	4	0		X	G5	S5				C		Forb	N				X		X				
Anemone quinquefolia	Wood Anemone	7	0			G5	S5				C		Forb	N			X	X		X				
Anthemis cotula	Stinking Chamomile		3	-1		G5	SNA				IU		Forb	I	X									
Apocynum androsaemifolium	Spreading Dogbane	3	5			G5	S5				C		Forb	N	X									
Apocynum cannabinum var. cannabinum	Hemp Dogbane	3	0			G5T5	S5				C		Forb	N	X			X						
Aralia nudicaulis	Wild Sarsaparilla	4	3			G5	S5				C		Forb	N			X	X	X	X				
Aralia racemosa	American Spikenard	7	5			G5	S5				C		Forb	N						X				
Arctium minus	Common Burdock		3	-2		GNR	SNA				IC		Forb	I	X		X	X						
Arisaema triphyllum	Jack-in-the-pulpit	5	-3		X	G5	S5				C		Forb	N			X	X		X				
Asarum canadense	Canada Wild Ginger	6	5			G5	S5				C		Forb	N				X						
Asclepias exaltata	Poke Milkweed	8	5			G5	S4				R		Forb	N			X	X						
Asclepias incarnata	Swamp Milkweed	6	-5		X	G5	S5				C		Forb	N					X		X	X		
Asclepias syriaca	Common Milkweed	0	5			G5	S5				C		Forb	N	X						X	X		
Athyrium filix-femina	Common Lady Fern	4	0			G5	S5						Fern	N				X		X				
Barbarea vulgaris	Bitter Wintercress		0	-1		GNR	SNA				IC		Forb	I	X									

SCIENTIFIC NAME	COMMON NAME	CC [1]	CW[1]	WEEDINESS[1]	OWES WETLAND PLANT[2]	G RANK[3]	S RANK[4]	COSEWIC[5]	SARA[6]	SARO[7]	CAROLINIAN ZONE (OLDHAM 2017)[8]	WATERLOO REGION (1999)[8]	PHYSIOLOGY[1]	NATIVE STATUS[9]	UNIT 1A	UNIT 1B	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 10	UNIT 11	UNIT 12	UNIT 18
Berberis thunbergii	Japanese Barberry		3	-3		GNR	SNA				IX		Shrub	I			X	X		X				
Berberis vulgaris	Common Barberry		3	-2		GNR	SNA				IX		Shrub	I							X			
Berteroa incana	Hoary Alyssum		5	-3		GNR	SNA				IX		Forb	I	X						X			
Betula alleghaniensis	Yellow Birch	6	0		X	G5	S5				C		Tree	N				X	X	X				
Betula papyrifera	Paper Birch	2	3		X	G5	S5				C		Tree	N				X	X	X				
Bidens cernua	Nodding Beggarticks	2	-5		X	G5	S5				C		Forb	N		X					X	X	X	X
Bidens frondosa	Devil's Beggarticks	3	-3		X	G5	S5				C		Forb	N		X				X		X		X
Bidens tripartita	Three-parted Beggarticks	5	-3		X	G5	S5?				C		Forb	N		X			X	X		X		
Bidens vulgata	Tall Beggarticks	5	0		X	G5	S5				C		Forb	N		X								
Boehmeria cylindrica	False Nettle	4	-5		X	G5	S5				C		Forb	N					X	X				
Brachyelytrum erectum	Southern Shorthusk	7	3		X	G4G5	S4				U		Grass	N				X						
Bromus inermis	Smooth Brome		5	-3		G5	SNA				IC		Grass	I	X							X	X	X
Bromus tectorum	Downy Brome		5	-2		GNR	SNA				IC		Grass	I							X			
Calamagrostis canadensis var. *canadensis*	Bluejoint Reedgrass	4	-5		X	G5T5	S5				C		Grass	N		X						X		
Calla palustris	Wild Calla	8	-5		X	G5	S5				R	W*	Forb	N		X								
Caltha palustris	Yellow Marsh Marigold	5	-5		X	G5	S5				C		Forb	N					X	X				
Capsella bursa-pastoris	Common Shepherd's Purse		3	-1		GNR	SNA				IC		Forb	I	X									
Cardamine diphylla	Two-leaved Toothwort	7	3			G5	S5				C		Forb	N						X				
Cardamine pensylvanica	Pennsylvania Bittercress	6	-3		X	G5	S5				C		Forb	N					X	X				
Carex arctata	Drooping Woodland Sedge	5	5			G5	S5				C		Sedge	N				X						
Carex atherodes	Wheat Sedge	6	-5		X	G5	S4				R	W	Sedge	N								X		
Carex bromoides	Brome-like Sedge	7	-3		X	G5	S5				C		Sedge	N						X				
Carex crinita	Fringed Sedge	6	-5		X	G5	S5				C		Sedge	N					X	X	X	X		
Carex cristatella	Crested Sedge	3	-3		X	G5	S5				C		Sedge	N					X					
Carex deweyana	Dewey's Sedge	6	3			G5	S5				C		Sedge	N			X	X						
Carex gracillima	Graceful Sedge	4	3		X	G5	S5				C		Sedge	N				X		X				
Carex hystericina	Porcupine Sedge	5	-5		X	G5	S5				C		Sedge	N							X	X		
Carex intumescens	Bladder Sedge	6	-3		X	G5	S5				C		Sedge	N				X		X				
Carex lacustris	Lake Sedge	5	-5		X	G5	S5				C		Sedge	N		X				X		X		
Carex laevivaginata	Smooth-sheathed Sedge	8	-5		X	G5	S4				U	W	Sedge	N						X				
Carex laxiculmis var. laxiculmis	Spreading Sedge	7	3			G5T5	S4				C	W	Sedge	N				X						
Carex leptonervia	Finely-nerved Sedge	5	0			G5	S5				U		Sedge	N				X						
Carex pedunculata	Long-stalked Sedge	5	3			G5	S5				C		Sedge	N				X		X				
Carex pellita	Woolly Sedge	2	-5		X	G5	S5				C		Sedge	N		X								
Carex pensylvanica	Pennsylvania Sedge	5	5			G5	S5				C		Sedge	N			X	X		X				

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Carex pseudocyperus	Cyperus-like Sedge	6	-5		X	G5	S5				U		Sedge	N					X			X		
Carex radiata	Eastern Star Sedge	4	0		X	G5	S5				C		Sedge	N				X		X				
Carex rosea	Rosy Sedge	2	5			G5	S5				C		Sedge	N			X	X						
Carex scabrata	Eastern Rough Sedge	8	-5		X	G5	S5				U	W	Sedge	N						X				
Carex sp.	Sedge sp.												Sedge		X	X				X				
Carex sparganioides	Burreed Sedge	5	3			G5	S4S5				C	W*	Sedge	N			X	X						
Carex stipata	Awl-fruited Sedge	3	-5		X	G5	S5				C		Sedge	N			X	X			X			
Carex stricta	Tussock Sedge	4	-5		X	G5	S5				C		Sedge	N		X			X	X				
Carex tenera	Tender Sedge	4	0		X	G5	S5				C		Sedge	N			X							
Carex vulpinoidea	Fox Sedge	3	-5		X	G5	S5				C		Sedge	N						X	X		X	
Carpinus caroliniana	Blue-beech	6	0		X	G5	S5				C		Tree	N			X	X	X	X				
Carya cordiformis	Bitternut Hickory	6	0			G5	S5				C		Tree	N			X	X						
Caulophyllum thalictroides	Blue Cohosh	5	5			G5	S5				X		Forb	N			X	X						
Celtis occidentalis	Common Hackberry	8	0			G5	S4				C	W*	Tree	N			X	X						
Ceratophyllum demersum	Common Hornwort	4	-5		X	G5	S5				U		Forb	N		X					X			
Chelidonium majus	Greater Celandine		5	-3		GNR	SNA				IU		Forb	I			X							
Chelone glabra	White Turtlehead	7	-5		X	G5	S5				C		Forb	N					X	X				
Chenopodium album	Common Lamb's-quarters		3	-1		G5	SNA				IC		Forb	I							X			
Chrysosplenium americanum	American Golden-saxifrage	8	-5		X	G5	S4				U		Forb	N					X					
Cichorium intybus	Wild Chicory		5	-1		GNR	SNA				IC		Forb	I	X				X				X	
Cicuta bulbifera	Bulbous Water-hemlock	5	-5		X	G5	S5				C		Forb	N		X		X	X	X	X	X		
Cicuta maculata	Spotted Water-hemlock	6	-5		X	G5	S5						Forb	N					X	X				
Cinna latifolia	Drooping Woodreed	7	-3		X	G5	S5				R		Grass	N						X				
Circaea alpina	Small Enchanter's Nightshade	6	-3		X	G5	S5				C		Forb	N						X				
Circaea canadensis	Broad-leaved Enchanter's Nightshade	2	3			G5	S5				C		Forb	N	X		X	X						
Cirsium arvense	Canada Thistle		3	-1		G5	SNA				IC		Forb	I	X						X	X	X	
Cirsium vulgare	Bull Thistle		3	-1		GNR	SNA				IC		Forb	I	X						X			
Clintonia borealis	Yellow Clintonia	7	0		X	G5	S5				U		Forb	N						X				
Comarum palustre	Marsh Cinquefoil	7	-5		X	G5	S5				R		Forb	N					X					
Convallaria majalis	European Lily-of-the-valley		5	-2		G5	SNA				IX		Forb	I			X	X						
Coptis trifolia	Goldthread	7	-3		X	G5	S5				C		Forb	N						X				
Cornus alternifolia	Alternate-leaved Dogwood	6	3			G5	S5				C		Shrub	N			X	X		X				
Cornus canadensis	Bunchberry	7	0			G5	S5				U		Shrub	N						X				
Cornus obliqua	Silky Dogwood	2	-3		X	G5	S5				C		Shrub	N		X						X		
Cornus racemosa	Grey Dogwood	2	0		X	G5	S5				C		Shrub	N			X					X		

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Cornus rugosa	Round-leaved Dogwood	6	5			G5	S5				C		Shrub	N	X									
Cornus sericea	Red-osier Dogwood	2	-3		X	G5	S5				C		Shrub	N		X		X	X	X	X	X		
Corylus cornuta	Beaked Hazelnut	5	3			G5	S5				U		Shrub	N						X				
Crataegus coccinea var. pringlei	Pringle's Hawthorn	4	5			G--T5	S5				U	W*	Tree	N				X						
Crataegus macrosperma	Big-fruited Hawthorn	4	5			G5	S5				C		Tree	N			X							
Crataegus punctata	Dotted Hawthorn	4	5			G5	S5				C		Tree	N	X									
Crepis capillaris	Smooth Hawksbeard		5	-1		GNR	SNA				IR		Forb	I	X									
Cynoglossum officinale	Common Hound's-tongue		5	-1		GNR	SNA				IU		Forb	I							X			
Cyperus esculentus	Perennial Yellow Flatsedge	1	-3		X	G5	S5				C		Sedge	N							X			X
Cystopteris bulbifera	Bulblet Bladder Fern	5	-3		X	G5	S5				C		Fern	N						X				
Dactylis glomerata	Orchard Grass		3	-1		GNR	SNA				IC		Grass	I							X		X	
Datura stramonium	Jimsonweed		5	-1		GU	SNA				IR		Forb	I	X						X			
Daucus carota	Wild Carrot		5	-2		GNR	SNA				IC		Forb	I	X						X	X	X	X
Diervilla lonicera	Northern Bush-honeysuckle	5	5			G5	S5				C		Shrub	N	X		X	X						
Digitaria sanguinalis	Hairy Crabgrass		3	-1		G5	SNA				IC		Grass	I							X			
Dipsacus fullonum	Common Teasel		3	-1		GNR	SNA				IC		Forb	I	X						X			
Dirca palustris	Eastern Leatherwood	7	0			G4	S4				U		Shrub	N				X						
Dryopteris carthusiana	Spinulose Wood Fern	5	-3		X	G5	S5				C		Fern	N			X		X	X				
Dryopteris cristata	Crested Wood Fern	7	-5		X	G5	S5				U		Fern	N					X	X				
Dryopteris intermedia	Evergreen Wood Fern	5	0			G5	S5				C		Fern	N				X	X	X		X		
Dulichium arundinaceum	Three-way Sedge	7	-5		X	G5	S5				R		Sedge	N					X					
Echinochloa crus-galli	Large Barnyard Grass		-3	-1	X	GNR	SNA				IC		Grass	I	X						X	X	X	X
Echinocystis lobata	Wild Cucumber	3	-3		X	G5	S5				C		Vine	N	X							X		X
Echium vulgare	Common Viper's Bugloss		5	-2		GNR	SNA				IC		Forb	I							X			
Eleocharis obtusa	Blunt Spikerush	5	-5		X	G5	S5				C		Sedge	N							X	X		
Eleocharis palustris	Common Spikerush	6	-5		X	G5?	S5				R		Sedge	N							X	X	X	
Eleocharis sp.	Spikerush sp.												Sedge	N		X								
Elymus hystrix	Bottlebrush Grass	5	5			G5	S5				C		Grass	N				X						
Epifagus virginiana	Beechdrops	6	5			G5	S5				C		Forb	N				X		X				
Epilobium ciliatum	Northern Willowherb	3	-3		X	G5	S5						Forb	N						X				
Epilobium coloratum	Purple-veined Willowherb	3	-5		X	G5	S5				C		Forb	N							X			
Epilobium parviflorum	Small-flowered Willowherb		3	-1	X	GNR	SNA				IU		Forb	I	X					X	X	X		X
Epipactis helleborine	Broad-leaved Helleborine		3	-2		GNR	SNA				IC		Forb	I			X	X	X	X	X			
Equisetum arvense	Field Horsetail	0	0		X	G5	S5				C		Fern	N				X	X	X	X	X		X
Equisetum fluviatile	Water Horsetail	7	-5		X	G5	S5				U		Fern	N		X								
Equisetum hyemale	Common Scouring-rush	2	0		X	G5	S5				C		Fern	N				X		X				

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Equisetum palustre	Marsh Horsetail	10	-3		X	G5	S5				R	W	Fern	N						X				
Equisetum scirpoides	Dwarf Scouring-rush	7	0		X	G5	S5				R		Fern	N				X						
Erigeron annuus	Annual Fleabane	0	3			G5	S5				C		Forb	N	X						X		X	
Erigeron canadensis	Canada Horseweed	0	3			G5	S5				C		Forb	N	X						X	X	X	X
Erigeron philadelphicus	Philadelphia Fleabane	1	-3		X	G5	S5				C		Forb	N	X									
Erigeron strigosus	Rough Fleabane	4	3			G5	S5				C		Forb	N	X					X				
Erucastrum gallicum	Common Dog Mustard		5	-1		G5	SNA				IX		Forb	I	X									
Erysimum cheiranthoides	Wormseed Wallflower		3	-1		G5	S5				IC		Forb	I	X									
Erythronium americanum	Yellow Trout Lily	5	5			G5	S5						Forb	N			X	X						
Euonymus obovatus	Running Strawberry-bush	6	5			G5	S4				C		Shrub	N			X	X						
Eupatorium perfoliatum	Common Boneset	2	-3		X	G5	S5				C		Forb	N		X				X	X			
Eurybia macrophylla	Large-leaved Aster	5	5			G5	S5				C		Forb	N				X		X				
Euthamia graminifolia	Grass-leaved Goldenrod	2	0			G5	S5				C		Forb	N								X		
Eutrochium maculatum	Spotted Joe Pye Weed	3	-5		X	G5	S5						Forb	N		X				X	X			
Fagus grandifolia	American Beech	6	3			G5	S4				C		Tree	N			X	X	X					
Fallopia convolvulus	Eurasian Black Bindweed		3	-1		GNR	SNA				IC		Vine	I							X			
Festuca rubra	Red Fescue		3			G5	S5						Grass	N									X	
Fragaria vesca ssp. americana	Woodland Strawberry	4	3			G5T5	S5				U		Forb	N				X			X	X		
Fragaria virginiana ssp. virginiana	Wild Strawberry	2	3			G5T5	S5				C		Forb	N						X	X	X		
Frangula alnus	Glossy Buckthorn		0	-3	X	GNR	SNA				IU		Shrub	I	X		X	X	X	X	X	X		
Fraxinus americana	White Ash	4	3			G5	S4				C		Tree	N			X	X						
Fraxinus nigra	Black Ash	7	-3		X	G5	S3	THR			C		Tree	N		X		X	X	X				
Fraxinus pennsylvanica	Green Ash	3	-3		X	G5	S4				C		Tree	N				X		X				
Fraxinus sp.	Ash sp.												Tree					X		X				
Galium aparine	Common Bedstraw	4	3			G5	S5				C		Forb	N			X		X		X			
Galium mollugo	Smooth Bedstraw		5	-2		GNR	SNA				IU		Forb	I							X	X	X	
Galium obtusum	Blunt-leaved Bedstraw	6	-3		X	G5	S4S5				C	W*	Forb	N								X		
Galium palustre	Common Marsh Bedstraw	5	-5		X	G5	S5				R		Forb	N		X				X		X		
Galium triflorum	Three-flowered Bedstraw	4	3			G5	S5				C		Forb	N			X	X		X				
Geranium maculatum	Spotted Geranium	6	3			G5	S5				C		Forb	N			X	X						
Geranium robertianum	Herb-Robert	2	3	-2		G5	S5				C		Forb	I			X	X						
Geum aleppicum	Yellow Avens	2	0		X	G5	S5				C		Forb	N	X		X			X		X		
Geum canadense	Canada Avens	3	0		X	G5	S5				C		Forb	N	X		X							
Geum fragarioides	Barren Strawberry	5	5			G5	S5				U		Forb	N	X			X		X				
Glechoma hederacea	Ground-ivy		3	-2		GNR	SNA				IC		Forb	I							X			
Glyceria grandis	Tall Mannagrass	5	-5		X	G5	S5				U		Grass	N							X		X	

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Glyceria septentrionalis	Eastern Mannagrass	7	-5		X	G5	S4				U	W*	Grass	N							X	X		
Glyceria sp.	Mannagrass sp.												Grass							X				
Glyceria striata	Fowl Mannagrass	3	-5		X	G5	S5				C		Grass	N		X			X	X				
Glycine max	Soybean		5	-1		GNR	SNA				IR		Forb	I							X			X
Gymnocarpium dryopteris	Common Oak Fern	7	3		X	G5	S5				U		Fern	N				X		X				
Hackelia virginiana	Virginia Stickseed	5	3			G5	S5				C	W*	Forb	N	X		X	X		X				
Hamamelis virginiana	American Witch-hazel	6	3			G5	S4S5				C		Shrub	N						X				
Hepatica acutiloba	Sharp-lobed Hepatica	8	5			G5	S5				C		Forb	N			X							
Hepatica americana	Round-lobed Hepatica	6	5			G5	S5				C		Forb	N				X						
Hesperis matronalis	Dame's Rocket		3	-3		G4G5	SNA				IC		Forb	I	X		X	X						
Hylodesmum glutinosum	Large Tick-trefoil	6	5			G5	S4				U		Forb	N				X						
Hypericum punctatum	Spotted St. John's-wort	5	0		X	G5	S5				C		Forb	N								X		
Ilex verticillata	Common Winterberry	5	-3		X	G5	S5				C		Shrub	N		X			X	X				
Impatiens capensis	Spotted Jewelweed	4	-3		X	G5	S5				C		Forb	N		X	X		X	X				
Inula helenium	Elecampane		3	-2	X	GNR	SNA				IU		Forb	I							X			
Iris versicolor	Harlequin Blue Flag	5	-5		X	G5	S5				C		Forb	N					X	X		X		
Juglans cinerea	Butternut	6	3			G4	S2?	END	END	END	U		Tree	N				X						
Juglans nigra	Black Walnut	5	3			G5	S4?				C	W*+	Tree	N	X			X						
Juncus articulatus	Jointed Rush	5	-5		X	G5	S5				U		Rush	N							X	X		
Juncus bufonius	Toad Rush	1	-3		X	G5	S5				C		Rush	N							X			
Juncus canadensis	Canada Rush	6	-5		X	G5	S5				R	W	Rush	N		X						X		
Juncus dudleyi	Dudley's Rush	1	-3		X	G5	S5				C		Rush	N							X			
Juncus effusus ssp. solutus	Soft Rush	4	-5		X	G5T5	S5?						Rush	N		X					X	X	X	
Lactuca serriola	Prickly Lettuce		3	-1		GNR	SNA				IC		Forb	I	X									
Larix laricina	Tamarack	7	-3		X	G5	S5				U		Tree	N						X				
Leersia oryzoides	Rice Cutgrass	3	-5		X	G5	S5				C		Grass	N				X	X	X	X	X		
Leersia virginica	White Cutgrass	6	-3		X	G5	S4				C		Grass	N				X						
Lemna minor	Small Duckweed	5	-5		X	G5	S5?				C		Forb	N		X			X	X	X	X	X	
Lemna trisulca	Star Duckweed	6	-5		X	G5	S5				U		Forb	N		X			X		X	X		
Leonurus cardiaca	Common Motherwort		5	-2		GNR	SNA				IC		Forb	I	X		X				X			
Lepidium virginicum	Poor-man's Peppergrass	0	3			G5	S5				U		Forb	N							X			
Linaria vulgaris	Butter-and-eggs		5	-1		GNR	SNA				IC		Forb	I							X			
Lindera benzoin	Northern Spicebush	6	-3		X	G5	S4				C		Shrub	N						X				
Lonicera dioica	Limber Honeysuckle	5	3			G5	S5				C		Vine	N			X							
Lonicera hirsuta	Hairy Honeysuckle	7	0			G5	S5				R	W	Shrub	N			X	X						
Lonicera tatarica	Tatarian Honeysuckle		3	-3		GNR	SNA				IC		Shrub	I	X							X		

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Lonicera x bella	Bell's Honeysuckle		3	-3		GNA	SNA				hyb		Shrub	I				X						
Lotus corniculatus	Garden Bird's-foot Trefoil		3	-2		GNR	SNA				IC		Forb	I	X						X			
Ludwigia palustris	Marsh Seedbox	5	-5		X	G5	S5				C		Forb	N								X		
Luzula acuminata	Hairy Woodrush	6	3			G5	S5				C		Rush	N				X		X				
Lycopus americanus	American Water-horehound	4	-5		X	G5	S5				C		Forb	N								X		
Lycopus uniflorus	Northern Water-horehound	5	-5		X	G5	S5				C		Forb	N		X			X	X	X	X		
Lysimachia borealis	Northern Starflower	6	0			G5	S5				C		Forb	N						X				
Lysimachia ciliata	Fringed Yellow Loosestrife	4	-3		X	G5	S5				C		Forb	N						X	X			
Lysimachia nummularia	Creeping Yellow Loosestrife		-3	-3		GNR	SNA				IC		Forb	I							X			
Lysimachia terrestris	Swamp Yellow Loosestrife	6	-5		X	G5	S5				R	W	Forb	N						X				
Lysimachia thyrsiflora	Tufted Yellow Loosestrife	7	-5		X	G5	S5				U		Forb	N							X	X		
Lythrum salicaria	Purple Loosestrife		-5	-3	X	G5	SNA				IC		Forb	I		X				X	X	X		
Maianthemum canadense	Wild Lily-of-the-valley	5	3			G5	S5				C		Forb	N	X		X	X	X	X				
Maianthemum racemosum	Large False Solomon's-seal										C		Forb	N	X		X	X		X				
Maianthemum stellatum	Star-flowered Solomon's-seal	6	0			G5	S5				C		Forb	N				X		X				
Malva neglecta	Dwarf Mallow		5	-1		GNR	SNA				IC		Forb	I							X			
Matricaria discoidea	Pineappleweed		3			G5	SNA				IC		Forb	I	X									
Matteuccia struthiopteris	Ostrich Fern	5	0		X	G5	S5						Fern	N						X				
Medeola virginiana	Indian Cucumber-root	8	3			G5	S5				C		Forb	N			X							
Medicago lupulina	Black Medick		3	-1		GNR	SNA				IC		Forb	I							X		X	
Melica smithii	Smith's Melic Grass	9	5			G4	S4				R		Grass	N							X			
Melilotus albus	White Sweet-clover		3	-3		G5	SNA				IC		Forb	I	X									
Mentha canadensis	Canada Mint	3	-3			G5	S5				C		Forb	N		X					X	X		
Mitchella repens	Partridgeberry	6	3			G5	S5				C		Shrub	N				X		X				
Mitella diphylla	Two-leaved Mitrewort	5	3		X	G5	S5				C		Forb	N						X				
Morus alba	White Mulberry		0	-3		GNR	SNA				IC		Tree	I	X									
Nabalus albus	White Rattlesnakeroot	6	3		X	G5	S5				C		Forb	N				X		X				
Nabalus altissimus	Tall Rattlesnakeroot	5	3			G5	S5				U		Forb	N				X						
Nasturtium officinale	Common Watercress		-5	-1		GNR	SNA				IX		Forb	I						X				
Nepeta cataria	Catnip		3	-2		GNR	SNA				IC		Forb	I							X			
Nicandra physalodes	Apple-of-peru		5	-1		GNR	SNA				IR		Forb	I							X			
Oenothera biennis	Common Evening Primrose	0	3			G5	S5				C		Forb	N	X						X			
Onoclea sensibilis	Sensitive Fern	4	-3		X	G5	S5				C		Fern	N		X		X	X	X		X		
Oryzopsis asperifolia	Round-leaved Mountain ricegrass	6	5			G5	S5				C		Grass	N				X		X				
Osmunda regalis	Royal Fern	7	-5		X	G5	S5				C		Fern	N					X	X				
Osmundastrum cinnamomeum	Cinnamon Fern	7	-3		X	G5	S5				C		Fern	N					X	X				

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Ostrya virginiana	Eastern Hop-hornbeam	4	3			G5	S5				C		Tree	N			X	X		X				
Oxalis stricta	European Wood-sorrel		3			G5	S5				C		Forb	I	X						X			
Panicum capillare	Common Panicgrass	0	0			G5	S5				C		Grass	N	X						X			X
Panicum flexile	Wiry Panicgrass	8	-3		X	G5	S4				R		Grass	N							X			
Panicum miliaceum	Proso Millet		5	-1		GNR	SNA				IR		Grass	I							X			
Parthenocissus vitacea	Thicket Creeper	4	3			G5	S5				C		Vine	N	X		X	X		X	X			
Pedicularis canadensis	Canada Lousewort	7	3			G5	S5				U		Forb	N			X	X						
Persicaria amphibia	Water Smartweed	5	-5			G5	S5						Forb	N		X			X		X	X		
Persicaria hydropiper	Marshpepper Smartweed		-5		X	GNR	SNA				IC		Forb	I							X			
Persicaria lapathifolia	Pale Smartweed	2	-3	-1	X	G5	S5				C		Forb	N		X					X	X		
Persicaria maculosa	Spotted Lady's-thumb		-3	-1	X	G3G5	SNA				IC		Forb	I	X						X	X		
Persicaria pensylvanica	Pennsylvania Smartweed	3	-3		X	G5	S5				C		Forb	N							X			
Persicaria sagittata	Arrow-leaved Smartweed	5	-5		X	G5	S4S5				U	W	Forb	N		X								
Phalaris arundinacea var. arundinacea	Reed Canarygrass	0	-3		X	G5TNR	S5				C		Grass	N		X			X	X	X	X	X	X
Phleum pratense	Common Timothy		3	-1		GNR	SNA				IC		Grass	I	X						X		X	X
Phragmites australis ssp. australis	European Reed		-3		X	G5T5	SNA				IC		Grass	I		X					X			
Phryma leptostachya	Lopseed	6	3			G5	S4S5				C		Forb	N			X							
Pilea fontana	Lesser Clearweed	5	-3		X	G5	S4				U	W	Forb	N				X	X					
Pilea pumila	Dwarf Clearweed	5	-3		X	G5	S5				C		Forb	N		X			X	X				
Pilosella piloselloides	Tall Hawkweed		5	-2		GNR	SNA						Forb	I	X									
Pinus strobus	Eastern White Pine	4	3		X	G5	S5				C		Tree	N	X		X	X	X	X				
Plantago major	Common Plantain		3	-1		G5	SNA				IC		Forb	I	X						X			X
Plantago rugelii	Rugel's Plantain	1	0			G5	S5				C		Forb	N	X									
Poa compressa	Canada Bluegrass	0	3			GNR	SNA				IC		Grass	I	X	X	X			X				
Poa palustris	Fowl Bluegrass	5	-3		X	G5	S5				C		Grass	N								X		
Poa pratensis ssp. pratensis	Kentucky Bluegrass		3			G5T5	SNA				IC		Grass	I	X	X					X	X	X	
Podophyllum peltatum	May-apple	5	3			G5	S5				C		Forb	N	X		X	X						
Polygaloides paucifolia	Fringed Milkwort	6	3			G5	S5				R		Forb	N				X		X				
Polygonatum biflorum	Giant Solomon's Seal	8	3			G5	S4						Forb	N				X						
Polygonatum pubescens	Hairy Solomon's Seal	5	5			G5	S5				C		Forb	N			X	X						
Polygonum aviculare	Prostrate Knotweed		3	-1		GNR	S4?				IC		Forb	I	X									
Polystichum acrostichoides	Christmas Fern	5	3			G5	S5				C		Fern	N				X						
Populus balsamifera	Balsam Poplar	4	-3		X	G5	S5				U		Tree	N		X						X		
Populus deltoides	Eastern Cottonwood	4	0			G5	S5					W+	Tree	N								X		
Populus grandidentata	Large-toothed Aspen	5	5			G5	S5				C		Tree	N			X	X						
Populus tremuloides	Trembling Aspen	2	0			G5	S5				C		Tree	N	X					X		X		

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Portulaca oleracea	Common Purslane		3			GU	SNA				IU		Forb	I	X									
Potamogeton sp.	Pondweed sp.												Forb	N		X								
Potamogeton zosteriformis	Flat-stemmed Pondweed	5	-5		X	G5	S5				R		Forb	N		X					X			
Potentilla norvegica	Rough Cinquefoil	0	0		X	G5	S5						Forb	N							X			
Potentilla recta	Sulphur Cinquefoil		5	-2		GNR	SNA				IC		Forb	I	X		X							
Prunella vulgaris	Common Self-heal		0			G5	S5						Forb					X						
Prunus serotina	Black Cherry	3	3			G5	S5				C		Tree	N	X		X	X		X				
Prunus virginiana	Chokecherry	2	3			G5	S5						Shrub	N	X		X	X		X				
Pteridium aquilinum	Bracken Fern	2	3			G5	S5				C		Fern	N				X		X				
Pyrola elliptica	Shinleaf	5	5			G5	S5				U		Forb	N				X						
Quercus alba	White Oak	6	3			G5	S5				C		Tree	N	X		X							
Quercus ellipsoidalis	Northern Pin Oak	9	5			G5	S3				R	W	Tree	N	X									
Quercus macrocarpa	Bur Oak	5	3		X	G5	S5				C		Tree	N	X		X			X				
Quercus rubra	Northern Red Oak	6	3			G5	S5				C		Tree	N	X		X	X		X				
Ranunculus abortivus	Kidney-leaved Buttercup	2	0			G5	S5				C		Forb	N			X	X		X				
Ranunculus acris	Common Buttercup		0	-2	X	G5	SNA				IC		Forb	I			X	X			X		X	
Ranunculus hispidus var. caricetorum	Northern Swamp Buttercup	5	-5		X	G5	S5				C		Forb	N						X		X		
Ranunculus pensylvanicus	Pennsylvania Buttercup	3	-5		X	G5	S5				C		Forb	N		X								
Ranunculus recurvatus	Hooked Buttercup	4	-3			G5	S5				C		Forb	N		X		X						
Ranunculus sceleratus var. sceleratus	Cursed Buttercup	2	-5		X	G5T5	SNA						Forb	N		X			X		X	X		
Rhamnus cathartica	European Buckthorn		0	-3	X	GNR	SNA				IC		Tree	I	X		X	X		X	X	X		
Ribes americanum	American Black Currant	4	-3		X	G5	S5				C		Shrub	N		X	X	X						
Ribes cynosbati	Eastern Prickly Gooseberry	4	3			G5	S5				C		Shrub	N			X	X						
Rorippa palustris ssp. palustris	Marsh Yellowcress	3	-5		X	G5T5	S5?				C		Forb	N							X	X		
Rosa blanda	Smooth Rose	3	3			G5	S5				C		Shrub	N	X									
Rosa canina	Dog Rose		5	-1		GNR	SNA				IX		Shrub	I				X						
Rosa multiflora	Multiflora Rose		3	-3		GNR	SNA				IC		Shrub	I	X			X		X				
Rubus allegheniensis	Alleghany Blackberry	2	3			G5	S5				C		Shrub	N			X	X						
Rubus hispidus	Bristly Dewberry	6	-3		X	G5	S4				C	W#	Shrub	N		X								
Rubus idaeus ssp. strigosus	American Red Raspberry	2	3			G5T5	S5				C		Shrub	N	X		X					X		
Rubus occidentalis	Black Raspberry	2	5			G5	S5				C		Shrub	N			X	X						
Rubus pubescens	Dwarf Raspberry	4	-3		X	G5	S5				C		Forb	N				X		X				
Rudbeckia hirta	Black-eyed Susan	0	3			G5	S5				C		Forb	N	X									
Rudbeckia laciniata	Cut-leaved Coneflower	7	-3		X	G5	S5				U		Forb	N						X				
Rumex crispus	Curly Dock		0	-2	X	GNR	SNA				IC		Forb	I	X						X	X		
Rumex obtusifolius	Bitter Dock		-3	-1	X	GNR	SNA				IX		Forb	I			X				X			

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Rumex verticillatus	Swamp Dock	7	-5		X	G5	S4				U		Forb	N		X								
Sagittaria latifolia	Broad-leaved Arrowhead	4	-5		X	G5	S5				C		Forb	N		X						X		
Salix alba	White Willow		-3	-2	X	G5	SNA				IX		Tree	I		X								
Salix amygdaloides	Peach-leaved Willow	6	-3		X	G5	S5				C		Tree	N		X			X		X			
Salix bebbiana	Bebb's Willow	4	-3		X	G5	S5				C		Shrub	N		X					X			
Salix discolor	Pussy Willow	3	-3		X	G5	S5				C		Shrub	N					X			X		
Salix eriocephala	Cottony Willow	4	-3		X	G5	S5				C		Shrub	N		X			X	X	X	X		
Salix euxina	Crack Willow		0			GNR	SNA				IC		Tree	I		X						X		
Salix interior	Sandbar Willow	1	-3		X	GNR	S5				C		Shrub	N								X		
Salix lucida	Shining Willow	5	-3		X	G5	S5				U		Shrub	N							X	X		
Salix nigra	Black Willow	6	-5		X	G5	S4				U		Tree	N		X						X		
Salix petiolaris	Meadow Willow	3	-3		X	G5	S5				C		Shrub	N		X						X		
Salix purpurea	Purple Willow		-3	-2	X	G5	SNA				IU		Shrub	I		X						X		
Salix x fragilis	Hybrid White Willow		0	-3	X	GNA	SNA				hyb		Tree	I		X						X		
Sambucus canadensis	Common Elderberry	5	-3		X	G5	S5				C		Shrub	N		X				X	X	X		
Sambucus racemosa	Red Elderberry	5	3			G5	S5				C		Shrub	N			X	X				X		
Sanguinaria canadensis	Bloodroot	5	3			G5	S5				C		Forb	N				X		X				
Schoenoplectus tabernaemontani	Soft-stemmed Bulrush	5	-5		X	G5	S5				C		Sedge	N		X								
Scirpus atrovirens	Dark-green Bulrush	3	-5		X	G5	S5				C		Sedge	N							X	X		
Scirpus cyperinus	Common Woolly Bulrush	4	-5		X	G5	S5				C		Sedge	N		X			X			X		
Scutellaria galericulata	Marsh Skullcap	6	-5		X	G5	S5				C		Forb	N		X			X			X		
Scutellaria lateriflora	Mad-dog Skullcap	5	-5		X	G5	S5				C		Forb	N		X			X	X		X		
Setaria faberi	Giant Foxtail		3	-1		GNR	SNA				IC		Grass	I	X									
Setaria pumila	Yellow Foxtail		0	-1		GNR	SNA				IC		Grass	I	X						X			
Setaria viridis	Green Foxtail		5	-1		GNR	SNA				IC		Grass	I							X			X
Silene latifolia	White Campion		5	-2		GNR	SNA				IX		Forb	I							X			
Sium suave	Common Water-parsnip	4	-5		X	G5	S5				C		Forb	N		X			X	X		X		
Smilax herbacea	Herbaceous Carrionflower	5	0			G5	S4?				C		Vine	N			X	X						
Smilax tamnoides	Hispid Greenbrier	6	0			G5	S5				C		Vine	N	X			X						
Solanum dulcamara	Climbing Nightshade		0	-2	X	GNR	SNA				IC		Forb	I	X	X		X	X	X	X	X		
Solanum americanum	American Black Nightshade	1	3			G5	S5				C		Forb	N	X						X			
Solidago altissima	Tall Goldenrod	1	3			G5	S5				C		Forb	N	X						X	X		
Solidago caesia	Blue-stemmed Goldenrod	5	3			G5	S5				C		Forb	N				X						
Solidago canadensis	Canada Goldenrod	1	3			G5	S5						Forb	N						X	X			
Solidago flexicaulis	Zigzag Goldenrod	6	3			G5	S5				C		Forb	N								X		
Solidago gigantea	Giant Goldenrod	4	-3		X	G5	S5				C		Forb	N						X				

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Solidago patula	Round-leaved Goldenrod	8	-5		X	G5	S4				C		Forb	N						X	X			
Solidago rugosa	Rough-stemmed Goldenrod	4	0			G5	S5						Forb	N				X		X				
Sonchus arvensis ssp. arvensis	Field Sow-thistle		3	-1		GNRTNR	SNA				IC		Forb	I							X	X		
Sonchus asper	Prickly Sow-thistle		3	-1		GNR	SNA				IX		Forb	I	X						X	X		
Sparganium eurycarpum	Broad-fruited Burreed	3	-5		X	G5	S5				C		Forb	N		X			X		X		X	
Spiraea alba	White Meadowsweet	3	-3		X	G5	S5				C		Shrub	N		X						X		
Spirodela polyrhiza	Great Duckweed	4	-5		X	G5	S5				U		Forb	N		X					X	X		
Streptopus lanceolatus	Rose Twisted-stalk	7	3			G5	S5				U		Forb	N						X				
Stuckenia filiformis	Thread-leaved Pondweed	8	-5		X	G5	S5					W*	Forb	N		X								
Stuckenia pectinata	Sago Pondweed	4	-5		X	G5	S5				U		Forb	N							X			
Symphoricarpos albus	Thin-leaved Snowberry	7	3			G5	S5						Shrub	N			X	X						
Symphyotrichum cordifolium	Heart-leaved Aster	5	5			G5	S5				C		Forb	N				X		X				
Symphyotrichum ericoides	White Heath Aster	4	3			G5	S5						Forb	N	X									
Symphyotrichum firmum	Glossy-leaved Aster	4	-3			G5	S4?				X		Forb	N				X						
Symphyotrichum lanceolatum	Panicled Aster	3	-3		X	G5	S5						Forb	N	X					X	X	X		
Symphyotrichum lateriflorum	Calico Aster	3	0			G5	S5						Forb	N						X				
Symphyotrichum novae-angliae	New England Aster	2	-3			G5	S5				C		Forb	N	X			X				X		
Symphyotrichum pilosum var. pilosum	Old Field Aster	1	3			G5T5	S5				C		Forb	N	X							X		
Symphyotrichum urophyllum	Arrow-leaved Aster	6	5			G4G5	S4				C		Forb	N								X		
Symplocarpus foetidus	Eastern Skunk Cabbage	7	-5		X	G5	S5				C		Forb	N				X	X	X	X			
Taraxacum officinale	Common Dandelion		3	-2		G5	SNA				IC		Forb	I	X		X			X	X		X	
Thalictrum dioicum	Early Meadow-rue	6	3			G5	S5				C		Forb	N				X						
Thelypteris noveboracensis	New York Fern	7	0			G5	S4S5				C		Fern	N						X				
Thelypteris palustris	Marsh Fern	5	-3		X	G5	S5				C		Fern	N					X	X				
Thlaspi arvense	Field Pennycress		5	-1		GNR	SNA				IC		Forb	I	X									
Thuja occidentalis	Eastern White Cedar	4	-3		X	G5	S5				C		Tree	N				X		X				
Tiarella cordifolia	Heart-leaved Foamflower	6	3		X	G5	S5				C		Forb	N				X		X				
Tilia americana	Basswood	4	3			G5	S5				C		Tree	N			X	X						
Toxicodendron radicans var. rydbergii	Western Poison Ivy	2	0			G--T5	S5				C		Vine	N			X	X		X				
Trifolium hybridum	Alsike Clover		3	-1		GNR	SNA				IC		Forb	I							X	X		
Trifolium pratense	Red Clover		3	-2		GNR	SNA				IC		Forb	I	X						X		X	
Trifolium repens	White Clover		3	-1		GNR	SNA				IC		Forb	I	X									
Trillium grandiflorum	White Trillium	5	3			G5	S5				C		Forb	N	X		X	X		X				
Trillium sp.	Trillium sp.												Forb					X						
Triosteum aurantiacum	Orange-fruit Horse-gentian	7	5			G5	S4S5				U		Forb	N			X	X						
Tsuga canadensis	Eastern Hemlock	7	3		X	G5	S5				C		Tree	N				X						

SCIENTIFIC NAME	COMMON NAME	CC [1]	CW[1]	WEEDINESS[1]	OWES WETLAND PLANT[2]	G RANK[3]	S RANK[4]	COSEWIC[5]	SARA[6]	SARO[7]	CAROLINIAN ZONE (OLDHAM 2017)[8]	WATERLOO REGION (1999)[8]	PHYSIOLOGY[1]	NATIVE STATUS[9]	UNIT 1A	UNIT 1B	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 10	UNIT 11	UNIT 12	UNIT 18
Tussilago farfara	Coltsfoot		3	-2	X	GNR	SNA				IC		Forb	I	X						X			
Typha angustifolia	Narrow-leaved Cattail		-5		X	G5	SNA				IC		Forb	I		X					X	X	X	
Typha latifolia	Broad-leaved Cattail	1	-5		X	G5	S5				C		Forb	N		X					X	X		
Typha x glauca	Blue Cattail		-5		X	GNA	SNA				hyb		Forb	I		X					X	X	X	
Ulmus americana	White Elm	3	-3		X	G5	S5				C		Tree	N		X	X	X	X	X	X	X	X	
Urtica dioica ssp. gracilis	Slender Stinging Nettle	2	0		X	G5T5	S5				C		Forb	N		X					X			
Uvularia grandiflora	Large-flowered Bellwort	6	5			G5	S5				C		Forb	N				X						
Vaccinium angustifolium	Early Lowbush Blueberry	6	3			G5	S5				C	W*	Shrub	N				X	X					
Verbena hastata	Blue Vervain	4	-3		X	G5	S5				C		Forb	N							X			
Verbena urticifolia	White Vervain	4	0		X	G5	S5				C		Forb	N	X									
Veronica chamaedrys	Germander Speedwell		5	-1		GNR	SNA				IR		Forb	I	X			X						
Veronica officinalis	Common Speedwell		5	-2		G5	SNA				IX		Forb	I	X	X								
Viburnum acerifolium	Maple-leaved Viburnum	6	5			G5	S5				C		Shrub	N				X						
Viburnum lantana	Wayfaring Viburnum		5	-1		GNR	SNA				IX		Shrub	I	X	X								
Viburnum lentago	Nannyberry	4	0		X	G5	S5				C		Shrub	N	X				X	X		X		
Viburnum opulus ssp. opulus	Cranberry Viburnum		-3	-1	X	G5TNR	SNA				IX		Shrub	I			X							
Viburnum rafinesquianum	Downy Arrowwood	7	5			G5	S5				C		Shrub	N	X			X						
Vicia cracca	Tufted Vetch		5	-1		GNR	SNA				IX		Forb	I	X						X	X		
Viola cucullata	Marsh Blue Violet	5	-5		X	G5	S5				C		Forb	N					X					
Viola labradorica	Labrador Violet	3	0			G5	S5				C		Forb	N				X						
Viola pubescens	Downy Yellow Violet	5	3			G5	S5				C		Forb	N			X	X						
Viola sororia	Woolly Blue Violet	4	0		X	G5	S5				C		Forb	N			X	X		X				
Viola sp.	Violet sp.												Forb				X	X	X					
Vitis riparia	Riverbank Grape	0	0			G5	S5				C		Vine	N	X		X	X	X	X		X		
Wolffia borealis	Northern Watermeal	4	-5		X	G5	S5				U	W*	Forb	N		X					X	X		
Wolffia columbiana	Columbia Watermeal	4	-5		X	G5	S5				U	W*	Forb	N		X					X	X		
Zanthoxylum americanum	Northern Prickly-ash	3	3			G5	S5				C	W*	Shrub	N			X			X				
Totals	**420**				**188**			**2**	**1**	**1**		**27**			**105**	**82**	**94**	**145**	**69**	**146**	**131**	**111**	**29**	**18**

Legend:

Scientific Name, Common Name and Family

Vascan: http://data.canadensys.net/vascan/search

NHIC: http://www.sse.gov.on.ca/sites/MNR-PublicDocs/EN/ProvincialServices/Ontario_Vascular_Plants.xlsx

[1] Coefficient of Conservatism, Coefficient of Wetness, Weediness, and Physiology/Habit

Oldham, M. J., W. D. Bakowsky and D. A. Sutherland. 1995. Floristic Quality Assessment System for Southern Ontario. Natural Heritage Information Centre, Ministry of Natural Resources. Peterborough, Ontario.

NHIC: http://www.sse.gov.on.ca/sites/MNR-PublicDocs/EN/ProvincialServices/Ontario_Vascular_Plants.xlsx

CC and CW values reflect updates by NHIC, current as of Dec. 28, 2020).

CC: Coefficient of Conservatism. Rank of 0 to 10 based on plants degree of fidelity to a range of synecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters.

CW: Coefficient of Wetness. Value between 5 and –5. A value of –5 is assigned to Obligate Wetland (OBL) and 5 to Obligate Upland (UPL), with intermediate values assigned to the remaining categories.

Weediness: Weediness Score, assigned to all non-native species and range from -1(low impact of the species on natural areas) to -3 (high impact of the species on natural areas).

Habit: Physiology/Habit. The growth form of the species (e.g. forb, shrub, tree).

[2] OWES Wetland Plant List

Ontario Ministry of Natural Resources. 2013. Ontario Wetland Evaluation System Southern Manual. 3rd Edition, Version 3.3

Species presence or absence on the Ontario Wetland Evaluation System (OWES) Wetland Plant List.

Codes are defined as follows:

X: Present on the list

[3] G-Rank (Global)

Global Status from Nature Serve (via NHIC, Feb 28, 2020)

NS: http://explorer.natureserve.org/

NHIC: http://www.sse.gov.on.ca/sites/MNR-PublicDocs/EN/ProvincialServices/Ontario_Vascular_Plants.xlsx

Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

Global (G) Conservation Status Ranks

G1: Critically Imperiled - At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.

G2: Imperiled - at high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

G3: Vulnerable - At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

G4: Apparently Secure - At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

G5: Secure - At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.

G#G#: Range Rank – A numeric range rank (e.g., G2G3, G1G3) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).

GX: Presumed Extinct - Not located despite intensive searches and virtually no likelihood of rediscovery.

GH: Possibly Extinct - Known from only historical occurrences but still some hope of rediscovery. Examples of evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species has been searched for unsuccessfully, but not thoroughly enough to presume that it is extinct or eliminated throughout its range.

GU: Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

GNR: Unranked – Global rank not yet assessed.

GNA: Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities. A global conservation status rank may be not applicable for several reasons, related to its relevance as a conservation target. For species, typically the species is a hybrid without conservation value, or of domestic origin. For ecosystems, the type is typically non-native (e.g, many ruderal vegetation types), agricultural (e.g. pasture, orchard) or developed (e.g. lawn, garden, golf course).

?: Inexact Numeric Rank – Denotes inexact numeric rank; this should not be used with any of the Variant Global Conservation Status Ranks or GX or GH.

T#: Infraspecific Taxon (trinomial) - The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T subrank cannot imply the subspecies or variety is more abundant than the species, for example, a G1T2 subrank should not occur. A vertebrate animal population (e.g., listed under the U.S. Endangered Species Act or assigned candidate status) may be tracked as an infraspecific taxon and given a T rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status.

Q: Questionable taxonomy that may reduce conservation priority – Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower priority (numerically higher) conservation status rank. The "Q" modifier is only used at a global level and not at a national or subnational level.

C: Captive or Cultivated Only – Taxon or ecosystem at present is presumed or possibly extinct or eliminated in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population or ecosystem restoration, not yet established. The "C" modifier is only used at a global level and not at a national or subnational level. Possible ranks are GXC or GHC. This is equivalent to "Extinct" in the Wild (EW) in IUCN's Red List terminology (IUCN 2001).

[4] S-Ranks (Provincial)

Provincial Status from the NHIC (Feb 20, 2020)

NHIC: http://www.sse.gov.on.ca/sites/MNR-PublicDocs/EN/ProvincialServices/Ontario_Vascular_Plants.xlsx
Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

S1:	Critically Imperiled – At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
S2:	Imperiled – At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
S3:	Vulnerable – At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
S4:	Apparently Secure – At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
S5:	Secure – At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.
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 or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
SX:	Presumed Extirpated – Species or ecosystem is believed to be extirpated from the jurisdiction (province). Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered. [equivalent to "Regionally Extinct" in IUCN Red List terminology]
SH:	Possibly Extirpated (Historical) – Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the jurisdiction, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.
SNR:	Unranked – subnational conservation status not yet assessed.
SU:	Unrankable – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA:	Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities (e.g., long distance aerial and aquatic migrants, hybrids without conservation value, and non-native species.
?:	Inexact or Uncertain - Denotes inexact or uncertain numeric rank.
T#:	Infraspecific Taxon (trinomial) - The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above. For example, the subnational rank of a critically imperiled subspecies of an otherwise widespread and common species would be S5T1. A T subrank cannot imply the subspecies or variety is more abundant than the species, for example, a S1T2 subrank should not occur. A vertebrate animal population may be tracked as an infraspecific taxon and given a T rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status.

[5] COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

The federal review process is implemented by COSEWIC (Status as of Feb 20, 2020)

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is an independent advisory panel to the Minister of Environment and Climate Change Canada that meets twice a year to assess the status of wildlife species at risk of extinction.

https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html

EXT:	Extinct – A species that no longer exists.
EXP:	Extirpated – A species no longer existing in the wild in Canada, but occurring elsewhere.
END:	Endangered – A species facing imminent extirpation or extinction.
THR:	Threatened – A species likely to become endangered if limiting factors are not reversed.
SC:	Special Concern – A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
NAR:	Not At Risk – A species that has been evaluated and found to be not at risk of extinction given the current circumstances.
DD:	Data Deficient – Available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

[6] SARA (Species at Risk Act) Status and Schedule

Federal status from the Government of Canada's Species at Risk Public Registry (Status as of Feb 20, 2020)

http://www.registrelep-sararegistry.gc.ca/
The Act establishes Schedule 1, as the official list of species at risk in Canada. It classifies those species as being either Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed species are implemented. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern.

EXT:	Extinct – A species that no longer exists.
EXP:	Extirpated – A species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
END:	Endangered – A species that is facing imminent extirpation or extinction.
THR:	Threatened – A species likely to become endangered if limiting factors are not reversed.
SC:	Special Concern – A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

[7] SARO (Species At Risk in Ontario)

Provincial status from MNRF (Status as of Feb 20, 2020)

https://www.ontario.ca/environment-and-energy/species-risk-ontario-list

The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO). COSSARO is an independent advisory panel to the Ontario Ministry of Natural Resources and Forestry that assesses the status of species at risk of extinction.

EXP: Extirpated – Lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario.

END: Endangered – Lives in the wild in Ontario but is facing imminent extinction or extirpation.

THR: Threatened – Lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.

SC: Special Concern – Lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.

[8] Regional Status

Region of Waterloo

Regional Municipality of Waterloo, 1999. Revisions to Waterloo Region's Significant Species List: Vascular Plants Component. Report to Planning and Culture Committee PC-99-028.1. Approved by Council June 23, 1999.

Codes are defined as follows:

W: Significant in the Region of Waterloo

W*: Significant in the Region of Waterloo but with the expectation that additional research may prove otherwise.

W+: Significant in the Region of Waterloo ONLY if demonstrably indigenous – most populations in RMW are thought to be of non-indigenous origin.

W#: Significant in the Region of Waterloo but known RMW reports are treated as hypothetical.

Carolinian Zone

Oldham, Michael J. 2017. List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Carolinian Canada and Ontario Ministry of Natural Resources and Forestry. Peterborough, ON. 132 pp.
Rankings within each jurisdiction within the Carolinian Zone are based on "previous lists, personal communications, and the author's knowledge of the Carolinian Zone flora. An overall status in the Carolinian Zone is provided based on status in each of the 11 areas and general knowledge of the Carolinian Zone flora."

Codes are defined as follows (**CZ Status Column Only**)

H: Historic. Native in all Carolinian Zone areas and no known records for at least 30 years in all areas where native and ranked (i.e. not X). Occasionally used for a native species known to be extirpated from its only known Carolinian Zone location(s).

R: Rare. Native to the Carolinian Zone and (a) rare (as defined in source lists; sometimes including "very uncommon") or historic (no records in ≥30 years) in more than half of the Carolinian Zone areas (≥6) in which it is native and ranked (i.e. not X); or (b) if rare or historic in <6 areas it must be uncommon or common in no more than one area.

U: Uncommon. Native in the Carolinian Zone and (a) listed as common in no more than one Carolinian Zone area; and (b) not rare or historic in more than half of the Carolinian Zone areas (≥6) in which it is native and ranked (i.e. not X).

C: Common. Native in the Carolinian Zone and (a) common in at least two Carolinian Zone areas; and (b) not rare or historic in more than half of the Carolinian Zone areas (≥6) in which it is native and ranked (i.e. not X).

X: No status. Present and native in the Carolinian Zone but no status assigned because of lack of information, often due to confusion with similar species.

I: Introduced. A non-native (exotic) species that is established (or was formerly established) outside of cultivation in the Carolinian Zone.

CZ: Restricted in Ontario as a native species to the Carolinian Zone

cz: Nearly restricted in Ontario as a native species to the Carolinian Zone (approximately 90%+ records)

Note: In a few cases, based on professional opinion, Carolinian Zone status ranks departed from the above criteria, particularly if the species is not ranked (i.e. X) in at least four Carolinian Zone areas.

[9] Native Status

Based on VASCAN and NHIC (February 28, 2020)

Vascan: http://data.canadensys.net/vascan/search

NHIC: http://www.sse.gov.on.ca/sites/MNR-PublicDocs/EN/ProvincialServices/Ontario_Vascular_Plants.xlsx

Codes are defined as follows:

N = Native

I = Introduced

APPENDIX D

WILDLIFE SURVEY RESULTS

Table D.1. Spring amphibian breeding survey results, Westwood Village Phase 2, Township of North Dumfries

SPECIES	AC3[1] (AM2) – in WSU2				AC4[2] (AM11) – in WSU8			AC5 (AM3) – in WSU2				AC6 (AM4) – in WSU3				AC7 (AM6) – in WSU6				AC9 (AM5) – in WSU3				AM9 (AC8[3]) – in WSU4			AM10[4] -- in WSU4		AM12[5] -- in WSU4	
	2008-2011	2014-2015	2019	2020	2008-2011	2019	2020	2008-2011	2014-2015	2019	2020	2008-2011	2014-2015	2019	2020	2008-2011	2014-2015	2019	2020	2008-2011	2014-2015	2019	2020	2008-2011	2019	2020	2019	2020	2019	2020
American Toad	1[6]	1	1		1			1	1			2				1	1													
American Bullfrog					3	1	1																							
Chorus Frog	1				2			2				1				1				1				2						
Green Frog	3	2	1	1	3	1	1	1	2	1	1	3	2	1	1	2	1	1	1	3	1	2	2	1						
Gray Treefrog	3	3	3	3	3	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		3				2
Northern Leopard Frog	2	2		1	2				3		1	2	2		1		1		1	1	1		2	1						
Spring Peeper	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3	1	3	3	3	3	3	3	3	3	3	1	1	1
Wood Frog	3	3	1	1	2			2	3	1	2	3	3		2				1		3	1	3	3		2	3			
Species Richness	**7**	**6**	**5**	**5**	**8**	**4**	**4**	**6**	**6**	**4**	**5**	**7**	**5**	**3**	**5**	**5**	**5**	**3**	**5**	**5**	**5**	**4**	**5**	**6**	**1**	**3**	**2**	**0**	**1**	**2**
Average Species Richness	**6**				**5**			**5**				**5**				**5**				**5**				**3**			**1**		**2**	

Table D.2. Turtle Survey Results, Westwood Village Phase 2 Township of North Dumfries

LOCATION	2011		2014 / 2015		2019		2020	
	Midland Painted Turtle	Snapping Turtle	Midland Painted Turtle	Snapping Turtle	Midland Painted Turtle	Snapping Turtle	Midland Painted Turtle	Snapping Turtle
Pond 1		1						
Pond 2 (WSU 6)	7		24	3	13	2	48	
Pond 3 (WSU 2)	5	1	30	2	4	1	13	
Pond 4/5 (WSU 3)	36		93	2	37	2	93	1
Barrie's Lake (WSU 8)[7]	42	1	138	1	37	1	17	1
Blenheim / Roseville Road	5	2	2 (1 alive crossing, 1 alive but hit)		3 DOR (WSU8 west end)			

1 Station identifiers indicated as 'ACx' are for 2008-2011 surveys, while those indicated 'AMx' are corresponding to 2014, 2015, 2019 and 2020 survey station identifiers.
2 surveyed during MESP and 2019-2020 surveys
3 surveyed during MESP only and 2019-2020 surveys
4 initiated in 2019
5 initiated in 2019
6 Call Code 1- individual calls can be counted, no overlap; Call Code 2- some calls can be counted, some overlap; Call Code 3- calls continuous and overlapping, individuals not distinguishable
7 Note: In 2011, only the East Section of WSU 8 was surveyed. In 2014/015, both the East and West Sections of WSU8 were surveyed. In 2019-2020, only the West Section of WSU 8 was surveyed.

Table D.3. Summary of Avifauna Species Observed in WSU 2, WSU 3, and WSU 4

COMMON NAME	SRANK[2]	SARO (ESA) STATUS[3]	COSEWIC STATUS[4]	SARA STATUS[5]	SARA SCHEDULE[5]	WATERLOO REGION 1996 SIGNIFICANCE[6]	AREA SENSITIVE BIRDS - ECOREGION 6E	WSU 2 SOUTH-WEST WETLAND										WSU 3 WEST CENTRAL WETLAND										WSU 4 NORTH-WEST WOODLAND							
								2008-2012		2014		2015		2019		2020		2008-2012		2014		2015		2019		2020		2008-2012		2014		2019		2020	
								BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.
Alder Flycatcher	S5B					W								S/H	1									S/H	2										
American Black Duck	S5B					W														P	2													
American Coot	S4B	NAR	NAR			W		S	1									S	2															
American Crow	S5B							P	3	H	4	H	1					T	4	H	2	H	2	H	1	H	2	FY	6	FY	7	T	3		
American Goldfinch	S5B							P	5			T	5	T	3	T	2	T	9	H	5			T	2	T	9	P	8	T	2	T	7	T	8
American Redstart	S5B					W												T	3							S/H	2	A	1			S/H	1	S/H	1
American Robin	S5B							FY	5	FY	5	FY	7	T	3	T	3	CF	10	FY	8			T	3	T	6	NE	15	FY	9	T	5	FY	8
American Woodcock	S4B																																		
Baltimore Oriole	S4B							P	3	T	1	CF	3			S/H	1	FY	4	T	3	CF	3	T	1	S/H	1	D	2	H	1	T	2	T	1
Bank Swallow	S4B	THR	THR	THR	1			X	3	X	10	X	5					X	6			X	15			S/H	3	FY	8	T	1				
Barn Swallow	S4B	THR	THR	THR	1			FY	30	X	15	X	15	X	10	X	9	FY	10	X	10	X	15	X	1	X	1								
Bay-breasted Warbler	S5B																											FY	40			X	1		
Belted Kingfisher	S4B					U						X	1					S	1	H	1			H	1										
Black-billed Cuckoo	S4B, SZN					W														S	1					T	1	S	1						
Black-capped Chickadee	S5							T	4	H	2			S/H	2	T	2	FY	4	H	2	H	2	S/H	1	FY	2	FY	9	FY	6	T	4	T	4
Blackpoll Warbler	S4B																									X	1								
Blue Jay	S5																					H	2			H	1	T	5	H	2	T	1	T	5
Blue-winged Teal	S5									H	1							P	2	T	2														
Bobolink	S4B	THR	THR	THR	1					S	1																								
Brown Thrasher	S4B					W												S	1			T	1												
Brown-headed Cowbird	S4B							P	3	FY	5					S/H	1	P	12	H	2	P	3	T	2	S/H	1	FY	14	FY	2	T	1	T	1
Canada Goose	S5							FY	10	H	6	FY	7	FY	10	H	18	FY	70	FY	6	FY	9	X	36	H	10								
Canada Warbler	S4B	SC	THR	THR	1	W	X	S	2																										
Cedar Waxwing	S5B							P	8	H	2	T	3	T	4	T	3	T	7					S/H	3	T	4	P	6	H	3	T	4	T	4
Chestnut-sided Warbler	S5B					W												S	1																
Chimney Swift	S4B, S4N	THR	THR	THR	1			X	4																										
Chipping Sparrow	S5B							S	1									S	1									S	2			S/H	1		
Cliff Swallow	S4B					W*		P	3	X	7			X	1			FY	40																
Common Grackle	S5B							FY	11	FY	32	FY	15	T	6	S/H	7	CF	30	FY	18			T	2	T	4	FY	10	FY	6	S/H	12	T	4
Common Gallinule (Common Moorhen)	S4B, SZN					W		FY	7	T	1			T	2			FY	6	T	3			T	1	T	1								
Common Raven	S5																																		
Common Yellowthroat	S5B							S	3	T	2	T	2					T	3	A	5	T	3	T	2	S/H	3			H	1			T	1

COMMON NAME	SRANK[2]	SARO (ESA) STATUS[3]	COSEWIC STATUS[4]	SARA STATUS[5]	SARA SCHEDULE[5]	WATERLOO REGION 1996 SIGNIFICANCE[6]	AREA SENSITIVE BIRDS - ECOREGION 6E	WSU 2 SOUTH-WEST WETLAND										WSU 3 WEST CENTRAL WETLAND										WSU 4 NORTH-WEST WOODLAND							
								2008-2012		2014		2015		2019		2020		2008-2012		2014		2015		2019		2020		2008-2012		2014		2019		2020	
								BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.
Double-crested Cormorant	S5B	NAR	NAR																														
Downy Woodpecker	S5													H	1			FY	2	H	1			S/H	1	T	1	S	1	T	1			H	1
Eastern Kingbird	S4B							S	2	A	2	A	2					T	2	A	2	T	2	S/H	1	S/H	1			P	2				
Eastern Phoebe	S5B							S	1							S/H	1	FY	6	S	1														
Eastern Wood-pewee	S4B	SC	SC	SC	1																	T	1					T	4	T	2	T	1	T	1
European Starling	SNA							FY	14	FY	35	FY	11	S/H	1	S/H	1	FY	30	FY	16	FY	25			S/H	3	FY	30	FY	9	S/H	1		
Gray Catbird	S4B							T	1	S	1	S	3	S/H	1	H	1	T	4	CF	5	A	4	T	1	S/H	1	S	1	A	3	T	3	T	1
Great Blue Heron	S4					W										X	1	P	2	T	2	H	1	X	1	X	1	X	1						
Great Crested Flycatcher	S4B																					T	1			S/H	1	T	2	T	1	T	2	T	1
Great Horned Owl	S4																											X	1						
Green Heron	S4B					W		H	1	H	1									T	1					T	1								
Hairy Woodpecker	S5																	S	1									H	1	H	1				
Hooded Merganser	S5B, S5N					W												FY	4	T	1			P	2										
Horned Lark	S5B, SZN									T	4									T	2														
House Finch	SNA							S	2	H	2	S	1					S	2																
House Sparrow	SNA							P	5	X	10	H	2					FY	8																
House Wren	S5B									S	1			S/H	1			S	2	T	1			S/H	2			A	3			S/H	1		
Indigo Bunting	S4B							S	1	T	2							S	2	T	1	T	2	S/H	1			T	4	T	2	S/H	3	T	4
Killdeer	S5B, S5N							A	3	H	1	A	2			H	1	NE	4	A	3	DD	4												
Least Bittern	S4B	THR	THR	THR	1	CV												S	2																
Least Flycatcher	S4B					W												S	1			S	1												
Mallard	S5							FY	10	T	8	T	4	P/T	3			FY	31	FY	27	T	6	T	1	T	8								
Marsh Wren	S4B					W		T	2	S	2													T	2	T	1								
Mourning Dove	S5							P	4	H	2			H	1			S	2	T	4	H	2	T	4	T	6			H	2	S/H	1		
Mourning Warbler	S4B					W								S/H	1																			H	1
Northern Cardinal	S5							S	1			H	2	T	2	T	1	T	4					T	2	T	4	FY	4	T	2	T	3	T	4
Northern Flicker	S4B									H	1	H	2					T	1	T	2	T	2	H	1	H	1	NY	2	T	2	S/H	1	H	1
Northern Mockingbird	S4					W																						S	1			S/H	1		
Northern Rough-winged Swallow	S4B							H	2									FY	35	X	7														
Northern Waterthrush	S5B					W																								S	1				
Orchard Oriole	S4B					W						S	1																						
Osprey	S5B					W														X	1					X	1								
Pied-billed Grebe	S4B, S4N					W		S	1	T	1			T	1	S/H	1	FY	4	N	4			S/H	1	FY	5	S	1						
Pileated Woodpecker	S5					W																								T	1				

COMMON NAME	SRANK[2]	SARO (ESA) STATUS[3]	COSEWIC STATUS[4]	SARA STATUS[5]	SARA SCHEDULE[5]	WATERLOO REGION 1996 SIGNIFICANCE[6]	AREA SENSITIVE BIRDS - ECOREGION 6E	WSU 2 SOUTH-WEST WETLAND										WSU 3 WEST CENTRAL WETLAND										WSU 4 NORTH-WEST WOODLAND							
								2008-2012		2014		2015		2019		2020		2008-2012		2014		2015		2019		2020		2008-2012		2014		2019		2020	
								BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.
Pine Warbler	S5B					W																						S	2	T	1	S/H	1		
Pine Siskin	S4B					W																										S/H	1		
Red-bellied Woodpecker	S4					W																H	1					T	8	T	5	T	3	T	1
Red-eyed Vireo	S5B																	S	1	S	2	T	3			S/H	1	H	1	A	1	T	4	S/H	1
Red-tailed Hawk	S5	NAR	NAR															S	1							H	1	FY	50	FY	7	T	1		
Red-winged Blackbird	S4							NE	100	FY	16			CF	20	T	20	FY	100	FY	23	FY	21	T	30	T	31					T	2	T	12
Rock Pigeon	SNA															X	1											FY	3	T	3				
Rose-breasted Grosbeak	S4B																					T	2					S	3						
Ruby-throated Hummingbird	S5B					W*														H	1														
Sandhill Crane	S4B, SZN	NAR	NAR			W												D	2	H	1			T	3										
Savannah Sparrow	S4B						X	S	2											T	4									S	1				
Scarlet Tanager	S4B					W	X																					T	3	T	4				
Song Sparrow	S5B							T	7	FY	8	FY	6	T	3	T	4	FY	12	FY	13	FY	4	T	4	T	10					T	5	T	3
Sora	S4B					W		S	1	S	1					S/H	1	T	4	T	3	A	1	S/H	1										
Spotted Sandpiper	S5									T	2	P	2	T	2	T	1	FY	3	A	2	A	2			T	1								
Swainson's Thrush	S4B					W																										X	1		
Swamp Sparrow	S5B									T	2	T	2	T	1	S/H	1	A	2	T	4	T	2	T	2	S/H	3								
Tree Swallow	S4B							T	8	T	10	T	10	T	4			FY	25	FY	18	T	12	T	1	X	2	FY	10						
Trumpeter Swan	S2S3	NAR	NAR					P	2							FY	6	FY	5	N	2			S/H	3	H	4								
Turkey Vulture	S5B					W												X	2			X	2					X	4	X	3			X	1
Veery	S4B					W	X																												
Vesper Sparrow	S4B					W	X													S	1							S	2						
Virginia Rail	S5B					W		T	2			A	1			S/H	1	T	5	T	4	A	1												
Warbling Vireo	S5B							NE	3	T	1	S	2	T	3	T	2	T	3	T	3	T	3	T	2	T	3			T	2			T	1
White-breasted Nuthatch	S5																	S	1			H	1	S/H	1			FY	4			S/H	2	T	1
Wild Turkey	S5																	H	1			H	1					FY	6	H	2				
Willow Flycatcher	S5B, SZN							T	3	T	2	T	3	T	2	T	2	T	2	T	5	S	3	T	2	T	1								
Wilson's Snipe	S5B, SZN					W				H	6																								
Winter Wren	S5B					W	X																					S	2						
Wood Duck	S5					W*		FY	10	T	4	T	2	P/T	2	FY	11	FY	12	FY	18	FY	8	P	2	FY	3	P	2					S/H	2
Yellow-billed Cuckoo	S4B					W										S/H	1									S/H	1								
Yellow Warbler	S5B							T	3	A	5	CF	6	CF	3	T	5	FY	12	CF	11	CF	5	T	2	T	4	S	1	T	5				
Yellow-rumped Warbler	S5B					W		S	1									S	1																
98		**7**	**7**	**7**	**7**	**41**	**6**	**45**		**41**		**30**		**28**		**29**		**61**		**50**		**39**		**39**		**44**		**43**		**35**		**31**		**26**	

Table D.4. Summary of Avifauna Species Observed within WSU 6, WSU 8, and Agricultural Lands

COMMON NAME	SRANK[2]	SARO (ESA) STATUS[3]	COSEWIC STATUS[4]	SARA STATUS[5]	SARA SCHEDULE[5]	WATERLOO REGION 1996 SIGNIFICANCE[6]	AREA SENSITIVE BIRDS - ECOREGION 6E[7]	WSU 6 CENTRAL ISOLATED WETLAND										WSU 8 BARRIE'S LAKE										AGRICULTURAL LANDS					
								2008-2012		2014		2015		2019		2020		2008 - 2012 EAST SECTION		2014 EAST AND WEST SECTIONS		2015 EAST AND WEST SECTIONS		2019 WEST SECTION ONLY		2020 WEST SECTION ONLY		2008-2012		2019		2020	
								BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.
Alder Flycatcher	S5B					W																		S/H	1								
American Black Duck	S5B					W																											
American Coot	S4B	NAR	NAR			W		S/H	1	T	1																						
American Crow	S5B							H	1			H	2					H	1			T	5			H	1	H	4			H	3
American Goldfinch	S5B							P	4					S/H	1	T	2	S/H	3	H	2	T	2	T	2	T	4	P	6				
American Redstart	S5B					W														T	2	T	2									
American Robin	S5B							CF	2	FY	6			S/H	2			P	2			FY	7	T	2	T	1	FY	5				
American Woodcock	S4B															H	1																
Baltimore Oriole	S4B							S	3									S	1	T	3	T	2	S/H	1	T	1						
Bank Swallow	S4B	THR	THR	THR	1			X	8	X	40	X	1	X	25	X	6			X	6	X	9										
Barn Swallow	S4B	THR	THR	THR	1			X	6	X	40	X	4	X	2	X	1			FY	10	T	10			X	1	X	20				
Bay-breasted Warbler	S5B																											X	6				
Belted Kingfisher	S4B					U														T	2	H	1			H	1						
Black-billed Cuckoo	S4B, SZN					W																											
Black-capped Chickadee	S5																	S	2	FY	5	P	2	S/H	2	T	2	S	6				
Blackpoll Warbler	S4B																																
Blue Jay	S5																	H	4					S/H	1			H	3				
Blue-winged Teal	S5							S	1	H	2																						
Bobolink	S4B	THR	THR	THR	1																												
Brown Thrasher	S4B					W														S	1												
Brown-headed Cowbird	S4B							P	2									S	1	FY	3					S/H	1	P	4	X	3	X	1
Canada Goose	S5							FY	18	FY	11	FY	7	S/H	3			FY	10	FY	22	FY	22	FY	41	FY	40	H	25	X	20		
Canada Warbler	S4B	SC	THR	THR	1	W	X																										
Cedar Waxwing	S5B															H	2							T	4	H	4						
Chestnut-sided Warbler	S5B					W																											
Chimney Swift	S4B, S4N	THR	THR	THR	1																							X	2				
Chipping Sparrow	S5B																			S	2					T	1	S	2				
Cliff Swallow	S4B					W*				X	50	X	2							X	4												
Common Grackle	S5B							FY	8	FY	6	FY	4			T	2	S	10	FY	24			T	3	S/H	7	FY	4				
Common Gallinule (Common Moorhen)	S4B, SZN					W		FY	7	T	1	H	1	T	1	S/H	1	S	1														
Common Raven	S5																													FY	4	NE	2
Common Yellowthroat	S5B							S	1					S/H	2					A	2	T	3	T	2	T	1						
Double-crested Cormorant	S5B	NAR	NAR																			X	4	S/H	3								
Downy Woodpecker	S5																	H	2	H	1	H	1	S/H	1	H	1						

COMMON NAME	SRANK[2]	SARO (ESA) STATUS[3]	COSEWIC STATUS[4]	SARA STATUS[5]	SARA SCHEDULE[5]	WATERLOO REGION 1996 SIGNIFICANCE[6]	AREA SENSITIVE BIRDS - ECOREGION 6E[7]	WSU 6 CENTRAL ISOLATED WETLAND										WSU 8 BARRIE'S LAKE										AGRICULTURAL LANDS					
								2008-2012		2014		2015		2019		2020		2008 - 2012 EAST SECTION		2014 EAST AND WEST SECTIONS		2015 EAST AND WEST SECTIONS		2019 WEST SECTION ONLY		2020 WEST SECTION ONLY		2008-2012		2019		2020	
								BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.
Eastern Kingbird	S4B																	H	1			T	2	T	1	P	2	P	2				
Eastern Phoebe	S5B																																
Eastern Wood-pewee	S4B	SC	SC	SC	1																							T	2				
European Starling	SNA									H	2							S/H	2	FY	25			T	100	FY	8	CF	20	X	15		
Gray Catbird	S4B																			A	5	T	4	S/H	1								
Great Blue Heron	S4					W		P	2	X	1							S/H	7	T	3	T	3	X	1	X	4						
Great Crested Flycatcher	S4B																			T	1												
Great Horned Owl	S4																											FY	1				
Green Heron	S4B					W				X	1					H	1			H	1												
Hairy Woodpecker	S5																					H	1										
Hooded Merganser	S5B, S5N					W		S/H	2									FY	4														
Horned Lark	S5B, SZN							P	2	FY	4																	T	11	T	3	T	6
House Finch	SNA							S	1											S	1												
House Sparrow	SNA							P	2																			FY	6				
House Wren	S5B																	S	1	A	2	S	2	S/H	1	H/S	1						
Indigo Bunting	S4B																			T	2	T	2										
Killdeer	S5B, S5N							DD	13	A	2	A	2			H	3			A	2	A	2					A	2	T	9	DD	4
Least Bittern	S4B	THR	THR	THR	1	CV								T	1																		
Least Flycatcher	S4B					W																											
Mallard	S5							P	9	FY	17	T	2	T	5			H	2	FY	16	FY	7	H	1	P	2						
Marsh Wren	S4B					W						S	1	T	3	S/H	1							S/H	1	S/H	1						
Mourning Dove	S5							P	22			X	2					S	1					S/H	2	H	1	P	6			X	10
Mourning Warbler	S4B					W																											
Northern Cardinal	S5							S	1									P	2	T	3	S	2			T	2	S/H	1				
Northern Flicker	S4B																	S/H	1	T	2	H	1					S/H	1				
Northern Mockingbird	S4					W																											
Northern Rough-winged Swallow	S4B							P	4	X	9			X	1									X	4								
Northern Waterthrush	S5B					W																											
Orchard Oriole	S4B					W																				S/H	1						
Osprey	S5B					W						X	3							CF	1			T	1								
Pied-billed Grebe	S4B, S4N					W		FY	9	N	3							FY	5	FY	7	N	4	FY	6	FY	2						
Pileated Woodpecker	S5					W																											
Pine Warbler	S5B					W																											
Pine Siskin	S4B					W																											
Red-bellied Woodpecker	S4					W																											

COMMON NAME	SRANK[2]	SARO (ESA) STATUS[3]	COSEWIC STATUS[4]	SARA STATUS[5]	SARA SCHEDULE[5]	WATERLOO REGION 1996 SIGNIFICANCE[6]	AREA SENSITIVE BIRDS - ECOREGION 6E[7]	WSU 6 CENTRAL ISOLATED WETLAND										WSU 8 BARRIE'S LAKE										AGRICULTURAL LANDS					
								2008-2012		2014		2015		2019		2020		2008 - 2012 EAST SECTION		2014 EAST AND WEST SECTIONS		2015 EAST AND WEST SECTIONS		2019 WEST SECTION ONLY		2020 WEST SECTION ONLY		2008-2012		2019		2020	
								BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.	BE	NO.
Red-eyed Vireo	S5B																			S	1							H	1				
Red-tailed Hawk	S5	NAR	NAR																									S/H	1				
Red-winged Blackbird	S4							FY	50	T	8	FY	12	A,T	21	FY	23	FY	50	FY	42	FY	27	CF	30	CF	14	S/H	15	X	1		
Rock Pigeon	SNA									X	7																			T	18	X	4
Rose-breasted Grosbeak	S4B							S/H	1											S	1												
Ruby-throated Hummingbird	S5B					W*																						D	2				
Sandhill Crane	S4B, SZN	NAR	NAR			W												P	3	T	1			T	3			T	3				
Savannah Sparrow	S4B						X			T	2																						
Scarlet Tanager	S4B					W	X																					A	4				
Song Sparrow	S5B							S	2	T	2	T	1	T	3	T	4	T	3	T	11	FY	5	T	2	T	2						
Sora	S4B					W		S	3	T	2	S	1															S/H	1				
Spotted Sandpiper	S5							A	8	A	2			S/H	2	T	1			T	1									H	1	H	1
Swainson's Thrush	S4B					W																											
Swamp Sparrow	S5B																			T	3	S	2	T	1	T	1						
Tree Swallow	S4B							P	10	FY	35	T	11	X	1			S	3	FY	33	T	15										
Trumpeter Swan	S2S3	NAR	NAR															H	2									X	8				
Turkey Vulture	S5B					W		X	8													H	2										
Veery	S4B					W	X																					FY	1				
Vesper Sparrow	S4B					W	X			T	2																						
Virginia Rail	S5B					W				S	1			T	1			T	2														
Warbling Vireo	S5B																			T	2	S	1	T	3	T	2						
White-breasted Nuthatch	S5																	H	1					S/H	2			H	4				
Wild Turkey	S5																																
Willow Flycatcher	S5B, SZN																			T	3	T	4	T	2	S/H	1						
Wilson's Snipe	S5B, SZN					W																											
Winter Wren	S5B					W	X																										
Wood Duck	S5					W*		P	2									FY	5	FY	11	FY	3										
Yellow-billed Cuckoo	S5B					W																											
Yellow Warbler	S5B							S	2									S	1	CF	7	A	8	T	2	T	4						
Yellow-rumped Warbler	S5B					W																											
98		**7**	**7**	**7**	**7**	**41**	**6**	**33**		**26**		**16**		**16**		**13**		**30**		**41**		**33**		**31**		**30**		**32**		**9**		**8**	

Notes:

American Coot	Recorded in WSU 2 and WSU 3 on May 20 and May 22, 2009; Recorded in Unit 6 on July 9, 2009. Earlier records possible migrants.
Bank Swallow	Foraging visitants. No suitable nesting habitat (typically sand, clay or gravel river banks or steep cliffs) is present in the study area. Local breeding habitat may be present in nearby gravel pits.
Barn Swallow	Foraging visitants. Confirmed breeding of at least 10 pairs within the barns at 200 Blenheim Road (adjacent to WSU2). No suitable nesting habitat is present elsewhere in the study area.
Bay-breasted Warbler	Recorded on May 31, 2019. Likely a late migrant. Typically breeds further north.
Blackpoll Warbler	Recorded on May 27, 2020. Likely a late migrant. Typically breeds further north.
Black-throated Green Warbler	Recorded on May 20 and May 22, 2009. Likely a late migrant. Typically breeds further north.
Bobolink	Singing singing/displaying male recorded on May 21, 2014 west of the laneway west of WSU 2 (in field adjacent to barn).
Canada Warbler	Recorded on May 20 and May 22, 2009. Likely a late migrant. Typically breeds further north.
Chimney Swift	Nesting habitat not observed in study area; Chimney Swifts are aerial insectivores typically foraging over water, flying distances from nesting site for food supply
Cliff Swallow	Nesting habitat not observed on-site (typically cliffs/bluffs/bridges/houses), however, fledged young observed in WSU 3. CLSW's are aerial insectivores typically foraging over water, flying distances from nesting site for food supply. Nesting present on local bridges (e.g. Grand River).
Common Raven	Active nest with young confirmed on silo (adjacent to WSU6) on May 5, 2019. Three young confirmed in nest on May 21, 2019. One remaining fledged young observed on top of silo on May 31, 2019 (adults still tending). Adults and fledged young observed again on June 18, 2019 within WSU3.
	2020: Adult at active nest in silo (adjacent to WSU2) on April 27, 2020. Pair observed at nest again on May 16, 2020. Adult observed at nest again on May 21, 2020. No sign of adults at silo on May 27, 2020 and nest was knocked over. Not observed again within the study area during remainder of 2020 season.
Osprey	Foraging visitants. No nests recorded.
Northern Rough-winged Swallow	Recorded on May 29, 2008; July 9, 2009; June 8, 2010; July 7, 2010; July 26, 2010; May 25, 2011. Nesting habitat not observed on-site (sandy road banks, steep riparian banks or drainage holes), however, fledged young observed in WSU 3. NRWS's are aerial insectivores typically foraging over water, flying distances from nesting site for food supply.
Northern Waterthrush	1 S recorded on July 26, 2010 WSU 4.
Pine Siskin	Recorded on May 31, 2019. Likely a late migrant. Typically breeds further north.
Swainson's Thrush	Recorded on May 31, 2019. Likely a late migrant. Typically breeds further north.
Yellow-rumped Warbler	Recorded on May 20 and May 22, 2009. Likely a late migrant. Typically breeds further north.

Legend:

[1]G-Rank (global)

Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

- G1 Extremely rare - usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
- G2 Very rare - usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.
- G3 Rare to uncommon - usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
- G4 Common - usually more than 100 occurrences; usually not susceptible to immediate threats.
- G5 Very common - demonstrably secure under present conditions.

[2]S-Rank (provincial)

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

- S1 Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
- S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
- S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
- S4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- S5 Secure - Common, widespread, and abundant in the nation or state/province.
- 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 or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
- SAN Non-breeding accidental.
- SE Exotic - not believed to be a native component of Ontario's fauna.
- SZN Non-breeding migrants/vagrants.
- SZB Breeding migrants/vagrants.

[3]SARO (Species at Risk in Ontario / Endangered Species Act) Status
(Provincial status from MECP SARO list website: https://www.ontario.ca/page/species-risk-ontario*)*
EXT Extinct - A species that no longer exists anywhere in the world.
EXP Extirpated - A species that lives somewhere in the world, lived at one time in the wild in Ontario, but no longer lives in the wild in Ontario.
END Endangered - A species that is facing imminent extinction or extirpation.
THR Threatened - A species that is likely to become endangered if steps are not taken to address factors threatening to lead to its extinction or extirpation.
SC Special Concern – A species that may become threatened or endangered because of a combination of biological characteristics and identified threats.

[4]COSEWIC (Committee on the Status of Endangered Wildlife in Canada)
(COSEWIC status from SARA Registry website: https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html*)*
EXT Extinct - A species that no longer exists.
EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.
END Endangered - A species facing imminent extirpation or extinction.
THR Threatened - A species likely to become endangered if limiting factors are not reversed.
SC Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
NAR Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.
DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

[5]SARA (Species at Risk Act) Status and Schedule
(*Federal status from SARA Registry website:* https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html)
The Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.
EXT Extinct - A wildlife species that no longer exists.
EXP Extirpated **-** A wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
END Endangered - A wildlife species that is facing imminent extirpation or extinction.
THR Threatened - A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
SC Special Concern - A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

Schedule 1: is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2: species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3: species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

The Act establishes Schedule 1 as the official list of wildlife species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern.
Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Wildlife Species at Risk.

[6]Regional Status
Waterloo Region Significance (RMOW) (1996)
From Regional Municipality of Waterloo Significant Species List Breeding Birds (1996). Significant ONLY when evidence of breeding (many are common and widespread as migrants). Main purpose of the list is in evaluation of the 'significant species' criterion for the designation of Environmentally Sensitive Policy Areas.
W = Waterloo: Regionally Significant
W* = Significant only when nesting in natural circumstances
V = Very Rare (0-3 occurrences)
R = Rare (0-5)
S = Scarce (6-20)
U = Uncommon (21-100)
C = Common (>100)
I = Introduced
CV = Canada (COSEWIC) Vulnerable; CT = Canada (COSEWIC) Threatened; CE = Canada (COSEWIC) Endangered
OV = Ontario (SARO) Vulnerable; OT = Ontario (SARO) Threatened; OE = Ontario (SARO) Endangered
Note: A number of the COSEWIC and SARO designations have changed since when the Region of Waterloo list was created in 1996. Please use the other columns for the most up-to-date COSEWIC and SARO rankings.

[7]MNRF Area Sensitive Species
Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers
From: Ministry of Natural Resources and Forestry. 2015. Significant Wildlife Habitat Criteria Schedules For Ecoregion 6E. January, 2015. Regional Operations Division, Southern Region Resources Section. 39pp.

Ontario Breeding Bird Atlas - Breeding Evidence Codes

OBSERVED
X Species observed in its breeding season (no breeding evidence).

POSSIBLE
H Species observed in its breeding season in suitable nesting habitat.
S Singing male(s) present, or breeding calls heard, in suitable nesting habitat in breeding season.

PROBABLE
P Pair observed in suitable nesting habitat in nesting season.
T Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two days, a week or more apart, at the same place.
D Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation.
V Visiting probable nest site
A Agitated behaviour or anxiety calls of an adult.
B Brood Patch on adult female or cloacal protuberance on adult male.
N Nest-building or excavation of nest hole.

CONFIRMED
DD Distraction display or injury feigning.
NU Used nest or egg shells found (occupied or laid within the period of the survey).
FY Recently fledged young (nidicolous species) or downy young (nidifugous species), including incapable of sustained flight.
AE Adult leaving or entering nest sites in circumstances indicating occupied nest.
FS Adult carrying fecal sac.
CF Adult carrying food for young.
NE Nest containing eggs.
NY Nest with young seen or heard.

Table D.5. Summary of Lepidoptera Species Observed in WSU 2, WSU3, WSU 4, WSU 6, and WSU 8

COMMON NAME	G-RANK[1]	S-RANK[2]	SARO (ESA)[3]	COSEWIC[4]	SARA STATUS[5]	LOCALLY UNCOMMON[6]	WSU 2 SOUTH-WEST WETLAND				WSU 3 WEST CENTRAL WETLAND				WSU 4 WEST SIDE FOREST				WSU 6 CENTRAL ISOLATED WETLAND			WSU 8 BARRIE'S LAKE EAST AND WEST			
							2010	2011	2014 SUPPLEMENTAL	COMPOSITE	2010	2011	2014 SUPPLEMENTAL	COMPOSITE	2010	2011	2014 SUPPLEMENTAL	COMPOSITE	2010	2011	COMPOSITE	2010	2011	2014 SUPPLEMENTAL	COMPOSITE
American Lady	G5	S5							✓	✓	1			✓											
American Snout	G5	SZB													1			✓							
Black Swallowtail	G5	S5									1		✓	✓	1			✓							
Bronze Copper	G5	S5								✓	1			✓		1		✓	1		✓				
Cabbage White	G5	SE					2	5		✓	25	5		✓	15	5		✓	7	5	✓	3			✓
Clouded Sulphur	G5	S5								✓	25			✓	30	5	✓	✓	15	6	✓				
Columbine Duskywing	G4	S4				✓						2		✓	1			✓							
Common Branded Skipper	G5	S4S5																							
Common Ringlet	G5	S5					2			✓															✓
Common Sootywing	G5	S3S4										1	✓	✓		1		✓							
Common Wood-Nymph	G5	S5								✓															
Dun Skipper	G5	S5										2		✓											
Duskywing Species	G5	S5																✓							
Eastern Comma	G5	S5					1			✓					1			✓						✓	✓
Eastern Tiger Swallowtail	G5	S4S5									1	2	✓	✓	2			✓							
European Skipper	G5	SE					20			✓	10	3		✓	10			✓							
Giant Swallowtail	G5	S3														1		✓							
Hobomok Skipper	G5	S5									1			✓		1		✓							
Least Skipper	G5	S5					3	2		✓	4	7		✓		2		✓		2	✓	5			✓
Monarch	G4	S4	SC	END	SC/1					✓	2	2	✓	✓	2			✓		1	✓	1			✓
Mourning Cloak	G5	S5													2			✓							
Northern Crescent	G5	S5										3		✓											
Orange Sulphur	G5	S5													1			✓							
Painted Lady	G5	SZB									3			✓											
Pearl Crescent	G5	S4									9			✓	5	4		✓							
Question Mark	G5	S5									1			✓											
Red Admiral	G5	SZB					2		✓	✓	3	1	✓	✓			✓	✓	2		✓				
Spicebush Swallowtail	G5	S4				✓																			
Spring Azure	G5	S5							✓	✓							✓	✓							
Summer Azure	G5	S5						1		✓					3			✓				2			✓
Tawny Emperor	G5	S2S3														1		✓							
Tawny-edged Skipper	G5	S5																							
Viceroy	G5	S5										2	✓	✓		1		✓							
Wild Indigo Duskywing	G5	S4														2		✓						✓	✓
34			**1**	**1**	**1**	**2**	**6**	**3**	**3**	**13**	**14**	**11**	**6**	**19**	**13**	**11**	**3**	**24**	**4**	**4**	**6**	**4**	**0**	**2**	**7**

Legend:

[1]G-Rank (global)
Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

G1	Extremely rare - usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2	Very rare - usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.
G3	Rare to uncommon - usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
G4	Common - usually more than 100 occurrences; usually not susceptible to immediate threats.
G5	Very common - demonstrably secure under present conditions.

[2]S-Ranks (provincial)
Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

S1	Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2	Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3	Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4	Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5	Secure - Common, widespread, and abundant in the nation or state/province.
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 or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
SAN	Non-breeding accidental.
SE	Exotic - not believed to be a native component of Ontario's fauna.
SZN	Non-breeding migrants/vagrants.
SZB	Breeding migrants/vagrants.

[3] SARO (Species At Risk in Ontario / Endangered Species Act) Status
(provincial status from MECP SARO list website)
EXT Extinct - A species that no longer exists anywhere in the world.
EXP Extirpated - A species that lives somewhere in the world, lived at one time in the wild in Ontario, but no longer lives in the wild in Ontario.
END Endangered - A species that is facing imminent extinction or extirpation.
THR Threatened - A species that is likely to become endangered if steps are not taken to address factors threatening to lead to its extinction or extirpation.
SC Special Concern – A species that may become threatened or endangered because of a combination of biological characteristics and identified threats.

[4]COSEWIC (Committee on the Status of Endangered Wildlife in Canada) Status
(COSEWIC status from SARA Registry website)

EXT	Extinct - A species that no longer exists.
EXP	Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.
END	Endangered - A species facing imminent extirpation or extinction.
THR	Threatened - A species likely to become endangered if limiting factors are not reversed.
SC	Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
NAR	Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.
DD	Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

[5]SARA (Species at Risk Act) Status and Schedule
(*federal status from SARA Registry website*)
The Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.

EXT	Extinct - A wildlife species that no longer exists.
EXP	Extirpated **-** A wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
END	Endangered - A wildlife species that is facing imminent extirpation or extinction.
THR	Threatened - A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
SC	Special Concern - A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

Schedule 1: is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2: species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3: species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

The Act establishes Schedule 1 as the official list of wildlife species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern.Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Wildlife Species at Risk.

[6] Regional Status Waterloo Region Significance (RMOW) (1996)

Table D.6. Summary of Odonate Species Observed in WSU 2, WSU 3, WSU 4, WSU 6, and WSU 8

COMMON NAME	G-RANK[1]	S-RANK[2]	SARO (ESA)[3]	COSEWIC[4]	SARA STATUS[5]	LOCALLY UNCOMMON[6]	WSU 2 SOUTH-WEST WETLAND				WSU 3 WEST CENTRAL WETLAND				WSU 4 WEST SIDE FOREST				WSU 6 CENTRAL ISOLATED WETLAND			WSU 8 BARRIE'S LAKE EAST AND WEST			
							2010	2011	2014 SUPPLEMENTAL	COMPOSITE	2010	2011	2014 SUPPLEMENTAL	COMPOSITE	2010	2011	2014 SUPPLEMENTAL	COMPOSITE	2010	2011	COMPOSITE	2010	2011	2014 SUPPLEMENTAL	COMPOSITE
Amber-winged Spreadwing	G4	S3									3			✓											
American Emerald	G5	S5				✓																		✓	✓
Autumn Meadowhawk	G5	S5								✓	30			✓	15			✓				3			✓
Band-winged Meadowhawk	G5	S4				✓										1		✓							
Black Saddlebags	G5	S4									5			✓	2	3		✓	3						
Black-tipped Darner	G4	S4													5			✓							
Blue Dasher	G5	S5					2	2		✓	6	1		✓					2	9	✓	30			✓
Bluet Species	G5	S5								✓		250		✓				✓		150	✓				
Boreal Bluet	G5	S5										1		✓											
Calico Pennant	G5	S5																							
Canada Darner	G5	S5								✓				✓	2	1		✓							
Carolina Saddlebags	G5	SZB				✓							✓	✓										✓	✓
Chalk-fronted Corporal	G5	S5				✓																		✓	✓
Cherry-faced Meadowhawk	G5	S5													2			✓							
Common Baskettail	G5	S5					2			✓	5			✓	5			✓							
Common Green Darner	G5	S5					1	2	✓	✓	11	3	✓	✓	7	6	✓	✓	4		✓	5		✓	✓
Common Spreadwing	G5	S5														2		✓							
Common Whitetail	G5	S5					2	1		✓	4	3		✓	2	5		✓				3			✓
Dot-tailed Whiteface	G5	S5					20		✓	✓	60	15		✓			✓	✓	10		✓	40	25	✓	✓
Eastern Forktail	G5	S5					20	5		✓	300	25		✓	10			✓	25	15	✓	30			✓
Eastern Pondhawk	G5	S5						1		✓	3			✓						4	✓	9			✓
Ebony Jewelwing	G5	S5																							
Emerald Spreadwing	G5	S5									2	75		✓		5		✓					13		✓
Familiar Bluet	G5	S5					20	10	✓	✓	40	10	✓	✓	10	2		✓	20		✓	20	20		✓
Four-spotted Skimmer	G5	S5					2		✓	✓	20			✓	2			✓	2		✓	1			✓
Fragile Forktail	G5	S4								✓	2	2		✓											
Frosted Whiteface	G5	S5				✓					2		✓	✓		3	✓	✓						✓	✓
Glider Species	G5	S4																							
Halloween Pennant	G5	S4																							
Harlequin Darner	G5	S3													1			✓							
Lance-tipped Darner	G5	S5									3	5		✓	2	7		✓			✓				
Lyre-tipped Spreadwing	G5	S5									10			✓								2			✓
Marsh Bluet	G5	S5									3	35		✓		15		✓							
Meadowhawk Species	G5	S5								✓		200		✓		50		✓			✓				

COMMON NAME	G-RANK[1]	S-RANK[2]	SARO (ESA)[3]	COSEWIC[4]	SARA STATUS[5]	LOCALLY UNCOMMON[6]	WSU 2 SOUTH-WEST WETLAND				WSU 3 WEST CENTRAL WETLAND				WSU 4 WEST SIDE FOREST				WSU 6 CENTRAL ISOLATED WETLAND			WSU 8 BARRIE'S LAKE EAST AND WEST			
							2010	2011	2014 SUPPLEMENTAL	COMPOSITE	2010	2011	2014 SUPPLEMENTAL	COMPOSITE	2010	2011	2014 SUPPLEMENTAL	COMPOSITE	2010	2011	COMPOSITE	2010	2011	2014 SUPPLEMENTAL	COMPOSITE
Painted Skimmer	G5	S2				✓							✓	✓											
Ruby Meadowhawk	G5	S5													2	2		✓							
Sedge Sprite	G5	S5									10	7		✓							✓				
Shadow Darner	G5	S5													2			✓							
Slaty Skimmer	G5	S4				✓						1		✓											
Slender Spreadwing	G5	S5					5	4		✓	100	10		✓	75	50		✓			✓	3			✓
Spatterdock Darner	G3G4	S1																				3	1		✓
Spotted Spreadwing	G5	S5								✓	25	10		✓	15	5		✓			✓				
Spreadwing Species	G5	S5								✓		500		✓											
Swamp Darner	G5	S2S3													2			✓							
Tule Bluet	G5	S5									5			✓											
Twelve-spotted Skimmer	G5	S5						4		✓	5	3		✓	2	3		✓	5		✓	2	2		✓
Unicorn Clubtail	G5	S2S3																					1		✓
Variable Darner	G5	S5				✓				✓															
Wandering Glider	G5	S4								✓					2	2		✓							
White-faced Meadowhawk	G5	S5					5			✓	15			✓		11		✓							
Widow Skimmer	G5	S5									5			✓								2			✓
51						**8**	**10**	**8**	**4**	**21**	**25**	**19**	**5**	**33**	**20**	**18**	**3**	**29**	**8**	**4**	**14**	**14**	**6**	**6**	**20**

Legend:

[1]G-Rank (global)
Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

G1	Extremely rare - usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2	Very rare - usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.
G3	Rare to uncommon - usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
G4	Common - usually more than 100 occurrences; usually not susceptible to immediate threats.
G5	Very common - demonstrably secure under present conditions.

[2]S-Rank (provincial)
Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

S1	Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2	Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3	Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4	Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5	Secure - Common, widespread, and abundant in the nation or state/province.
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 or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
SAN	Non-breeding accidental.
SE	Exotic - not believed to be a native component of Ontario's fauna.
SZN	Non-breeding migrants/vagrants.
SZB	Breeding migrants/vagrants.

[3] SARO (Species at Risk in Ontario / Endangered Species Act) Status
(provincial status from MECP SARO List website)
EXT Extinct - A species that no longer exists anywhere in the world.
EXP Extirpated - A species that lives somewhere in the world, lived at one time in the wild in Ontario, but no longer lives in the wild in Ontario.
END Endangered - A species that is facing imminent extinction or extirpation.
THR Threatened - A species that is likely to become endangered if steps are not taken to address factors threatening to lead to its extinction or extirpation.
SC Special Concern – A species that may become threatened or endangered because of a combination of biological characteristics and identified threats.

[4]COSEWIC (Committee on the Status of Endangered Wildlife in Canada) Status
(COSEWIC status from SARA Registry website)

EXT	Extinct - A species that no longer exists.
EXP	Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.
END	Endangered - A species facing imminent extirpation or extinction.
THR	Threatened - A species likely to become endangered if limiting factors are not reversed.
SC	Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
NAR	Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.
DD	Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

[5]SARA (Species at Risk Act) Status and Schedule
(*federal status from SARA Registry website*)
The Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.

EXT	Extinct - A wildlife species that no longer exists.
EXP	Extirpated **-** A wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
END	Endangered - A wildlife species that is facing imminent extirpation or extinction.
THR	Threatened - A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
SC	Special Concern - A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

Schedule 1: is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2: species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3: species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

The Act establishes Schedule 1 as the official list of wildlife species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern. Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Wildlife Species at Risk.

[6] Regional Status
Waterloo Region Significance (RMOW) (1996)

APPENDIX E

SPECIES AT RISK HABITAT ASSESSMENT

Table E.1: Species at Risk Habitat Assessment, Westwood Village Phase 2, Township of North Dumfries

SPECIES AT RISK ESA STATUS DESIGNATIONS				
ENDANGERED	THREATENED	SPECIAL CONCERN	EXTIRPATED	

SPECIES	ESA STATUS AND REGIONAL OCCURRENCE	ESA PROTECTION	SOURCE OF RECORD*	KEY HABITATS USED BY SPECIES	POTENTIAL FOR SPECIES PRESENCE IN THE STUDY AREA	SURVEYS UNDERTAKEN	FIELD SURVEY RESULTS	POTENTIAL FOR IMPACTS TO SPECIES AND/OR HABITATS
AMPHIBIANS								
Jefferson Salamander (*Ambystoma jeffersonianum*)	**Known to Occur**	Species Protection and **Habitat Regulation**	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Suitable breeding habitat is present within WSU 2,3,4,6 and 8 and there are recent records in the Region.	Targeted Jefferson Salamander surveys from 2008-2011 and 2016 (pond trapping, pitfall trapping, dip netting). Supplemental wildlife / amphibian surveys from 2008-2011, 2014-2015 and 2019-2020 (road/mortality, cover boards).	No Jefferson Salamander were recorded.	**None**. No known records and none recorded during targeted surveys. Potentially suitable habitats will be retained as part of the Natural Heritage System.
Unisexual Ambystoma (Jefferson Salamander dependent population) (*Ambystoma laterale – (2) jeffersonianum*)		Species Protection and **Habitat Regulation**	MNRF City of Cambridge SAR List (2019)	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Suitable breeding habitat is present within WSU 2,3,4,6 and 8 and there are recent records in the Region.	Targeted Jefferson Salamander surveys from 2008-2011 and 2016 (pond trapping, pitfall trapping, dip netting). Supplemental wildlife / amphibian surveys from 2008-2011, 2014-2015 and 2019-2020 (road/mortality, cover boards).	No Jefferson-dominated polyploids were recorded.	**None**. No known records and none recorded during targeted surveys. Potentially suitable habitats will be retained as part of the Natural Heritage System.
BIRDS								
Acadian Flycatcher (*Empidonax virescens*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF SAR Website (2015)	Generally requires large areas of mature, undisturbed forest; avoids the forest edge; often found in well wooded swamps and ravines	**Unlikely**. Marginally suitable habitat is present within WSU4.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020).	Not Observed	**Minimal**. No known records and limited potential to occur within subject property. All forested areas to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
Bald Eagle (*Haliaeetus lecuocehphalus*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Prefers deciduous and mixed-deciduous forest; and habitat close to water bodies such as lakes and rivers. They roost in super canopy trees such as Pine	Suitable foraging and breeding habitat is present within WSU8 and there are recent records in the Region and Grand River Watershed.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020).	Not Observed	**Minimal**. All forested and wetland areas to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
Bank Swallow (*Riparia riparia*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Nests in a wide variety of naturally and anthropogenically created vertical banks, which often erode and change over time including aggregate pits and the shores of large lakes and rivers	**Confirmed**. Foraging habitat was present within the subject property under former agricultural use; such habitat is widespread in the local landscape. No suitable nesting habitat is present within the property.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Low-moderate numbers (1-40) recorded foraging over WSU 2,3,4,6 and 8. No evidence of breeding/nesting.	**Minimal**. No nesting habitat impacted. High quality natural foraging area to be retained as part of the Natural Heritage System. Additional foraging habitat abundant in local landscape.
Barn Swallow (*Hirundo rustica*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	**Confirmed**. Foraging habitat was present within the subject property under former agricultural use; such habitat is widespread in the local landscape. Suitable nesting habitat exists in the barn and associated out buildings west of WSU2, south of the property.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Low - moderate numbers (1-40) recorded foraging over WSU 2,3,4,6 and 8. Nesting confirmed in the barn west of WSU2 (at 1034 Roseville Road).	**Minimal**. No nesting habitat impacted. All high quality natural foraging areas to be retained as part of the Natural Heritage System. Additional foraging habitat is abundant in the local landscape.

SPECIES	ESA STATUS AND REGIONAL OCCURRENCE	ESA PROTECTION	SOURCE OF RECORD*	KEY HABITATS USED BY SPECIES	POTENTIAL FOR SPECIES PRESENCE IN THE STUDY AREA	SURVEYS UNDERTAKEN	FIELD SURVEY RESULTS	POTENTIAL FOR IMPACTS TO SPECIES AND/OR HABITATS
Black Tern (*Childonias niger*)	**Historically Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014)	Generally prefer freshwater marshes and wetlands; nest either on floating material in a marsh or on the ground very close to water	Suitable nesting habitat is present within WSU8 and there are historical records of this species in the lake.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**Minimal**. Suitable habitat to be retained as part of the Natural Heritage System, with naturalized buffers, maintenance of hydrologic inputs and other mitigation measures.
Bobolink (*Dolichonyx oryzivorus*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands	**Confirmed**. Suitable habitat within unmown lawn / pasture associated with farm south of the property, west of WSU2.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Single singing male recorded in one year (2014) as a possible breeder in fallow field associated with the farmstead west of WSU 2.	**Minimal**. No known breeding records and no suitable habitat within areas potentially disturbed by proposed development.
Canada Warbler (*Cardellina canadensis*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally prefers wet coniferous, deciduous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	**Unlikely**. Marginally suitable habitat is present within WSU4.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Two individuals recorded in WSU 2 in May 2009. Probable migrants (typically breeds further north).	**Minimal**. No known records and limited potential to occur within subject property. All forested areas to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
Cerulean Warbler (*Setophaga cerulea;* formerly *Dendoica cerulea*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	**Unlikely**. Marginally suitable habitat is present within WSU4. Ideal habitat for Cerulean Warbler includes older growth forest with super-canopy trees, often Oaks.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**Minimal**. No known records and limited potential to occur within subject property. All forested areas to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
Chimney Swift (*Chaetura pelagica*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Historically found in deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys	**Confirmed.** Suitable foraging habitat was present on the subject property under former agricultural use; such habitat is widespread in the local landscape. There is some limited potential suitable nesting habitat (i.e., hollow trees and crevices) in WSU4 and in the grain silos and farm buildings adjacent to WSU2. However, offsite locations offer far superior nesting habitat (e.g. urban areas in Cambridge / Kitchener for anthropogenic sites and the *rare* woodlands for natural sites).	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Low numbers (2-4) recorded as foraging over WSU2 & agricultural fields. No breeding evidences.	**Minimal**. No confirmed nesting habitat impacted. All high quality natural foraging areas and potential nesting areas to be retained as part of the Natural Heritage System. Additional foraging habitat is abundant in the local landscape.
Common Nighthawk (Chordeiles minor)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally prefer open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops)	**Unlikely**. Suitable habitat is present along adjacent wetland edges and within unmown lawn / pasture associated with farm south of the property, west of WSU2. However, in urban environments this species is typically associated with gravel rooftops, trails and other open gravel areas.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**Minimal**. No known breeding records and no suitable habitat within areas potentially disturbed by proposed development.
Eastern Meadowlark (*Sturnella Magna*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	Suitable habitat is present within unmown lawn / pasture associated with farm south of the property, west of WSU2.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Single individual recorded in one year - as a migrant / forager in field associated with the farmstead west of WSU2. No evidence of breeding.	**Minimal**. No known breeding records and no suitable habitat within areas potentially disturbed by proposed development.

SPECIES	ESA STATUS AND REGIONAL OCCURRENCE	ESA PROTECTION	SOURCE OF RECORD*	KEY HABITATS USED BY SPECIES	POTENTIAL FOR SPECIES PRESENCE IN THE STUDY AREA	SURVEYS UNDERTAKEN	FIELD SURVEY RESULTS	POTENTIAL FOR IMPACTS TO SPECIES AND/OR HABITATS
Eastern Whip-poor-will (*Caprimlugus vociferus*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally prefer semi-open deciduous forests or patchy forests with clearings; areas with little ground cover are also preferred; In winter they occupy primarily mixed woods near open areas.	**None**. No suitable habitat is present. This species is area-sensitive and requires forests >100ha in size.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**None**. No known records and no suitable habitat.
Eastern Wood-pewee (*Contopus virens*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Associated with deciduous and mixed forests. Within mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges.	**Confirmed**. Suitable breeding habitat is present within WSU 2,3 and 4.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Low numbers (1-4) recorded across multiple years (between 2008-2012, 2014-2015, 2019-2020) as probable breeders in WSU2 and WSU3.	**Minimal**. All forested areas to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
Henslow's Sparrow (*Ammodramus henslowii*)	**Historically Known to Occur**	Species and General Habitat Protection	MNRF Regional SAR List (2014)	Generally found in old fields, pastures and wet meadows. They prefer areas with dense, tall grasses, and thatch, or decaying plant material.	**None**. No suitable habitat is present. This species is area-sensitive and requires >40ha of grassland (and prefers >100ha). There are no recent records in the Region.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**None**. No known records and no suitable habitat.
Horned Grebe (*Podiceps auritus*)		N/A	MNRF City of Cambridge SAR List (2019)	Usually nests in small ponds, marshes and shallow bays that contain areas of open water and emergent vegetation. Nests are usually located within a few metres of open water. It occupies natural habitat more often than man-made reservoirs and artificial ponds.	Suitable habitat is present in wetland habitats within WSU2, 3, 6 and 8.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**Minimal**. Suitable habitat to be retained as part of the Natural Heritage System, with naturalized buffers, maintenance of hydrologic inputs and other mitigation measures.
Least Bittern (*Ixobrychus exilis*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014)	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants.	**Confirmed**. Suitable habitat is present in wetland habitats within WSU2,3,6 and 8.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Two individuals recorded in 2011 as possible breeders in WSU3. One individual recorded in 2019 as a probable breeder in WSU6.	**Minimal**. Suitable habitat to be retained as part of the Natural Heritage System, with naturalized buffers, maintenance of hydrologic inputs and other mitigation measures.
Louisiana Waterthrush (*Parkesia motacilla*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps.	**None**. No suitable habitat is present.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**None**. No suitable habitat.
Northern Bobwhite (*Colinus virginianus*)	**Historically Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014)	Generally inhabits a variety of edge and grassland type - habitats including non-intensively farmed agricultural lands.	**Very unlikely**. Minimal suitable habitat was present within the subject property under former agricultural use. There are no recent records in the Region.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**None**. No known records, no suitable habitat and unlikely to be present.
Peregrine Falcon (*Falco peregrinus anatum/tundrius*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019), eBird (2018)	Generally nest on tall, steep cliff ledges adjacent to large waterbodies; some birds adapt to urban environments and nest on ledges of tall buildings, even in densely populated downtown areas.	**Unlikely**. Some marginally suitable nesting habitat exists on the silo on the farm south of the subject property, west of WSU2.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**Minimal**. No suitable nesting habitat impacted.
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), eBird (2020)	Generally prefer open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks	Suitable habitat is present within WSU 2,3,4 and 8 and there are recent records in the Region.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**Minimal**. All forested areas to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
Short-eared Owl (Asio flammeus)	**Suspected to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of	Generally prefers a wide variety of open habitats, including grasslands, peat bogs, marshes, sand-sage concentrations, old pastures and agricultural fields	**Unlikely**. There are recent records of this species in the Region during the breeding season, however, no suitable breeding habitat is present.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**None**. No suitable habitat.

SPECIES	ESA STATUS AND REGIONAL OCCURRENCE	ESA PROTECTION	SOURCE OF RECORD*	KEY HABITATS USED BY SPECIES	POTENTIAL FOR SPECIES PRESENCE IN THE STUDY AREA	SURVEYS UNDERTAKEN	FIELD SURVEY RESULTS	POTENTIAL FOR IMPACTS TO SPECIES AND/OR HABITATS
			Cambridge SAR List (2019), eBird (2020)					
Wood Thrush (*Hylocichla mustelina*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019), eBird (2020)	Nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Prefers large forest mosaics, but may also nest in small forest fragments.	Suitable breeding habitat is present within WSU4 and there are recent records of this species in the Region during the breeding season.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**Minimal**. All forested areas to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
Yellow-breasted Chat (*Icteria virens*)	**Historically Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019), eBird (2017)	Generally prefer dense thickets around wood edges, riparian areas, and in overgrown clearings	**Unlikely**. Marginally suitable is present within WSU4 and 8. There are a few recent records of this species in the Region but this species is very rare.	Breeding bird surveys – 8 years (2008, 2009, 2010, 2011, 2014-2015, 2019-2020)	Not Observed	**Minimal**. Unlikely to be present. All potentially suitable habitat to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
FISH AND MOLLUSCS								
Black Redhorse (*Moxostoma duquesnei*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally lives in moderately sized rivers and streams, with generally moderate to fast currents	**None**. Not indicated on DFO SAR mapping (2020) and no suitable habitat present.	None	N/A -No searches undertaken	**None**. No suitable habitat for this species is present on the subject property.
Northern Brook Lamprey (Great Lakes-Upper St. Lawrence populations) (*Ichthyomyzon fossor*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014)	Generally inhabits small rivers and clear streams of varying sizes. Adults spawn in gravelly riffles.	**None**. Not indicated on DFO SAR mapping (2020) and no suitable habitat present.	None	N/A -No searches undertaken	**None**. No suitable habitat for this species is present on the subject property.
Rainbow Mussel (*Villosa iris*)	**Known to Occur**	N/A	MNRF City of Cambridge SAR List (2019)	Most abundant in shallow, well-oxygenated reaches of small- to medium-sized rivers and sometimes lakes, on substrates of cobble, gravel, sand and occasionally mud.	**None**. Not indicated on DFO SAR mapping (2020) and no suitable habitat present.	None	N/A -No searches undertaken	**None**. No suitable habitat for this species is present on the subject property.
Silver Shiner (*Notropis photogenis*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally prefers moderate to large, deep, relatively clear streams with swift currents, and moderate to high gradients	**None**. Not indicated on DFO SAR mapping (2020) and no suitable habitat present.	None	N/A -No searches undertaken	**None**. No suitable habitat for this species is present on the subject property.
Wavy-rayed Lampmussel (*Lampsilis fasciola*)	**Known to Occur**	Species and General Habitat Protection	MNRF City of Cambridge SAR List (2019)	Generally inhabits clear rivers and streams of a variety of sizes, where the water flow is steady and the substrate is stable.	**None**. Not indicated on DFO SAR mapping (2020) and no suitable habitat present.	None	N/A -No searches undertaken	**None**. No suitable habitat for this species is present on the subject property.
INSECTS								
Monarch (*Danaus plexippus*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Exists primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces	**Confirmed**. Suitable foraging habitat is present wherever wildflowers occur within WSU 2, 3, 4, 6 and 8, however, suitable breeding habitat (i.e. milkweed species) is limited in these areas.	Targeted Odonata / Lepidoptera surveys as well as incidental searches during other wildlife, aquatic and vegetation surveys.	Low numbers (1-2) recorded across multiple years (2008-2012, 2014-2015, 2019-2020) in WSU 2,3,4,6 & 8	**Minimal**. All natural areas to be retained as part of the Natural Heritage System. Additional habitat will be created through naturalization of substantial buffer zones.
Rusty-patched Bumble Bee (*Bombus affinis*)	**Formerly Occurred and May Still Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally inhabits a range of diverse habitats including mixed farmland, sand dunes, marshes, urban and wooded areas. It usually nests underground in abandoned rodent burrows	**Unlikely**. As a generalist, it could occur wherever nectar sources are found, however this is very unlikely given its provincial rarity and lack of recent observations outside of Pinery Provincial Park.	Incidental searches during Odonata / Lepidoptera and other wildlife, aquatic and vegetation surveys.	Not Observed	**Minimal**. No known recent records in the area. All natural areas to be retained as part of the Natural Heritage System. Additional habitat will be created through naturalization of substantial buffer zones.

SPECIES	ESA STATUS AND REGIONAL OCCURRENCE	ESA PROTECTION	SOURCE OF RECORD*	KEY HABITATS USED BY SPECIES	POTENTIAL FOR SPECIES PRESENCE IN THE STUDY AREA	SURVEYS UNDERTAKEN	FIELD SURVEY RESULTS	POTENTIAL FOR IMPACTS TO SPECIES AND/OR HABITATS
West Virginia White (*Pieris virginiensis*)	**Formerly Occurred and May Still Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally prefer moist, deciduous woodlands. The larvae feed only on the leaves of the two-leaved toothwort (*Cardamine diphylla*), which is a small, spring-blooming plant of the forest floor.	**Unlikely**. The larval host plant species (*Cardamine diphylla*) for West Virginia White was not found in the woodland habitat within WSU4.	Incidental searches during Odonata / Lepidoptera and other wildlife, aquatic and vegetation surveys.	Not Observed	**Minimal**. All forested areas to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
Yellow-banded Bumble Bee (*Bombus terricola*)		N/A	MNRF City of Cambridge SAR List (2019); iNaturalist (2020)	This species is a forage and habitat generalist. It can be found in mixed woodlands, particularly for nesting and overwintering, as well as a variety of open habitat such as native grasslands, farmlands and urban areas. Nest sites are often underground in abandoned rodent burrows or decomposing logs.	As a generalist, it could occur wherever nectar sources are found. Suitable habitat exists within WSU 2, 3, 4, 6 and 8 and there are three recent records in the Region.	Incidental searches during Odonata / Lepidoptera and other wildlife, aquatic and vegetation surveys.	Not Observed	**Minimal**. All natural areas to be retained as part of the Natural Heritage System. Additional habitat will be created through naturalization of substantial buffer zones.
MAMMALS								
American Badger (Southwestern Ontario population) (*Taxidea taxus jacksoni*)	**Known to Occur**	Species Protection and **Habitat Regulation**	MNRF Waterloo Regional SAR List (2014)	Generally prefer open habitats, whether natural (grasslands) or man-made (agricultural fields, road right-of-ways, golf courses)	**Unlikely**. Though badgers are known from the broader area, habitat quality within the property is limited by the presence of abundant rocks and stones in the soils.	Targeted badger den / habitat assessment surveys in September / October 2010 and May 2011. Supplemental searches during other fieldwork 2008-2012, 2014-2015 and 2019-2020.	Not observed and no evidence of use (i.e., dens, burrows) recorded.	**None**. Suitable habitat to be retained as part of the Natural Heritage System. Additional habitat will be created through naturalization of substantial buffer zones.
Eastern Small-footed Myotis (*Myotis leibii*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Overwintering habitat: Caves and mines that remain above 0 deg. C. Maternal Roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses and under tree bark (MNRF 2015)	Woodland features provide potential roost / maternity habitat within WSU 2, 3, 4, and 8.	Habitat suitability assessment (i.e., assessment of snag trees with suitable loose bark conditions) per MNRF Protocols (2014).	A bat was incidentally observed foraging over WSU3 in 2015. Suitable maternity habitat exists in woodland areas (WSU4).	**Minimal**. All forested areas to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
Little Brown Myotis (*Myotis lucifugus*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014)	Overwintering habitat: Caves and mines that remain above 0 deg. C. Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh) (MNRF 2015)	Woodland features provide potential roost / maternity habitat within WSU 2, 3, 4, and 8.	Habitat suitability assessment (i.e., assessment of snag trees with suitable loose bark conditions) per MNRF Protocols (2014).	A bat was incidentally observed foraging over WSU3 in 2015. Suitable maternity habitat exists in woodland areas.	**Minimal**. All forested areas to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
Northern Myotis (*Myotis septentrionalis*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014)	Overwintering habitat: Caves and mines that remain above 0 deg. C. Maternal Roosts: Often associated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.: MNRF 2015)	Woodland features provide potential roost / maternity habitat within WSU 2, 3, 4, and 8.	Habitat suitability assessment (i.e., assessment of snag trees with suitable loose bark conditions) per MNRF Protocols (2014).	A bat was incidentally observed foraging over WSU3 in 2015. Suitable maternity habitat exists in woodland areas.	**Minimal**. All forested areas to be retained as part of the Natural Heritage System, with buffers and other mitigation measures.
PLANTS								
American Chestnut (*Castanea dentata*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Found in deciduous forest communities; this tree prefers arid forests with acid and sandy soils.	**Unlikely**. The study area is located at the northern limit of the Canadian range for this species. Potential habitat occurs in upland forested areas of Vegetation Units 1a / 2 / 3.	Three season botanical inventory and visual search of vegetation communities in the study area between 2008 and 2020. Scoped vegetation surveys in 2019.	Not Observed	**None**. None recorded within the study area and all suitable habitat to be retained as part of the Natural Heritage System, with naturalized buffers and other mitigation measures.
American Columbo (*Frasera caroliniensis*)		Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014),	American Columbo grows primarily in open deciduous forests, and to a lesser extent along open forest edges and dense shrub thickets in Ontario. It is most commonly found in dry upland woods, but in parts of its range it has been found in grasslands, moist woods and swampy habitats (MNRF 2015-Website)	Suitable habitat throughout upland natural areas in the study area (Units 1a, 2 and 3) and adjacent areas.	Three season botanical inventory and visual search of vegetation communities in the study area between 2008 and 2020. Scoped vegetation surveys in 2019.	Not Observed	**None**. None recorded within the study area and all suitable habitat to be retained as part of the Natural Heritage System, with naturalized buffers and other mitigation measures.
American Ginseng (*Panax quinquefolius*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Grows in rich, moist, undisturbed and relatively mature deciduous woods in areas of neutral soil (such as over limestone or marble bedrock).	Suitable habitat throughout upland natural areas on the study area (Units 1a, 2 and 3) and adjacent areas.	Three season botanical inventory and visual search of vegetation communities in the study area between 2008 and 2020. Scoped vegetation surveys in 2019.	Not Observed	**None**. None recorded within the study area and all suitable habitat to be retained as part of the Natural Heritage System, with naturalized buffers and other mitigation measures.

SPECIES	ESA STATUS AND REGIONAL OCCURRENCE	ESA PROTECTION	SOURCE OF RECORD*	KEY HABITATS USED BY SPECIES	POTENTIAL FOR SPECIES PRESENCE IN THE STUDY AREA	SURVEYS UNDERTAKEN	FIELD SURVEY RESULTS	POTENTIAL FOR IMPACTS TO SPECIES AND/OR HABITATS
Butternut (*Juglans cinerea*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows	Suitable habitat is present throughout wooded areas in the study area (Units 1a, 2, 3, and 11a).	Three season botanical inventory and visual search of vegetation communities in the study area between 2008 and 2020. Scoped vegetation surveys in 2019.	One tree recorded in Unit 3, more than 50 m from the woodland dripline.	**None**. One tree recorded within the study area, but no trees are present within the subject property. All suitable habitat to be retained as part of the Natural Heritage System, with naturalized buffers and other mitigation measures.
Eastern Flowering Dogwood (*Cornus florida*)	**Known to Occur - Planted**	Species Protection and **Habitat Regulation**	MNRF Regional SAR List (2014)	Generally grows in deciduous and mixed forests, in the drier areas of its habitat, although it is occasionally found in slightly moist environments; Also grows around edges and hedgerows	**Unlikely.** Marginally suitable habitat throughout upland natural areas in the study area (Units 1a, 2, 3, and 11a).	Three season botanical inventory and visual search of vegetation communities in the study area between 2008 and 2020. Scoped vegetation surveys in 2019.	Not Observed	**None**. None recorded within the study area and all suitable habitat to be retained as part of the Natural Heritage System, with naturalized buffers and other mitigation measures.
False Hop Sedge (*Carex lupuliformis*)	**Known to Occur**	Species and General Habitat Protection	MNRF City of Cambridge SAR List (2019)	False Hop Sedge grows in riverine swamps and marshes, and around temporary forest ponds (MNRF 2014). It prefers open areas with lots of sunlight.	Although it has a restricted distribution in Ontario, there are potential erecent records within the broader vicinity of study area.	Three season botanical inventory and visual search of vegetation communities in the study area between 2008 and 2020. Scoped vegetation surveys in 2019.	Not Observed	**None**. None recorded within the study area and all suitable habitat to be retained as part of the Natural Heritage System, with naturalized buffers and other mitigation measures.
Green Dragon (*Arisaema dracontium*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014)	Generally grows in damp deciduous forests and along streams.	**Unlikely.** Marginally suitable habitat throughout swamp habitats in the study area (Units 1b, 4, and 5) and adjacent areas.	Three season botanical inventory and visual search of vegetation communities in the study area between 2008 and 2020. Scoped vegetation surveys in 2019.	Not Observed	**None**. None recorded within the study area and all suitable habitat to be retained as part of the Natural Heritage System, with naturalized buffers and other mitigation measures.
Kentucky Coffee-tree (*Gymnocladus dioicus*)	**Known to Occur - Planted**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014)	Generally inhabits open areas of floodplains and the edges of wetlands. Shade-intolerant.	**Unlikely.** Marginally suitable habitat throughout transitional natural areas in the study area.	Three season botanical inventory and visual search of vegetation communities in the study area between 2008 and 2020. Scoped vegetation surveys in 2019.	Not Observed	**None**. None recorded within the study area and all suitable habitat to be retained as part of the Natural Heritage System, with naturalized buffers and other mitigation measures.
REPTILES								
Blanding's Turtle (*Emydonidea blandingii*)	**Known to Occur**	Species and General Habitat Protection	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally occurs in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams.	Suitable wetland habitat is present within WSU 2,3,6 and 8, however, this species is rare in the Waterloo Region.	Targeted turtle basking surveys on 27 dates between 2011-2020. Supplemental searches during other field surveys 2008-2012, 2014-2015 and 2019-2020.	Not Observed	**None**. No known records in the vicinity of the subject property. Suitable wetland habitat to be retained as part of the Natural Heritage System, with naturalized buffers and other mitigation measures.
Eastern Ribbonsnake (a.k.a. Northern Ribbonsnake) (*Thamnophis sauritus septentrionalis*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally occurs along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	Suitable swamp/wetland habitat occurs within WSU 2,3,4,6 and 8.	Artificial shelter (cover board) surveys on 14 dates in 2010 and 2011. Supplemental searches during other field surveys 2008-2012, 2014-2015 and 2019-2020.	Not Observed	**Minimal**. All natural areas to be retained as part of the Natural Heritage System. Additional habitat will be created through naturalization of substantial buffer zones.
Northern Map Turtle (*Graptemys geographica*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (e.g., rocks and logs) and exposure to the sun for at least part of the day.	**None**. No suitable habitat is present and very limited potential for movement from potential habitat in Devil's Creek (a tributary of the Grand River).	Targeted turtle basking surveys on 27 dates between 2011-2020. Supplemental searches during other field surveys 2008-2012, 2014-2015 and 2019-2020.	Not Observed	**None**. No known records. Potentially suitable wetland habitat to be retained as part of the Natural Heritage System, with naturalized buffers and other mitigation measures.
Queensnake (*Regina septemvittata*)	**Known to Occur**	Species Protection and	MNRF Waterloo Regional SAR List (2014), MNRF City of	Generally requires a permanent body of water, flowing or still, with a temperature remaining at or above 18.3°C throughout most of the active season; abundant cover, such as flat rocks	**None**. No suitable habitat is present.	Artificial shelter (cover board) surveys on 14 dates in 2010 and 2011. Supplemental searches	Not Observed	**None**. No known records and no suitable habitat.

SPECIES	ESA STATUS AND REGIONAL OCCURRENCE	ESA PROTECTION	SOURCE OF RECORD*	KEY HABITATS USED BY SPECIES	POTENTIAL FOR SPECIES PRESENCE IN THE STUDY AREA	SURVEYS UNDERTAKEN	FIELD SURVEY RESULTS	POTENTIAL FOR IMPACTS TO SPECIES AND/OR HABITATS
		Habitat Regulation	Cambridge SAR List (2019)	submerged and/or on the bank; and an abundance of crayfish. Other important habitat features may include rocky, gravelly, or slate stream-bed substrates, swift to moderate current, and woodland surroundings.		during other field surveys 2008-2012, 2014-2015 and 2019-2020.		
Snapping Turtle (*Chelydra serpentina*)	**Known to Occur**	N/A	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally inhabits shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	**Confirmed**. Suitable wetland habitat is present within WSU 2,3,6 and 8,	Targeted turtle basking surveys on 27 dates between 2011-2020. Supplemental searches during other field surveys 2008-2012, 2014-2015 and 2019-2020.	Low numbers (2-8) recorded annually during targeted surveys between 2011-2020 within WSU 2,3,6 and 8.	**Minimal**. Suitable wetland habitat to be retained as part of the Natural Heritage System, with naturalized buffers and other mitigation measures.
Wood Turtle (*Glyptemys insculpta*)	**Historically Known to Occur**	Species Protection and **Habitat Regulation**	MNRF Waterloo Regional SAR List (2014), MNRF City of Cambridge SAR List (2019)	Generally inhabits fresh-water rivers and streams with sandy or gravely-sandy bottoms and prefers clear meandering watercourses with a moderate current. They nest on sand or gravel-sand beaches and banks. Although they prefer riparian areas with diverse, patchy cover, females also lay in gravel holes, at the edges of roads and railways, in utility right-of-ways, in farming fields, pastures and former fields – any sunny and easily dug spot.	**None**. No suitable habitat is present.	Targeted turtle basking surveys on 27 dates between 2011-2020. Supplemental searches during other field surveys 2008-2012, 2014-2015 and 2019-2020.	Not Observed	**None**. No known records and no suitable habitat.

LEGEND:

[1]S-Ranks (provincial)

Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.

- S1 Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
- S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often <20), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
- S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
- S4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- S5 Secure - Common, widespread, and abundant in the nation or state/province.
- 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 or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
- SAN Non-breeding accidental.
- SE Exotic - not believed to be a native component of Ontario's fauna.
- SZN Non-breeding migrants/vagrants.
- SZB Breeding migrants/vagrants.

[2]SARO (Species at Risk in Ontario / Endangered Species Act) Status

EXT Extinct - A species that no longer exists anywhere in the world.
EXP Extirpated - Species lives somewhere in the world, lived at one time in the wild in Ontario, but no longer lives in the wild in Ontario.
END Endangered - A species that is facing imminent extinction or extirpation.
THR Threatened - A species that is likely to become endangered if steps are not taken to address factors threatening to lead to its extinction or extirpation.
SC Special Concern – A species that may become threatened or endangered because of a combination of biological characteristics and identified threats.

[3]COSEWIC (Committee on the Status of Endangered Wildlife in Canada) Status

- EXT Extinct - A species that no longer exists.
- EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.
- END Endangered - A species facing imminent extirpation or extinction.
- THR Threatened - A species likely to become endangered if limiting factors are not reversed.
- SC Special Concern (formerly vulnerable) - A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
- NAR Not At Risk - A species that has been evaluated and found to be not at risk of extinction given the current circumstances.
- DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of extinction.

[4]SARA (Species at Risk Act) Status and Schedule

The Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.

- EXT Extinct - A wildlife species that no longer exists.
- EXP Extirpated **-** A wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
- END Endangered - A wildlife species that is facing imminent extirpation or extinction.
- THR Threatened - A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
- SC Special Concern - A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

Schedule 1: is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2: listed in Schedule 2 are species that had been designated as endangered or threatened and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3: species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
The Act establishes Schedule 1 as the official list of wildlife species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern. Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Wildlife Species at Risk.

APPENDIX F

EVALUATION OF SIGNIFICANT WILDLIFE HABITAT

This evaluation is based on the Significant Wildlife Habitat Ecoregion Criteria Schedules for Ecoregion 6E (MNRF January 2015). The following text and tables are from that document, but include an additional 'evaluation' column, with discussion of site-specific attributes within the Westwood Village Phase 2 study area.

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SCHEDULE 6E: IDENTIFICATION OF Significant Wildlife Habitat

This schedule is designed to provide the recommended criteria for identifying Significant Wildlife Habitat (SWH) within Ecoregion 6E [ccxvi]. Tables 1.1 through 1.4 within the Schedules provide guidance for SWH designation for the four categories of SWH outlined in the Significant Wildlife Habitat Technical Guide and its Appendices [cxlviii], [cxlix]. Table 1.5 contains and provides descriptions for exceptions criteria for ecoregional SWH which will be identified at an ecodistrict scale [ccxvi]. Exceptions occur when criteria for a specific habitat are different within an ecodistrict compared to the remainder of an ecoregion or if a habitat only occurs within a restricted area of the ecoregion.

The schedules, including description of wildlife habitat, wildlife species, and the criteria provided for determining SWH, are based on science and expert knowledge. The ELC Ecosite codes are described using the Ecological Land Classification (ELC) for Southern Ontario [lxxviii]. The information within these schedules will require periodic updating to keep pace with changes to wildlife species status in the Species at Risk in Ontario (SARO) list, or as new scientific information pertaining to wildlife habitats becomes available. Therefore, MNRF will occasionally need to review and update these schedules and provide addenda. A reference document for all SWH is found after the schedules and includes citations for all ecoregional schedules. Each citation used to assist with the criteria for SWH will be indicated by a roman numeric symbol. Where no reference exists, MNRF expert opinion was used for determination of criteria, this symbol "Ⓔ" represents when MNRF expert opinion was utilized to develop defining criteria.

Criteria For Significant Wildlife Habitat in Ecoregion 6E

1. 1 SEASONAL CONCENTRATION AREAS OF ANIMALS

Seasonal concentration areas are areas where wildlife species occur annually in aggregations at certain times of the year. Such areas are sometimes highly concentrated with members of a given species, or several species, within relatively small areas. In spring and autumn, migratory wildlife species will concentrate where they can rest and feed. Other wildlife species require habitats where they can survive winter. Examples of seasonal concentration areas include deer wintering areas, breeding bird colonies and hibernation sites for reptiles, amphibians and some mammals [cxlviii]. Table 1.1 outlines what wildlife habitats and defining criteria that are considered for seasonal concentration areas within Ecoregion 6E.

Table 1.1 Seasonal Concentration Areas of Animals.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
1. Waterfowl Stopover and Staging Areas (Terrestrial) **Rationale:** Habitat important to migrating waterfowl.	American Black Duck American Wigeon Blue-winged Teal Gadwall Green-winged Teal Mallard Northern Pintail Northern Shoveler Wood Duck	CUM1 CUT1 Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	Fields with sheet water during Spring (mid-March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available [cxlviii]. Information Sources • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Field Naturalist Clubs • Ducks Unlimited Canada • Natural Heritage Information Centre (NHIC)Waterfowl Concentration Area	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • Any mixed species aggregations of 100Ⓔ or more individuals required. • The flooded field ecosite habitat plus a 100-300m radius, dependant on local site conditions and adjacent land use is the significant wildlife habitat. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWH MiSTIndex #7 provides development effects and mitigation measures.	Multi-year field surveys completed (2008-2011, 2014-2015 and 2019-2020). Hydrologic monitoring completed as part of the MESP No records from landowner, background sources or agencies. CUM and CUT1 habitat is limited to small patches and narrow strips at wetland-woodland margins. Predominant land use is active cropland. Six of the listed species was recorded during field surveys (with maximum numbers in parentheses): • American Black Duck (2) • American Wigeon (8) • Green-winged Teal (50) • Blue-winged Teal (20) • Wood Duck (23) • Mallard (240) Both were recorded within open water or woodland units, not in flooded fields. While some of the listed species would be expected to occur over time, potentially at threshold numbers depending on conditions, the site is unlikely to meet criteria consistently over time, as indicated by multi-year studies. This form of potential SWH should be considered temporary, depending on rainfall, drainage, crop type etc. Local topography / drainage is unlikely to produce consistent sheetwater conditions that are suitable for waterfowl. **Conclusion: criterion is not met**

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
2. Waterfowl Stopover and Staging Areas (Aquatic) **<u>Rationale;</u>** Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	American Black Duck American Wigeon Black Scoter Blue-winged Teal Brant Bufflehead Cackling Goose Canada Goose Canvasback Common Goldeneye Common Merganser Gadwall Greater Scaup Green-winged Teal Hooded Merganser Lesser Scaup Long-tailed Duck Northern Pintail Northern Shoveler Red-breasted Merganser Redhead Ring-necked duck Ruddy Duck Ruddy Duck Snow Goose Surf Scoter White-winged Scoter	MAS1 MAS2 MAS3 SAF1 SAM1 SAS1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water) <u>Information Sources</u> • Environment Canada • Naturalist clubs often are aware of staging/stopover areas. • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Ducks Unlimited projects • Element occurrence specification by Nature Serve: http://www.natureserve.org • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of: • Aggregations of 100Ⓔ or more of listed species for 7 daysⒺ, results in > 700 waterfowl use days • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH[cxlix] • The combined area of the ELC ecosites and a 100m radius area is the SWH[cxlviii] • Wetland area and shorelines associated with sites identified within the SWHTG[cxlviii] Appendix K[cxlix] are significant wildlife habitat. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWH MIST[cxlix] Index #7 provides development effects and mitigation measures.	Candidate MAM2, MAM3, MAS3, SAF habitat is present within WSU 2, WSU 3, WSU 6 and WSU 8 (Barrie's Lake). The following species were recorded in MAM-MAS-SAF habitat (with highest abundance recorded in any survey year noted in parentheses): • Canada Goose (250 – Barrie's Lake) • American Black Duck (2) • American Wigeon (8) • Green-winged Teal (45) • Blue-winged Teal (12) • Common Merganser (12) • Hooded Merganser (4) • Ring-necked Duck (17) • Bufflehead (12) Within the aforementioned WSU's, migrant waterfowl recorded during field visits were typically short-duration visitors (i.e. one to several days) in relatively small numbers, with the exception of Canada Geese – recorded 50 – 250 individuals on several ponds and numerous dates. Based on professional expertise / experience and from a local perspective, the above species list and numbers would not be considered unusual or representative of an exceptional site. Diversity / numbers would likely only be considered high only in a local context, as many other wetlands in the region (and riverine areas such as nearby reaches of the Grand River) support far greater diversity / numbers. **Conclusion: criterion is not met**

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
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3. Shorebird Migratory Stopover Area **<u>Rationale:</u>** High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	American Golden-Plover Baird's Sandpiper Black-bellied Plover Dunlin Greater Yellowlegs Hudsonian Godwit Least Sandpiper Lesser Yellowlegs Marbled Godwit Pectoral Sandpiper Purple Sandpiper Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Semipalmated Plover Semipalmated Sandpiper Short-billed Dowitcher Solitary Sandpiper Spotted Sandpiper Stilt Sandpiper White-rumped Sandpiper	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 MAM1 MAM2 MAM3 MAM4 MAM5 SDO1 SDS2 SDT1	• Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. • Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. • Sewage treatment ponds and storm water ponds do not qualify as a SWH. <u>Information Sources</u> • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey. • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Natural Heritage Information Centre (NHIC) Shorebird Migratory Concentration Area	Studies confirming: • Presence of 3 or more of listed species and > 1000Í shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100Í Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area [cxlviii] • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWH MiST[cxlix] Index #8 provides development effects and mitigation measures.	Candidate MAM2 and MAM3 habitat is present within WSU 2, WSU 3, WSU 6 and WSU 8 (Barrie's Lake). No natural beach / dune or large mudflats are present. There are no records from landowner, background sources or agencies and no known anecdotal evidence or sites of interest for shorebirds where detailed field surveys were undertaken. **Conclusion: criterion is not met**
4. Raptor Wintering Area **<u>Rationale;</u>** Sites used by multiple species, a high number of individuals and used annually are most significant	American Kestrel Northern Harrier Red-tailed Hawk Rough-legged Hawk Snowy Owl **<u>Special Concern:</u>** Bald Eagle Short-eared Owl	<u>Hawks/Owls:</u> Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM; CUT; CUS; CUW. <u>Bald Eagle:</u> Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	• The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Raptor wintering (hawk/owl)sites need to be > 20 ha [cxlviii, cxlix] with a combination of forest and upland.[xvi, xvii, xviii, xix, xx, xxi]. • Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands [cxlix] • Field area of the habitat is to be wind swept with limited snow depth or accumulation. • Eagle sites have open water and large trees and snags available for roosting[cxlix] <u>Information Sources</u>: • OMNRF Ecologist or Biologist • Naturalist clubs • Natural Heritage Information Centre (NHIC) Raptor Winter Concentration Area • Data from Bird Studies Canada • Results of Christmas Bird Counts • Reports and other information available from Conservation Authorities.	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; One of more Bald Eagles or; At least10 individuals and two of the listed hawk/owl speciesⒺ • To be significant a site must be used regularly (3 in 5 years)[cxlix] for a minimum of 20 days by the above number of birdsⒺ. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting areaⒺ • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWH MiST[cxlix] Index #10 and #11 provides development effects and mitigation measures.	Candidate woodland habitat (primarily FOD) is present WSU 4, but CU habitats are very limited – no large open fields (non-agricultural) are present. Does not meet the 20 ha size threshold. One species was recorded (with maximum numbers in parentheses): • Red-tailed Hawk (50) – likely many were observed migrating Other non-breeding raptors which can be observed in southern Ontario during winter were not recorded during the many fall/winter/early spring surveys conducted for this study. Database records and anecdotal/other evidence (i.e., list-servers, local reports) suggest that other areas in the Region are generally notable for repeated over-winter raptor use; we are not aware of any such evidence for the study area. **Conclusion: criterion is not met**

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
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5. Bat Hibernacula **<u>Rationale;</u>** Bat hibernacula are rare habitats in all Ontario landscapes.	Big Brown Bat Tri-coloured Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as SWH • The locations of bat hibernacula are relatively poorly known. <u>Information Sources</u> • OMNRF for possible locations and contact for local experts • Natural Heritage Information Centre (NHIC) Bat Hibernaculum • Ministry of Northern Development and Mines for location of mine shafts. • Clubs that explore caves (eg. Sierra Club) • University Biology Departments with bat experts.	• All sites with confirmed hibernating bats are SWH Ⓔ. • The area includes 200m radius around the entrance of the hibernaculum , , Ⓔ for most development types and 1000m for wind farms[ccv]. • Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”[ccv]. • SWHMiST[cxlix] Index #1 provides development effects and mitigation measures.	Extensive field surveys (2008-2011, 2014-2015 and 2019-2020) did not detect any evidence of on-site hibernacula. The MNR Wind Atlas shows no known hibernacula within or adjacent to the subject property / study area and there are no known hibernacula / colony records from other background sources or anecdotal evidence. **Conclusion: criterion is not met**
6. Bat Maternity Colonies **<u>Rationale;</u>** Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	• Maternity colonies can be found in tree cavities, vegetation and often in buildlings[xxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario[xxii]. • Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx] with >10/ha large diameter (>25cm dbh) wildlife trees[ccvii] • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 [ccxiv] or class 1 or 2 [ccxii] . • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred[ccx] <u>Information Sources</u> • OMNRF for possible locations and contact for local experts • University Biology Departments with bat experts.	• Maternity Colonies with confirmed use by; >10 Big Brown BatsⒺ >5 Adult Female Silver-haired BatsⒺ • The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity coloniesⒺ. • Evaluation methods for maternity colonies should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”[ccv]. • SWHMiST[cxlix] Index #12 provides development effects and mitigation measures.	Extensive field surveys (2014-2017) did not detect any evidence of maternity colonies, though there is some potential in larger woodland blocks of WSU 4 – may meet snag density for candidate habitat. **Conclusion: candidate habitat is present in WSU 4; SWH is not confirmed.** **No impacts are anticipated as potential habitat will be retained in full (no removal or direct disturbance), with development setbacks and other mitigation measures.**

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
7. Turtle Wintering Areas **<u>Rationale;</u>** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Midland Painted Turtle **<u>Special Concern:</u>** Northern Map Turtle Snapping Turtle	Snapping and Midland Painted turtles, ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO Northern Map Turtle - Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	• For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen. [cix, cx, cxi, cxviii] • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. <u>Information Sources</u> • EIS studies carried out by Conservation Authorities. • Local field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • OMNRF Ecologist or Biologist • Field Naturalist clubs • Natural Heritage Information Center (NHIC)	• Presence of 5 over-wintering Midland Painted Turtles is significant[í]. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant[í]. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May) [cvii]. Congregation of turtles is more common where wintering areas are limited and therefore significant [cix, cx, cxi, cxii]. • Congregation of turtles is more common where wintering areas are limited and therefore significant [cix, cx, cxi,cxii]. • SWH MiST[cxlix] Index #28 provides development effects and mitigation measures for turtle wintering habitat.	Candidate habitat (potentially suitable overwintering areas) is present in WSU 2, WSU 3, WSU 6 and WSU 8 (Barrie's Lake). Based on targeted and supplemental field surveys, we recorded observations or evidence of two species: Midland Painted Turtle and Snapping Turtle. • Basking Midland Painted Turtles were widespread and abundant in the larger ponds during spring surveys (up to 40+ individuals observed in any one location on a single date). This species was also recorded incidentally in moderate numbers during road/mortality and pitfall trapping surveys (10-15). Greatest abundances were recorded in WSU 2, WSU 3 and WSU 8 (Barrie's Lake). • Moderate numbers of Snapping Turtle were recorded (<10 individuals) during spring basking, road/mortality and pitfall trapping survey. **Conclusion: SWH confirmed for WSU 2, 3, 6 and 8**

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
8. Reptile Hibernaculum **<u>Rationale;</u>** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	**<u>Snakes:</u>** Eastern Gartersnake Northern Brownsnake Northern Red-bellied Snake Northern Ring-necked Snake Northern Watersnake Smooth Green Snake **<u>Special Concern:</u>** Eastern Ribbonsnake Milksnake **<u>Lizard:</u>** **<u>Special Concern</u>** (Southern Shield population): Five-lined Skink	For all snakes, habitat may be found in any ecosite in central Ontario other than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats. Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line, , , , . • Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover. • Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures . <u>Information Sources</u> • In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g.old dug wells). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs • University herpetologists • Natural Heritage Information Centre (NHIC) • OMNRF ecologist or biologist may be aware of locations of wintering skinks	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. <u>or</u>; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. <u>or</u>; individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct)[Í] . • <u>Note</u>: If there are Special Concern Species present, then site is SWH • <u>Note</u>: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e. strong hibernation site fidelity). Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The the feature in which the hibernacula is located plus a 30 m buffer is the SWH[Í] • SWHMiST[cxlix] Index #13 provides development effects and mitigation measures for snake hibernacula. • Presence of any active hibernaculum for skink is significant. • SWHMiST [cxlix] Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat.	Targeted field surveys for snakes were completed from 2008 – 2011, including 'cover board' surveys (14 dates) and road/mortality surveys (19 dates). Potential use was also evaluated through supplemental observations during other surveys (e.g. drift fence / pitfall trapping, breeding birds, turtle basking /nesting), incl. many visits in spring, summer and fall. Results: 2 snake species were recorded, generally in small numbers: • Cover board surveys: (2) Dekay's Brownsnake at one location; (1-20) E. Gartersnake at 4 locations • Road/mortality surveys: small numbers (1-2) of E. Garternsnake • Pitfall surveys: moderate to high numbers of E. Gartersnake (max. 30) and low numbers of Dekay's Brownsnake (max. 4) • No snake congregations near potential hibernacula were recorded; however, substantial numbers of snakes (primarily E. Gartersnake) were recorded in spring (early-mid April), possibly indicating presence of a hibernacula in the area – outside of areas covered by the detailed field surveys listed above **Conclusion: criterion is not met**
9. Colonially -Nesting Bird Breeding Habitat (Bank and Cliff) **<u>Rationale;</u>** Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are declining in Ontario [cxcix] .	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns. Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation. <u>Information Sources</u> • Reports and other information available from Conservation Authorities. • Ontario Breeding Bird Atlas • Bird Studies Canada; NatureCounts <u>http://www.birdscanada.org/birdmon/</u> • Field Naturalist Clubs.	Studies confirming: • Presence of 1 or more nesting sites with 8or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests • Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #4 provides development effects and mitigation measures	Field survey results: • No suitable nesting habitat present where detailed field surveys were undertaken • Possible nesting habitat in the local landscape (active aggregate pits and cliffs along the Grand River) • No nesting sites recorded during field surveys • Cliff Swallow and Bank Swallow individuals and groups recorded foraging. **Conclusion: criterion is not met**

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
10. Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs) **<u>Rationale;</u>** Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Black-crowned Night-Heron Great Blue Heron Great Egret Green Heron	SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1 SWM2 SWM3 SWM5 SWM6	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree. <u>Information Sources</u> • Ontario Breeding Bird Atlas [ccv], colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). • Natural Heritage Information Centre (NHIC) Mixed Wader Nesting Colony • Aerial photographs can help identify large heronries. • Reports and other information available from Conservation Authorities. • MNRF District Offices. • Field Naturalist Clubs	Studies confirming: • Presence of 5[f] or more active nests of Great Blue Heron or other listed species. • The edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH [cc, ccvii] • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells • SWHMiST[cxlix] Index #5 provides development effects and mitigation measures.	No confirmed nesting of any of the listed species. No known nesting records on the subject property, study area or adjacent lands. Great Blue Herons were recorded regularly in small numbers (foraging in wetlands). Green Heron was recorded on several dates (foraging in wetlands). **Conclusion: criterion is not met**
11. Colonially - Nesting Bird Breeding Habitat (Ground) **<u>Rationale;</u>** Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Brewer's Blackbird Caspian Tern Common Tern Great Black-backed Gull Herring Gull Little Gull Ring-billed Gull	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) CUM CUT CUS MAS1-3; MAM1-6;	• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. <u>Information Sources</u> • Ontario Breeding Bird Atlas, rare/colonial species records. • Canadian Wildlife Service. • Reports and other information available from Conservation Authorities. • Natural Heritage Information Centre (NHIC) Colonial Waterbird Nesting Area • MNRF District Offices. • Field Naturalist Clubs.	Studies confirming: • Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian TernⒺ. • Presence of 5 or more pairs for Brewer's BlackbirdⒺ. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significantⒺ. • The edge of the colony and a minimum 150m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH [cc,cvii] • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxiix]Index #6 provides development effects and mitigation measures.	No suitable habitat present. **Conclusion: criterion is not met**

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
12. Migratory Butterfly Stopover Areas **<u>Rationale:</u>** Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Painted Lady Red Admiral <u>Special Concern</u> Monarch	Combination of ELC Community Series; need to have present one Community Series from each landclass: <u>Field</u>: CUM CUT CUS <u>Forest</u>: FOC FOD FOM CUP Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario [cxlix]. • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south [xxxii, xxxiii, xxxiv, xxxv, xxxvi]. • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat [cxlviii, cxlix]. • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes [xxxvii, xxxviii, xxxix, xl, xli]. <u>Information Sources</u> • OMNRF (NHIC) • Agriculture Canada in Ottawa may have list of butterfly experts. • Field Naturalist Clubs • Toronto Entomologists Association • Conservation Authorities	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)[xliii]. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day[xxxvii], significant variation can occur between years and multiple years of sampling should occur [xl, xlii]. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 **or** >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant.Í • SWHMiST [cxlix] Index #16 provides development effects and mitigation measures.	No suitable habitat is present – subject property not within 5 km of Lake Ontario While a moderate - good diversity of butterflies was recorded, open field / meadow habitat is very limited. Monarch was recorded regularly, but in very small numbers (< 5 individuals); Red Admiral was recorded on multiple dates in low numbers (< 3 individuals) and Painted Lady was recorded once (3 individuals) **Conclusion: criterion is not met**
13. Landbird Migratory Stopover Areas **<u>Rationale:</u>** Sites with a high diversity of species as well as high numbers are most significant.	All migratory songbirds. Canadian Wildlife Service Ontario website: <u>http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1</u> All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	• Woodlots need to be >10 haÍ in size and within 5 km [iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv] of Lake Ontario. • If multiple woodlands are located along the shoreline those Woodlands <2km from Lake Ontario are more significant[cxlix]. • Sites have a variety of habitats; forest, grassland and wetland complexes [cxlix]. • The largest sites are more significant [cxlix] • Woodlots and forest fragments are important habitats to migrating birds[ccxviii], these features located along the shore and located within 5km of Lake Ontario are Candidate SWH [cxlviii]. <u>Information Sources</u> • Bird Studies Canada • Ontario Nature • Local birders and field naturalist club • Ontario Important Bird Areas (IBA) Program	Studies confirm: • Use of the woodlot by >200 birds/day and with >35 spp with at least 10 bird spp. recorded on at least 5 different survey datesÍ. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (Apr./May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST [cxlix] Index #9 provides development effects and mitigation measures.	No suitable habitat is present – subject property not within 5 km of Lake Ontario. While a good diversity of migrant songbirds was recorded, no specific areas were particularly notable and the study area has little in the way of concentrating structure for passerine migrants. As a result, it likely supports random and erratic migrant usage, most often dictated by weather and fallouts rather than site specific conditions. There are no areas that would be expected to produce consistent migration concentrations, year after year. This would not be considered 'above average and significant' in the local landscape. **Conclusion: criterion is not met**

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
14. Deer Yarding Areas **<u>Rationale:</u>** Winter habitat for deer is considered to be the main limiting factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range.	White-tailed Deer	Note: OMNRF to determine this habitat. ELC Community Series providing a thermal cover component for a deer yard would include; FOM, FOC, SWM and SWC. Or these ELC Ecosites; CUP2 CUP3 FOD3 CUT	• Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. • The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60% [cxciv]. • OMNRF determines deer yards following methods outlined in "Selected Wildlife and Habitat Features: Inventory Manual" [cxcv] • Woodlots with high densities of deer due to artificial feeding are not significant. <u>Information Sources</u> • MNRF District Offices • LIO/NRVIS	No Studies Required: • Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH. [lvi,lvii,lviii,lix,lx, ©] • Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO). • Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations. [cxcv] • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST [cxlix] Index #2 provides development effects and mitigation measures.	No Stratum 2 Deer Wintering Areas are present. **Conclusion: criterion is not met**

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
15. Deer Winter Congregation Areas **<u>Rationale:</u>** Deer movement during winter in the southern areas of Eco-region 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions [cxlviii].	White-tailed Deer	All Forested Ecosites with these ELC Community Series; FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50 ha may also be used.	• Woodlots will typically be >100 ha in sizeⒺ. Woodlots <100ha may be considered as significant based on MNRF studies or assessment. • Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands. • If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha . • Woodlots with high densities of deer due to artificial feeding are not significantⒺ. • <u>Information Sources</u> • MNRF District Offices. • LIO/NRVIS	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF [cxlviii]. • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF Í.. • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques[ccxxiv] , ground or road surveys. or a pellet count deer density survey[ccxxv]. • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST [cxlix] Index #2 provides development effects and mitigation measures.	No woodlots greater than 100 ha are present and no Stratum 1 Deer Wintering Areas are present. **Conclusion: criterion is not met**

1.2 RARE VEGETATION COMMUNITIES OR SPECIALIZED HABITAT FOR WILDLIFE

1.2.1 Rare Vegetation Communities

Rare vegetation communities often contain rare species, particularly plants and small invertebrates, which depend on such habitats for their survival and cannot readily move to or find alternative habitats. When assessing rare vegetation communities, one of the most important criteria is the current representation of the community in the planning area based on its area relative to the total landscape or the number of examples within the planning area. There are a number of criterion used to define rare vegetation communities, however the NHIC uses a system that considers the provincial rank of a species or community type as a tool to prioritize protection efforts. These ranks are not legal designations but have been assigned using the best available scientific information, and follow a systematic ranking procedure developed by The Nature Conservancy (U.S.). The ranks are based on three factors: estimated number of occurrences, estimated community aerial extent, and estimated range of the community within the province:

S1 Extremely rare - usually 5 or fewer occurrences in the province, or very few remaining hectares. **S2 Very rare** - usually between 5 and 20 occurrences in the province, or few remaining hectares. **S3 Rare to uncommon** - usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with some extensive examples remaining.

The setting of criteria for significant wildlife habitat (SWH) has incorporated this ranking system into its process of determining rare vegetation communities and as such, a rare vegetation community is defined to include areas that contain a provincially rare vegetation community and/or areas that contain a vegetation community that is rare within the planning area. SWH Table 1.2.1 contains a listing of rare vegetation communities that are considered SWH for the planning area contained within Ecoregion 6E.

Table 1.2.1 Rare Vegetation Communities.

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Evaluation
	ELC Ecosite Code	Habitat Description	Detailed Information and Sources	Defining Criteria	
16. Cliffs and Talus Slopes **<u>Rationale;</u>** Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris	Most cliff and talus slopes occur along the Niagara Escarpment. <u>Information Sources</u> • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website. • Field Naturalist Clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes [lxxviii] • SWHMiST[cxlix] Index #21 provides development effects and mitigation measures.	No cliff habitat is present. **Conclusion: criterion is not met**
17. Sand Barren **<u>Rationale;</u>** Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always <u>≤</u> 60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%.	A sand barren area >0.5ha in size[Ⓔ]. <u>Information Sources</u> • OMNRF Districts. • Natural Heritage Information Centre (NHIC) has location information available on their website. • Field Naturalist Clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens [lxxviii] • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)[Í]. • SWHMiST[cxlix] Index #20 provides development effects and mitigation measures.	No sand barren habitat is present. **Conclusion: criterion is not met**

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Evaluation
	ELC Ecosite Code	**Habitat Description**	**Detailed Information and Sources**	**Defining Criteria**	
18. Alvar **<u>Rationale;</u>** Alvars are extremely rare habitats in Ecoregion 6E. Most alvars in Ontario are in Ecoregions 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic-Precambrian contact.	ALO1 ALS1 ALT1 CUM2 CUS2 CUT2-1 CUW2 FOC1 FOC2 **Five Alvar Indicator Species:** 1) Carex crawei 2) Panicum philadelphicum 3) Eleocharis compressa 4) Scutellaria parvula 5) Trichostema brachiatum These indicator species are very specific to Alvars within Ecoregion 6E Ⓔ[cxlix]	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover [lxxviii].	An Alvar site > 0.5 ha in size [lxxv]. <u>Information Sources</u> • Alvars of Ontario (2000), Federation of Ontario Naturalists . • Ontario Nature – Conserving Great Lakes Alvars. • Natural Heritage Information Centre (NHIC) has location information available on their website. • OMNRF Districts. • Field Naturalist Clubs. • Conservation Authorities.	• Field studies that identify four of the five Ⓔ Alvar Indicator Species [lxxv,cxlix] at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses [lxxv] • SWHMiST[cxlix] Index #17 provides development effects and mitigation measures.	No alvars are present. **Conclusion: criterion is not met**
19. Old Growth Forest **<u>Rationale:</u>** Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Woodland areas 30 ha or greater in size or with at least 10 ha interior habitat assuming 100 m buffer at edge of forest Ⓔ. <u>Information Sources</u> • OMNRF Forest Resource Inventory mapping • OMNRF Districts. • Field Naturalist Clubs • Conservation Authorities • Sustainable Forestry Licence (SFL) companies will possibly know locations through field operations. • Municipal forestry departments	Field Studies will determine: • If dominant trees species of the ecosite are >140 years old, then the area containing these trees is Significant Wildlife Habitat [cxlviii] • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities [cxlviii] (cut stumps will not be present) • The area of forest ecosites combined or an eco-element within an ecosite that contains the old growth characteristics is the SWH. • Determine ELC vegetation types for the forest area containing the old growth characteristics [lxxviii] • SWHMiST[cxlix] Index #23 provides development effects and mitigation measures.	Based on FRI mapping (1978) and field surveys, one area could be considered ‘older’ growth: a portion of WSU 4. In WSU 4, discontinuous older growth is found in a portion of upland deciduous forest at the east end. The estimated age of dominant trees (Sugar Maple, White Oak), based on projection from ages noted in the FRI mapping, is approximately 100 years old. However, some logging has occurred in the intervening years and canopy cover / age is not homogeneous throughout these areas. **Conclusion: criterion is not met within the subject property, potentially met within the portion of WSU4 in the *rare* lands.** **No impacts are anticipated; WSU 4 will be retained in full, with development setbacks and other mitigation measures.**

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Evaluation
	ELC Ecosite Code	**Habitat Description**	**Detailed Information and Sources**	**Defining Criteria**	
20. Savannah **<u>Rationale:</u>** Savannahs are extremely rare habitats in Ontario.	CUS2 TPS1 TPS2 TPW1 TPW2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60% [lxxix,] [lxxx, lxxxi, lxxxii, lxxxiii]	No minimum size to site [Í] Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. <u>Information Sources</u> • Natural Heritage Information Centre (NHIC) has location data available on their website. • OMNRF Districts. • Field Naturalists Clubs. • Conservation Authorities.	Field studies confirm one or more of the Savannah indicator species listed in [lxxv] Appendix N should be present [Í]. Note: Savannah plant spp. list from Ecoregion 6E should be used[cxlviii]. • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMiST[cxlix] Index #18 provides development effects and mitigation measures.	No savannah habitat is present. **Conclusion: criterion is not met**
21. Tallgrass Prairie **<u>Rationale:</u>** Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. [lxxix, lxxx, lxxxi, lxxxii, lxxxiii]	No minimum size to site [Í]. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. <u>Information Sources</u> • OMNRF Districts. • Natural Heritage Information Centre (NHIC) has location information available on their website. • Field Naturalists Clubs. • Conservation Authorities.	Field studies confirm one or more of the Prairie indicator species listed in [lxxv] Appendix N should be present [Í]. Note: Prairie plant spp. list from Ecoregion 6E should be used[cxlviii] • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMiST[cxlix] Index #19 provides development effects and mitigation measures.	No tallgrass habitat is present. **Conclusion: criterion is not met**
22. Other Rare Vegetation Communities **<u>Rationale:</u>** Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG[cxlviii] . Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M [cxlviii] The OMNRF/NHIC will have up to date listing for rare vegetation communities. <u>Information Sources</u> • Natural Heritage Information Centre (NHIC) has location information available on their website. • OMNRF Districts. • Field Naturalists Clubs. • Conservation Authorities.	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG[cxlviii] • Area of the ELC Vegetation Type polygon is the SWH. • SWHMiST [cxlix] Index #37 provides development effects and mitigation measures.	No provincially rare vegetation community types are present. **Conclusion: criterion is not met**

1.2.2 Specialized Habitat for Wildlife

Some wildlife species require large areas of suitable habitat for their long-term survival. Many wildlife species require substantial areas of suitable habitat for successful breeding. Their populations decline when habitat becomes fragmented and reduced in size[cxlviii]. Specialized habitat for wildlife is a community or diversity-based category, therefore, the more wildlife species a habitat contains, the more significant the habitat becomes to the planning area. The largest and least fragmented habitats within a planning area will support the most significant populations of wildlife. The specialized habitats for wildlife that are considered as SWH are outlined in Table 1.2.2.

Table 1.2.2 Specialized Habitats of Wildlife considered SWH.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
23. Waterfowl Nesting Area **<u>Rationale;</u>** Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.	American Black Duck Blue-winged Teal Gadwall Green-winged Teal Hooded Merganser Mallard Northern Pintail Northern Shoveler Wood Duck	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 **Note: includes adjacency to Provincially Significant Wetlands**	A waterfowl nesting area extends 120 m [cxlix] from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur [cxlix]. • Upland areas should be at least 120 m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. <u>Information Sources</u> • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from Conservation Authorities.	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards[f], or; • Presence of 10 or more nesting pairs for listed species including Mallards[f]. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m [cxlviii] from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMiST[cxlix] Index #25 provides development effects and mitigation measures.	Candidate CUM, CUT, CUW and FOD habitats are present adjacent to MAM/MAS/SWD/SWT/SAF wetland habitats in WSU 2, 3, 6 and 8. Generally, these adjacent upland habitats are very narrow, with portions ploughed regularly (typically less than 20 m wide). The following species were recorded in wetlands with adjacent upland habitat (maximum number in parentheses): • American Black Duck (2-probable) • Blue-winged Teal (2-probable) • Wood Duck (18-confirmed) • Hooded Merganser (4-confirmed) • Mallard (31-confirmed) Note: Blue-winged Teal would be considered uncommon local breeders (formerly common, pre 1980). Hooded Merganser would be considered uncommon / rare locally. The recorded numbers of Wood Duck and Mallard would not be considered unusual or locally / regionally significant as both species are common and widespread and expected to occur in most wetland habitat in southern Ontario. **Conclusion: SWH is present within narrow upland margins around WSU 2, WSU 3 WSU6, and WSU 8 and within suitable upland portions of WSU 4.** **No impacts are anticipated; these areas, which are outside of the development envelope, will be retained in full, with enhancements through buffer management / naturalization.**

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
24. Bald Eagle and Osprey Nesting, Foraging and Perching Habitat **<u>Rationale;</u>** Nest sites are fairly uncommon in Eco-region 6E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.	Osprey **<u>Special Concern:</u>** Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). <u>Information Sources</u> • Natural Heritage Information Centre (NHIC) compiles all known nesting sites for Bald Eagles in Ontario. • MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat. • Nature Counts, Ontario Nest Records Scheme data. • OMNRF Districts. • Check the Ontario Breeding Bird Atlas [ccv] or Rare Breeding Birds in Ontario for species documented • Reports and other information available from Conservation Authorities. • Field Naturalists clubs	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area[cxlviii] . • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH [ccvii], maintaining undisturbed shorelines with large trees within this area is important [cxlviii]. • For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. [cvi, ccvii] Area of the habitat from 400-800m is dependant on sight lines from the nest to the development and inclusion of perching and foraging habitat [cvi] • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for <u>></u> 3 years or suspected of not being used for >5 years before being considered not significant. [ccvii] • Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST[cxlix] Index #26 provides development effects and mitigation measures	Candidate woodland habitat is present adjacent to Barrie's Lake and within the local landscape. Both Osprey and Bald Eagle are regular foragers (and breeders – for Osprey) along nearby reaches of the Grand River. Osprey and Bald Eagle were recorded during supplemental surveys (1 individual each), no nests were observed during field work and no evidence of breeding was recorded. **Conclusion: criterion is not met**

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
25. Woodland Raptor Nesting Habitat **<u>Rationale:</u>** Nests sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.	Barred Owl Broad-winged Hawk Cooper's Hawk Northern Goshawk Red-shouldered Hawk Sharp-shinned Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3	All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat [lxxxviiii, lxxxix, xc, xci, xciii, xciv, xcv,xcvi, cxxxiii]. Interior habitat determined with a 200m buffer[cxlviii] • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. <u>Information Sources</u> • OMNRF Districts. • Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada. • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of 1 or more active nests from species list is considered significant[cxlviii]. • Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha of suitable habitat is the SWH [ccvii]. (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest) • Barred Owl – A 200m radius around the nest is the SWH [ccvii]. • Broad-winged Hawk and Coopers Hawk,– A 100m radius around the nest is the SWH[ccvii]. • Sharp-Shinned Hawk – A 50m radius around the nest is the SWH[ccvii]. • Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWHMiST [cxlix] Index #27 provides development effects and mitigation measures.	Suitable habitat is not present within the subject property or study area; may be present within the local landscape. **Conclusion: criterion is not met**

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
26. Turtle Nesting Areas **<u>Rationale;</u>** These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	Midland Painted Turtle **<u>Special Concern Species:</u>** Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m) [cxlviii] or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. <u>Information Sources</u> • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • Natural Heritage Information Centre (NHIC) • Field Naturalist Clubs	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles[í] • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH[í]. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependant on slope, riparian vegetation and adjacent land use is the SWH.[cxlviii] • Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100m area of habitat. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. • SWHMiST Index #28 provides development effects and mitigation measures for turtle nesting habitat.	Candidate nesting habitat is present in WSU 2, WSU 3, WSU 6 and WSU 8 (Barrie's Lake). Based on targeted and supplemental field surveys, we recorded observations or evidence of two species: Midland Painted Turtle and Snapping Turtle. • Basking Midland Painted Turtles were widespread and abundant in the larger ponds during spring surveys (up to 40+ individuals observed in any one location on a single date). This species was also recorded incidentally in moderate numbers during road/mortality and pitfall trapping surveys (10-15). Greatest abundances were recorded in WSU 2, WSU 3 and WSU 8 (Barrie's Lake). • Moderate numbers of Snapping Turtle were recorded (<10 individuals) during spring basking, road/mortality and pitfall trapping surveys. • Evidence of turtle nesting was recorded at ponds within WSU 6 and WSU 3) and in gravel berms beside Blenheim Road. Nesting / attempts were most common along Blenheim Road (5 nests), with 1-3 nests recorded in WSU 6 and WSU 3. **Conclusion: SHW is present in WSU 3, WSU 6 and WSU 8, based on possible nests and presence of many Midland Painted Turtles and at least one Snapping Turtle.**
27. Seeps and Springs **<u>Rationale;</u>** Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.	Ruffed Grouse Salamander spp. Spruce Grouse White-tailed Deer Wild Turkey	Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system [cxvii, cxlix]. • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species [cxix, cxx, cxxi, cxxii, cxiii, cxiv]. <u>Information Sources</u> • Topographical Map. • Thermography. • Hydrological surveys conducted by Conservation Authorities and MOE. • Field Naturalists Clubs and landowners. • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped.	Field Studies confirm: • Presence of a site with 2 or more[í] seeps/springs should be considered SWH. • The area of a ELC forest ecosite or an ecoelement within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation of the habitat. • SWHMiST Index #30 provides development effects and mitigation measures	Forested areas with groundwater seepage / springs are present in the headwater forested area of Cruikston Creek (WSU 4). Wild Turkey and White-tailed Deer were recorded in both locations. **Conclusion: SWH is present in WSU 4**

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
28. Amphibian Breeding Habitat (Woodland) **<u>Rationale:</u>** These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations	Blue-spotted Salamander Eastern Newt Gray Treefrog Spotted Salamander Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians	• Presence of a wetland, pond or woodland pool (including vernal pools) >500m^2 (about 25m diameter) within or adjacent (within 120m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat[cxlviii] <u>Information Sources</u> • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF Districts • OMNRF wetland evaluations • Field Naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Studies confirm; • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog species with Call Level Codes of 3Ⓔ. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the wetland area plus a 230m radius of woodland area [lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi] . If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • SWHMiST [cxlix] Index #14 provides development effects and mitigation measures.	Candidate wetland/pond habitats were surveyed using multiple methods from 2008-2011, 2014-2015 and 2019-2020 (i.e. spring calling amphibian surveys, road/mortality surveys, pitfall and pond trapping surveys). Breeding populations of all of the listed species (except Eastern Newt) were recorded at numerous locations, typically in excess of 20 individuals. Some of these locations are within 120 m of woodlands (FOD, SWM): 1. Woodland ponds (within WSU 4) and larger pond / wetland mosaics (WSU 3). 2. AM 11 – Barrie's Lake (WSU 8) **Conclusion: SWH is present in WSU2, WSU 3, WSU 4, WSU 6 and WSU 8 [Barrie's Lake],** **No impacts are anticipated; features will be retained in full, with development setbacks and other mitigation / enhancement measures.**
29. Amphibian Breeding Habitat (Wetlands) **<u>Rationale;</u>** Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario landscapes.	American Toad Blue-spotted Salamander Bullfrog Eastern Newt Four-toed Salamander Gray Treefrog Green Frog Mink Frog Northern Leopard Frog Pickerel Frog Spotted Salamander Western Chorus Frog	ELC Community Classes SW, MA, FE, BO, OA and SA. Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands	• Wetlands>500m^2 (about 25m diameter),supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats . • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanent water bodies with abundant emergent vegetation. <u>Information Sources</u> • Ontario Herpetofaunal Summary Atlas (or other similar atlases) • Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. • OMNRF Districts and wetland evaluations. • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3Ⓒ. or; Wetland with confirmed breeding Bullfrogs are significant. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys [cviii] will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST [cxlix] Index #15 provides development effects and mitigation measures.	Candidate wetland/pond habitats were surveyed using multiple methods from 2008-2011, 2014-2015 and 2019-2020 (i.e. spring calling amphibian surveys, road/mortality surveys, pitfall and pond trapping surveys). Breeding populations of many of the listed species (except Eastern Newt, Pickerel Frog and Mink Frog) were recorded at numerous locations, typically in excess of 20 individuals. The following locations had confirmed breeding of 1 or more listed salamander species and/or 3 or more species with at least 20 individuals in suitable habitat (MAM, SAS, SAF, SWT): 1. WSU 4, WSU 6, WSU 2, WSU 3 2. Barrie's Lake (WSU 8). Note that Bullfrog breeding was confirmed in Barrie's Lake. **Conclusion: SWH is present in WSU2, WSU 3, WSU 4, WSU 6 and WSU 8 [Barrie's Lake],** **No impacts are anticipated; features will be retained in full, with development setbacks and other mitigation / enhancement measures.**

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria	
30. Woodland Area-Sensitive Bird Breeding Habitat **<u>Rationale:</u>** Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds.	Blackburnian Warbler Black-throated Blue Warbler Black-throated Green Warbler Blue-headed Vireo Northern Parula Ovenbird Red-breasted Nuthatch Scarlet Tanager Veery Winter Wren Yellow-bellied Sapsucker **<u>Special Concern:</u>** Canada Warbler Cerulean Warbler	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha. [cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxxv, cxxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvi, clvii, clviii, clix] • Interior forest habitat is at least 200 m from forest edge habitat. [clxiv] <u>Information Sources</u> • Local birder clubs. • Canadian Wildlife Service (CWS) for the location of forest bird monitoring. • Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. Ⓔ • Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH.Ⓔ • Conduct field investigations in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” [ccxi] • SWHMiST [cxlix] Index #34 provides development effects and mitigation measures.	Candidate habitat is found in WSU 4 (mature woodland with forest interior – assuming 100m buffer). Evidence of breeding was recorded in WSU 4 for 3 of the listed species (with abundance; breeding evidence): • Scarlet Tanager (4; probable) • Veery (1; confirmed) • Winter Wren (2; possible) **Conclusion: SWH is present in WSU 4 (assuming that any species recorded in suitable habitat during the breeding season should be considered a ‘breeder’).** **No impacts are anticipated; features will be retained in full, with development setbacks and other mitigation / enhancement measures.**

1.3 HABITAT FOR SPECIES OF CONSERVATION CONCERN (NOT INCLUDING ENDANGERED OR THREATENED SPECIES)

Habitats of Species of Conservation Concern include wildlife species that are listed as Special Concern or rare, that are declining, or are featured species. Habitats of Species of Conservation Concern do not include habitats of Endangered or Threatened species as identified by the Endangered Species Act 2007. Table 1.3 assists with the identification of SWH for Species of Conservation Concern.

Table 1.3. Habitats of Species of Conservation Concern considered SWH.

Wildlife	Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite	Habitat Criteria and Information Sources	Defining Criteria	
31. Marsh Breeding Bird Habitat **<u>Rationale;</u>** Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern American Coot Common Loon Common Moorhen Green Heron Marsh Wren Pied-billed Grebe Sandhill Crane Sedge Wren Sora Trumpeter Swan Virginia Rail **<u>Special Concern:</u>** Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	• Nesting occurs in wetlands. • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present [cxxiv]. • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. <u>Information Sources</u> • OMNRF District and wetland evaluations. • Field Naturalist clubs • Natural Heritage Information Centre (NHIC) Records. • Reports and other information available from Conservation Authorities. • Ontario Breeding Bird Atlas.	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species Ⓔ. • Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH Ⓔ. • Area of the ELC ecosite is the SWH. • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWHMiST Index #35 provides development effects and mitigation measures	Candidate habitat is present within the wetland / pond areas (i.e., WSU 2, WSU 3, WSU 6 and WSU 8 (Barrie’s Lake)) Evidence of breeding was recorded for 9 of the listed species (with abundance; breeding evidence): • American Coot (2; possible) • Common Moorhen (7; confirmed) • Green Heron (1; probable) Marsh Wren (3; probable) • Pied-billed Grebe (9; confirmed) • Sandhill Crane (3; probable) • Sora (4; probable) • Virginia Rail (5; probable) • Trumpeter Swan (6; confirmed) **Conclusion: SWH is present in WSU 2 (8 spp. + Trumpeter Swan), WSU 3 (7 spp. + Sandhill Crane + Trumpeter Swan), WSU6, and WSU 8 (5 spp. + Sandhill Crane + Trumpeter Swan).** **No impacts are anticipated; features will be retained in full, with development setbacks and other mitigation / enhancement measures.**

Wildlife	Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite	Habitat Criteria and Information Sources	Defining Criteria	
32. Open Country Bird Breeding Habitat **Rationale;** This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	Grasshopper Sparrow Northern Harrier Savannah Sparrow Upland Sandpiper Vesper Sparrow **Special Concern:** Short-eared Owl	CUM1 CUM2	• Large grassland areas (includes natural and cultural fields and meadows) >30 ha [clx, clxi, clxii, clxiii, clxiv, clxv, clxvi, clxvii, clxviii, clxix]. Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years) Í. • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. • The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. Information Sources • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs. • Ontario Breeding Bird Atlas • EIS Reports and other information available from Conservation Authorities.	Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species.Í • A field with 1 or more breeding Short-eared Owls is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST [cxlix] Index #32 provides development effects and mitigation measures	Suitable grassland habitat is not present. Grassland / cultural meadow habitat is restricted to narrow strips abutting woodland / wetland. Two of the listed species were recorded: • Savannah Sparrow (4; probable); • Vesper Sparrow (2; probable). **Conclusion: criterion is not met**
33. Shrub/Early Successional Bird Breeding Habitat **Rationale;** This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records [cxcix].	**Indicator Spp:** Brown Thrasher Clay-coloured Sparrow **Common Spp.:** Black-billed Cuckoo Eastern Towhee Field Sparrow Willow Flycatcher **Special Concern:** Golden-winged Warbler Yellow-breasted Chat	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species	Large field areas succeeding to shrub and thicket habitats>10ha[clxiv] in size. • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years) Í. • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species [clxxiii]. • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Information Sources • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs. • Ontario Breeding Bird Atlas • Reports and other information available from Conservation Authorities.	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species.Í • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. Í • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMiST [cxlix] Index #33 provides development effects and mitigation measures.	Large fields of suitable shrub/early successional habitat are not present; habitat is restricted to narrow strips/edges, gaps and small blocks. Three of the listed species were recorded, none as confirmed nesters: • Black-billed Cuckoo (1; probable); • Brown Thrasher (1; probable) • Willow Flycatcher (5; probable). **Conclusion: criterion is not met**
34. Terrestrial Crayfish	Chimney or Digger Crayfish; (*Fallicambarus*	MAM1 MAM2 MAM3 MAM4 MAM5	Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish.	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys	Potentially suitable habitat present along marsh margins. No terrestrial crayfish or burrows were recorded during field surveys.

Wildlife	Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite	Habitat Criteria and Information Sources	Defining Criteria	
Rationale: Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. [ccii]	*fodiens*) Devil Crawfish or Meadow Crayfish; (*Cambarus Diogenes*)	MAM6 MAS1 MAS2 MAS3 SWD SWT SWM CUM1 with inclusions of above meadow marsh ecosites can be used by terrestrial crayfish.	• Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. Information Sources • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998	(burrows) in suitable meadow marsh, swamp or terrestrial sites [cci] • Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult • SWHMiST [cxlix] Index #36 provides development effects and mitigation measures.	**Conclusion: criterion is not met**
35. Special Concern and Rare Wildlife Species **Rationale:** These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre (NHIC).	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites [lxxviii] Information Sources • Natural Heritage Information Centre (NHIC) will have Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. • NHIC Website "Get Information" : http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas • Expert advice should be sought as many of the rare spp. have little information available about their requirements.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. • SWHMiST [cxlix] Index #37 provides development effects and mitigation measures.	The following S1-S3 or SC species were recorded: **Flora**: Butternut (S3); Hill's Oak (S3) **Avifauna**: Trumpeter Swan (S2S3); Canada Warbler (SC); Eastern Wood-pewee (SC) **Herpetofauna**: Snapping Turtle (SC) **Insects** - with critical habitat elements: ○ Monarch (SC): meadow/open areas with nectar / food plants (i.e. Milkweed). ○ Common Sootywing (S3S4): open agri. areas with legumes (e.g. soybeans), a crop typically abundant in the local landscape. Common Sootywing is common / widespread within agricultural matrices in S. Ont. (pers obs.). ○ Giant Swallowtail (S3): forest edges with Prickly Ash. Likely no single habitat aspect within the study area is critical for this species, apart from presence of Prickly Ash. Likely wanders widely to nectar. ○ Tawny Emperor (S2S3): forest edges with nectaring sites and Hackberry. A single hackberry tree can support a colony of this species, even within an urbanized environment (pers obs). Hackberry trees that are part of the broader woodland component [forest edges], as opposed to those in hedgerows or other isolated locations, probably will serve as more successful breeding sites. ○ Spatterdock Darner (S1): Barrie's Lake is the critical local habitat (large kettle lake with extensive spatterdock), with nearby lands used for foraging and dispersal. This species will use the agri. lands and woodland / open area interfaces to forage, with wetlands probably used for some foraging. ○ Unicorn Clubtail (S2S3) and Amber-winged Spreadwing (S3): large, diverse wetlands (e.g. WSU 2, 3, 6 and 8). Based on more recent and thorough surveys, Unicorn Clubtail has proven to be not uncommon in

Wildlife	Species	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Ecosite	Habitat Criteria and Information Sources	Defining Criteria	
					southern Ontario (pers. Obs.), using small mud bottomed ponds, often man-made, as well as various other, non-specialized wetland habitats. ○ Swamp Darner (S2S3) and Harlequin Darner (S3): mature mixed swamp woodland with standing dead trees (i.e. WSU 4 – the Rare 'hogsback'). For both species, the large, intact RARE woodland (WSU 4) is probably responsible for observations during the current study. These species likely breed within the swamp habitats in WSU 4, with occurrence elsewhere largely restricted to dispersing / foraging individuals. ○ The recorded butterflies are dependent on food plant presence, rather than specific habitat types. • **Mammals**: none **Conclusion: SWH is present in / associated with:** • WSU 2 (Canada Warbler, Trumpeter Swan, Monarch, Snapping Turtle) • WSU 3 (Hill's Oak, Least Bittern, Trumpeter Swan, Common Sootywing, Monarch, Amber-winged Spreadwing, Snapping Turtle) • WSU 4 (Butternut, Eastern Wood-pewee, Common Sootywing, Giant Swallowtail, Tawny Emperor, Monarch, Swamp Darner, Harlequin Darner) • WSU 6 (Monarch, Snapping Turtle) • WSU 8 (Trumpeter Swan, Hill's Oak, Monarch, Spatterdock Darner, Unicorn Clubtail, Snapping Turtle) SWH can be delineated for those occurrences associated with a defined ELC vegetation type (i.e. flora within a distinct woodland / wetland habitat, breeding habitat for avifauna or insects). Where ELC vegetation communities cannot be classified / delineated, SWH does not apply (e.g. for Hill's Oak hedgerow trees or insect foraging areas in active agricultural lands). **No impacts are anticipated; features will be retained in full, with development setbacks and other mitigation / enhancement measures.**

1.4 ANIMAL MOVEMENT CORRIDORS

Animal Movement Corridors are elongated areas used by wildlife to move from one habitat to another. They are important to ensure genetic diversity in populations, to allow seasonal migration of animals (e.g. deer moving from summer to winter range) and to allow animals to move throughout their home range from feeding areas to cover areas. Animal movement corridors function at different scales often related to the size and home range of the animal. For example, short, narrow areas of natural habitat may function as a corridor between amphibian breeding areas and their summer range, while wider, longer corridors are needed to allow deer to travel from their winter habitat to their summer habitat.

Identifying the most important corridors that provide connectivity across the landscape is challenging because of a lack of specific information on animal movements. There is also some uncertainty about the optimum width and mortality risks of corridors. Furthermore, a corridor may be beneficial for some species but detrimental to others. For example, narrow linear corridors may allow increased access for racoons, cats, and other predators. Also, narrow corridors dominated by edge habitat may encourage invasion by weedy generalist plants and opportunistic species of birds and mammals. Corridors often consist of naturally vegetated areas that run through more open or developed landscapes. However, sparsely vegetated areas can also function as corridors. For example, many species move freely through agricultural land to reach natural areas. Despite the difficulty of identifying exact movement corridors for all species, these landscape features are important to the long-term viability of certain wildlife populations.

Animal Movement Corridors should only be identified as SWH where:

Where a Confirmed or Candidate SWH has been identified by MNRF or the planning authority based on documented evidence of a habitat identified within these Criterion Schedules or the Significant Wildlife Habitat Technical Guide. The identified wildlife habitats Table 1.4.1 will have distinct passageways or rely on well defined natural features for movements between habitats required by the species to complete its life cycle.

Table 1.4.1 Animal Movement Corridors

Habitat	SPECIES	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Eco-sites	Habitat Criteria and Information Sources	Defining Criteria	
36. Amphibian Movement Corridors **<u>Rationale;</u>** Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	American Toad Blue-spotted Salamander Bullfrog Eastern Newt Four-toed Salamander Gray Treefrog Green Frog Mink Frog Northern Leopard Frog Pickeral Frog Spotted Salamander Western Chorus Frog	Corridors may be found in all ecosites associated with water. • Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1	Movement corridors between breeding habitat and summer habitat [clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi]. Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (**Amphibian Breeding Habitat –Wetland)** of this Schedule Í. <u>Information Sources</u> • MNRF District Office. • Natural Heritage Information Centre (NHIC). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs.	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant [cxlix] • Corridors should have at least 15m of vegetation on both sides of waterway [cxlix] or be up to 200m wide [cxlix] of woodland habitat and with gaps <20m [cxlix] . • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat [cxlix]. • SWHMiST [cxlix] Index #40 provides development effects and mitigation measures	Candidate habitat is present in WSU2, WSU 3, WSU 4, WSU 6 and WSU 8 [Barrie's Lake], where 'Amphibian Breeding SWH' was confirmed. Across all survey years, evidence of amphibian movement (anurans and salamanders) was recorded in several areas. All listed species were recorded, with the exception of Eastern Newt. In addition to assumed movement within contiguous natural areas (e.g. wetland – woodland – meadow), movement between the following areas was recorded: • Between Barrie's Lake and WSU 2 / 3 • Between WSU 2/3 and WSU 6 (radial dispersal) • Between WSU 4 and lands to the west In all cases, movement occurred across active croplands /roads and was not within a defined movement corridor. The most abundant species captured / recorded in those areas were (total # in parentheses): Blue-spotted Salamander (178), American Toad (291), Northern Leopard Frog (471) and Green Frog (54). Relatively small numbers of Bullfrog, Chorus Frog, Gray Treefrog, Spring Peeper, Wood Frog and Spotted Salamander were recorded (max. < 30). **Conclusion: Criterion is met for the above listed areas, but not within a defined map-able corridor.** **No impacts are anticipated within implementation of the naturalized ecological corridor between WSU 3 and WSU 6.**

Habitat	SPECIES	CANDIDATE SWH		CONFIRMED SWH	Evaluation
		ELC Eco-sites	Habitat Criteria and Information Sources	Defining Criteria	
37. Deer Movement Corridors **<u>Rationale:</u>** Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling.	White-tailed Deer	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule. Ⓔ • A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion [clxxxii, clxxxiii, cxlix, cxciv.] • Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges). <u>Information Sources</u> • MNRF District Office. • Natural Heritage Information Centre (NHIC). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs.	• Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas . • Corridors that lead to a deer wintering habitat should be unbroken by roads and residential areas. • Corridors should be at least 200m wide [cxlix] with gaps <20m [cxlix] and if following riparian area with at least 15m of vegetation on both sides of waterway [cxlix]. Shorter corridors are more significant than longer corridors, [cxlix]. • SWHMiST [cxlix] Index #39 provides development effects and mitigation measures	No candidate wintering habitat is present and no deer movement corridors are present. **Conclusion: criterion is not met**

1.5 EXCEPTIONS FOR ECOREGION 6E

Exceptions are candidate wildlife habitats that will have different criteria than what is proposed in the above schedules for an area within the Eco-region. The Exceptions will be based on Eco-Districts and municipalities can apply the exception for the eco-district within their planning area

Table 1.5.1 Significant Wildlife Habitat Exceptions for Ecodistricts within EcoRegion 6E

EcoDistrict	Wildlife Habitat and Species	Candidate SWH			Confirmed SWH	Evaluation
		Ecosites	Habitat Description	Habitat Criteria and Information	Defining Criteria	
6E-14 **Rationale:** The Bruce Peninsula has an isolated and distinct population of black bears. Maintenance of large woodland tracts with mast-producing tree species is important for bears. [clxxxvi, ccxvii]	**Mast Producing Areas** Black Bear	All forested habitat represented by ELC Community Series: FOM FOD	• Black bears require forested habitat that provides cover, winter hibernation sites, and mast producing tree species. Clxxxv, [clxxxvii, clxxxviii, clxxxix, cxc, cxci, cxcii, cxciii, ccxvii]	Woodland ecosites >30 ha with mast-producing tree species, either soft (cherry) or hard (oak and beech). Information Sources • Important forest habitat for black bears may be identified by OMNRF.	• All woodlands > 30ha with a 50%composition of these ELC Vegetation Ⓔ Types are considered significant: FOM1-1, FOM2-1, FOM3-1, FOD1-1, FOD1-2, FOD2-1, FOD2-2, FOD2-3, FOD2-4, FOD4-1, FOD5-2, FOD5-3, FOD5-7, FOD6-5 • SWHMiST cxlix Index #3 provides development effects and mitigation measures.	N/A
6E- 17 **Rationale:** Sharp-tailed grouse only occur on Manitoulin Island in Eco-region 6E, Leks are an important habitat to maintain their population	**Lek** **Sharp-tailed Grouse**	CUM CUS CUT	• The lek or dancing ground consists of bare, grassy or sparse shrubland. There is often a hill or rise in topography [ccxix]. • Leks are typically a grassy field/meadow >15ha with adjacent shrublands and >30ha with adjacent deciduous woodland. Conifer trees within 500m are not tolerated [ccxix].	Grasslands (field/meadow) are to be >15ha when adjacent to shrubland and >30ha when adjacent to deciduous woodland [ccxix]. • Grasslands are to be undisturbed with low intensities of agriculture (light grazing or late haying) • Leks will be used annually if not destroyed by cultivation or invasion by woody plants or tree planting [ccxix]. Information Sources • OMNRF District Office • Bird watching clubs • Local landowners • Ontario Breeding Bird Atlas	Studies confirming lek habitat are to be completed from late March to June. • Any site confirmed with sharp-tailed grouse courtship activities is considered significant. • The field/meadow ELC ecosites plus a 200 m radius area with shrub or deciduous woodland is the lek habitat • SWHMist [cxlix] Index #32 provides development effects and mitigation measures.	N/A

APPENDIX G

TECHNIAL MEMO: EVALUATION OF VEGETATION UNIT 18

From: Ungar, Darren (MNRF) <Darren.Ungar@ontario.ca>
Sent: January 18, 2021 8:01 AM
To: Gross, Jeff
Subject: RE: Wetland assessment - Cambridge West
Attachments: C.West_TWP_Wetland VU18_Analysis_Memo_Sept 15, 2020.pdf; 2nd-rev-44719-114-NEWMAN-FIG1.0.pdf

Good morning Jeff,

The MNRF agrees with you assessment that Wetland Unit 18 in the Barrie's Lake - Bauman Creek Wetland Complex should be removed from the evaluation. I will make the necessary changes to reflect this update in the evaluation and online with Land Information Ontario.

Thank you

Darren Ungar
Management Biologist
Ministry of Natural Resources & Forestry
Guelph District
© 226-962-6870

From: Gross, Jeff <Jeff.Gross@wsp.com>
Sent: September 15, 2020 12:59 PM
To: Buck, Graham (MNRF) <Graham.Buck@ontario.ca>
Cc: McPhee, Jennifer <Jennifer.McPhee@wsp.com>
Subject: Wetland assessment - Cambridge West

Hi Graham

Following up on this, please see the attached memo. Recall that this was a very small feature in an agricultural field that was not recommended for retention in the Cambridge West MESP. We're now proceeding with a development proposal for this parcel (in the Township of North Dumfries) and have completed an updated assessment, confirming the MESP conclusion, with a recommendation that it is declassified to non-wetland status and removed from the PSW. The memo summarizes previous work, with relevant mapping.

If you are in agreement, can you please reply via email or letter. We will include this in our forthcoming EIS report

Thanks

Jeff

Jeff Gross
Project Manager / Senior Ecologist
Ecology & Environmental Impact Assessment (EIA)

WSP Canada Ltd.
582 Lancaster Street West
Kitchener, ON Canada N2K 1M3
Jeff.Gross@wsp.com

T: +1 519.904.1757

wspgroup.ca

From: McPhee, Jennifer
Sent: Tuesday, September 15, 2020 12:51 PM
To: Gross, Jeff <Jeff.Gross@wsp.com>
Subject: FW: Wetland assessment - Cambridge West

Cheers,
Jenn

Jennifer (McPhee) Dyson, M.Sc
Ecologist – Botanist & ISA Certified Arborist
Ecology & Environmental Impact Assessment (EIA)

From: Buck, Graham (MNRF) [mailto:Graham.Buck@ontario.ca]
Sent: March 19, 2020 2:06 PM
To: McPhee, Jennifer <Jennifer.McPhee@wsp.com>
Subject: RE: Wetland assessment - Cambridge West

Hi Jenn,

You can send the memo to me.

Graham

From: McPhee, Jennifer <Jennifer.McPhee@wsp.com>
Sent: March-19-20 11:18 AM
To: Buck, Graham (MNRF) <Graham.Buck@ontario.ca>
Subject: Wetland assessment - Cambridge West

Hello Graham,

Hope you're keeping healthy and sane with all of this craziness!

I was wondering who the right person would be to forward a PSW question for the Cambridge West project site off of Blenheim Rd. There is a small wetland (0.07 ha) with the ag field that is listed as part of the adjacent wetland complex that the developer was wondering about potentially removing. We have drafted a more detailed memo, but weren't sure who it should be sent to.

Cheers,
Jenn

Jennifer (McPhee) Dyson, M.Sc
Ecologist – Botanist & ISA Certified Arborist
Ecology & Environmental Impact Assessment (EIA)

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Kitchener, ON Canada N2K 1M3
Jennifer.McPhee@wsp.com

T: +1 519.904.1760
C: +1 226.988.6581

wsp.com

Please consider the environment before printing this email and/or its attachements.

-LAEmHhHzdJzBiTWe4Hgs7pbKI

MEMO

TO: Graham Buck, MNRF

FROM: Jeff Gross, Project Manager, WSP

SUBJECT: Westwood Village Phase 2, Cambridge West. Wetland Analysis

DATE: September 15, 2020

WSP Canada Group Limited (WSP) has been retained to undertake a Scoped Environmental Impact Study in support of planning and development applications for Phase 2 of Westwood Village located in the Township of North Dumfries, Ontario (the Subject Property). As part of the EIS, WSP completed an updated delineation of wetland features on the Subject Property, revisiting the delineation of wetlands previously completed on the Subject Property. During an agency site walk to verify wetland limits on October 18, 2019, Grand River Conservation Authority (GRCA) staff requested that WSP verify the status of a small, isolated wetland on the Subject Property (identified as Vegetation Unit 18 in submitted reports for planning of the Cambridge West community). See relevant Figures in Attachment A for location.

This memo provides context, planning history, ecological characteristics and recommendations for that wetland feature.

1.0 PLANNING CONTEXT & HISTORY

WSP (formerly MMM Group / Ecoplans Ltd.) has a long history of involvement with planning for this area (the Cambridge West community), including completion of thousands of hours of field surveys on hundreds of dates from 2008 through 2020. WSP ecologists have prepared or contributed to many reports as input to planning for the Cambridge West community including:

- Cambridge West Community, Master Environmental Servicing Plan and Community Master Plan. Technical Work Plan (MHBC et.al.; November 2010)
- Cambridge West MESP, Natural Environment Study (NES). Final (Ecoplans; November 2013)
- Cambridge West Collector Road Network Class Environmental Assessment. Technical Memo – Natural Heritage Evaluation of Alternatives (MMM; February 2015)

- Technical Memorandum. Jefferson Salamander Sampling Survey Approach and Results on the Cambridge West and rare lands, Cambridge ON. (WSP/ MMM: August 31, 2016).
- Cambridge West Lands, Hallman Construction Limited & Cachet Developments, Draft Plan of Subdivisions, Cambridge, Ontario. Scoped Environmental Impact Study, EIS (MMM Group; December 2016)
- Collector Road Network Class Environmental Assessment. Environmental Study Report. Cambridge West, City of Cambridge. Natural Heritage Summary Report (WSP; April 2018)

The MESP process was guided by a Steering Committee which included staff from the City of Cambridge, Region of Waterloo, Township of North Dumfries, GRCA and Ministry of Natural Resources (MNR). The MESP included two levels of study: the General Study Area (GSA), encompassing the entire geographic area of the Cambridge West Subwatersheds (Devil's, Newman and Cruickston Creeks), predominantly outside the City of Cambridge; and the Development Study Area (DSA), an area of urban development interest entirely within City lands. Refer to Figure 1 of the MESP NES (Ecoplans 2013) for locations of the GSA and DSA.

Although the Subject Property is within the GSA, the MESP process explicitly considered the subject property as input to Community Planning, determination of a road network and a natural heritage system (NHS), the latter of which included lands on and adjacent to the Subject Property within the recommended NHS. As input to the above, a substantial amount of field survey and analysis was undertaken on the Subject Property during the MESP. The MESP was reviewed by agencies and considered by LPAT in approving Phase 1, Westwood Village in a decision issued on July 27, 2018 (Case Nos. PL170301 and PL170302).

Following approval of the MESP, WSP has continued to undertake ecological field surveys on the City lands and Subject Property (2014-2020), as input to development plans, refined road network analysis and biological monitoring associated with the approved developments on City lands adjacent to the Subject Property (i.e., Subdivisions 30T-16103 and 30T-16104).

2.0 VEGETATION UNIT 18

2.1 MESP ANALYSIS & RECOMMENDATIONS

At the time of MESP report preparation, the wetland in question was mapped as part of the *Barrie's Lake – Bauman Creek Provincially Significant Wetland* (PSW) Complex. In the policy analysis component of the NES, we considered the merits of retaining PSW status for this

small wetland (Vegetation Unit 18), which at that time, had been displaced by agriculture. Section 6.1.2.1 of the MESP NES (Ecoplans 2013), which documents that analysis, is included in Attachment B to this memo.

Refer to Figure 2, Figure 4 and Figure 5 of the MESP NES (Ecoplans 2013) for location.

2.1.1 Characteristics

Vegetation Unit 18 is a very small (0.07 ha), isolated feature located within a matrix of active agricultural cropland. At the time of MESP NES report preparation, it was characterized as an ephemeral feature (i.e., shallow standing water is typically present only during the wettest times of the year) under active crop cultivation during most of the growing year in dry years. Other key characteristics:

- No ELC vegetation community type applies
- Very little non-crop vegetation is typically present and it is dominated by early successional / upland 'weedy' species at the margins.
- Vegetation is typically ploughed before it reaches maturity.
- Appears to be primarily maintained by surface water run-off from the surrounding lands and there are no defined inlet or outlet surface drainage features.
- Botanical quality is very low (low diversity, weedy / adventive species dominate, no conservative species and no species of conservation concern present).

2.1.2 MESP Conclusion re; Wetland Status

As documented in Section 6.1.2.1 of the MESP NES, it was concluded that in 2013 Vegetation Unit 18 had been transformed by agriculture and no longer satisfied the Ontario Wetland Evaluation System (OWES) criteria for being classified as "wetland" and that it was not critical to ecological function of the broader landscape (per Section 6.4.1). As such, the MESP recommended that the wetland be declassified to non-wetland status and removed from the *Barrie's Lake – Bauman Creek PSW*. That is reflected on Figure 2 of the MESP NES. In addition, the wetland was not recommended for retention (in accordance with relevant GRCA policy – per Section 6.4.1 and Figure 14 of the NES), nor was it included in the recommended Natural Heritage System, per Figure 17 of the MESP NES.

The conclusion re; wetland status for Unit 18 was confirmed in the 2016 Scoped EIS for adjacent City lands (Draft Plans of Subdivision 30T-16103 and 30T-16104), wherein Figure 1 identifies this feature as 'other wetland' and not part of the PSW complex.

GRCA online mapping (March 2020) reflects the agency-confirmed and surveyed wetland limits as determined through the approved MESP.

Notwithstanding the recommendation for removal in the approved MESP, NHIC (LIO) mapping (Accessed March 23, 2020) still shows a wetland feature in the vicinity of Unit 18 as part of the PSW complex (not the confirmed / surveyed limit of Unit 18). Note, however, that the LIO wetland mapping does not accurately reflect agency-confirmed and surveyed wetland limits (per the approved MESP) in any area where wetlands were surveyed as part of the MESP.

2.1.3 MESP Linkage Recommendation

An additional key recommendation of the MESP was to establish ecological linkages to:

- restore connectivity between a currently isolated PSW wetland (the Central Wetland' on adjacent City lands to the east, "WSU 6") and nearby natural areas to provide a functional ecological link in a future urban context. Refer to MESP NES Figure 8 (2013) for WSU
- provide defined connections that facilitate wildlife movement between herpetofaunal breeding habitat (WSU 3, WSU 6), overwintering habitat (WSU 1, WSU 3 and WSU 6), foraging and juvenile dispersal areas (existing wetland/woodland and future buffer zones in WSU 1, WSU 3 and WSU 6)

These linkages, identified as Linkage 8a and 8b on Figure 16 of the MESP NES, are components of the broader NHS, shown on Figure 17 of the MESP NES.

Linkages 8a and 8b, under existing conditions, are in areas of active agricultural cropland. Based on MESP survey results, there is substantial herpetofaunal movement to / from the Central wetland, through this non-ideal movement habitat for herpetofauna. Specific design elements were presented in Section 7.3.3.3 of the MESP NES to establish a corridor suitable for herpetofaunal movement (e.g., width, 'directness', funnelling measures, habitat / native species plantings, eco-passages at road crossings, restricted access etc.).

Per specific direction under 'Soil Moisture' in Section 7.3.3.3. of the MESP, Vegetation Unit 18 was not recommended for retention within the linkage (as shown on Figure 17 of the MESP NES) – as this could be a ponded area which could act as a herpetofaunal breeding area sink.

The recommendation for linkages was confirmed in the 2016 Scoped EIS for adjacent City lands, with additional details provided for ecological enhancements in these areas, including design details for wildlife crossings at roads and specific planting recommendations.

Moreover, with approval of Draft Plans of Subdivision 30T-16103 and 30T-16104, as well as the Cambridge West Collector Road EA, the precise location of these linkages has been determined (per attached Consolidated Draft Plan dated September 10, 2020). Detailed design of the linkages is currently in process, with anticipated installation in 2021. The linkage location is shown on Figure 7 and Figure 8 of the EIS, and on the updated Plans of Subdivision currently being Registered (MHBC; July 16, 2019). In accordance with MESP recommendations, a preliminary design / grading for the portion of the ecological corridor on the Township lands has also been prepared (MTE; March 23, 2020).

2.2 UPDATED ANALYSIS

As noted, limit of Vegetation Unit 18 was revisited through an updated delineation in October 2019. Limits are consistent with previous delineations – see attached Figure 1 and MESP NES Figure 4.

Furthermore, the characterization of Vegetation Unit 18 presented above was confirmed through the field surveys undertaken subsequent to the MESP (from 2014 through 2020), with the feature exhibiting varying levels of ploughing and semi-natural vegetation / cropping across years. In 2019, VU18 was ploughed through, with a mix of remnant crops (corn, soybeans) and naturally regenerating vegetation. Naturally occurring species recorded during 2019 included Nodding Beggar's Ticks (*Bidens cernua*), Yellow Nutsedge (*Cyperus esculentus*), Barnyard Grass (*Echinochloa crus-galli*), and Small-flower Willow-herb (*Epilobium parviflorum*). Wetland species cover was slightly greater than 50% (based on in-season vegetation surveys on July 17, 2019 and September 13, 2019).

In consideration of updated field survey results, there is no new information that would suggest that this wetland warrants retention based on ecological or hydrological attributes. It exhibits the same characteristics and very limited ecological function as described in the approved studies referenced herein (i.e., isolated, very small, low botanical quality, low wildlife habitat value, no specialized habitat / locally unique attributes). Moreover, it is not critical to ecological or hydrological function of the broader landscape and would likely not be viable if retained in a future development scenario.

2.3 WETLAND COMPLEXING ANALYSIS

Vegetation Unit 18 is located less than 750 m from existing wetland areas in the Barrie's Lake – Bauman Creek PSW Complex, within the same watershed. However, it wetland is less than 2 ha in size and does not provide important ecological benefits to the larger PSW complex. In Vegetation Unit 18 there are no rare species, no groundwater seepage / discharge, no permanent hydrological connection, no significant wildlife habitat, and no linkage to wetlands to the east or west.

3.0 CONCLUSIONS & RECOMMENDATIONS

The removal of this small, highly disturbed feature would not cause a negative impact to the broader PSW, particularly in consideration of the substantive ecological enhancements to be undertaken on the City lands (through the approved Plans of Subdivision) and anticipated on the Township lands: conversion of significant areas of current agricultural cropland to naturalized buffer (30-50 m widths for much of the area); and establishment of naturalized ecological corridors / enhanced corridor function.

It is recommended that Vegetation Unit 18 be declassified to non-wetland status and removed from the *Barrie's Lake – Bauman Creek PSW Complex* and that LIO mapping be updated to reflect the agency-confirmed, surveyed limits within the Cambridge West community (City and Township lands).

Signatures

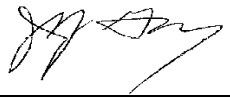
Prepared by

August 20, 2020

Jennifer McPhee, MSc.,
Ecologist

Date

Reviewed by



September 15, 2020

Jeff Gross, MSc.,
Project Manager / Senior Ecologist

Date

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ATTACHMENT A

Figures from Relevant Studies

ATTACHMENT B

Excerpts from Section 6.1.2.1 of the MESP NES (Ecoplans 2013)

6.1.2.1 Provincially Significant Wetland Evaluation

As noted, all wetlands contiguous to existing PSW within the DSA are recommended for inclusion in the PSWs (i.e., the adjusted wetland limits based on field flagging and agency confirmation, surveyed and shown on Figure 4.

In addition, we have considered the merits of: retaining PSW status for the small wetland in Vegetation Unit 18 that has been displaced by agriculture; and including the small wetland in Vegetation Unit 16 within the Barrie's Lake – Bauman Creek PSW Complex. The merits of reclassifying a third wetland feature to the south of Vegetation Unit 10 are also examined. This evaluation has been completed based on direction provided in the updated Ontario Wetland Evaluation System Southern Manual, 3rd Edition, Version 3.2 (2013), "OWES".

Vegetation Unit 18

Vegetation Unit 18 is a very small (0.07 ha), isolated wetland located in the GSA. It is currently identified as part of the Barrie's Lake – Bauman Creek Provincially Significant Wetland Complex. The wetland is located in an agricultural field at the bend in the farm lane that forms part of the boundary between the GSA and the DSA.

The boundaries of the PSW complex were last evaluated in April 2003. The status and boundaries of the PSW were verified by OMNR on 12 February 2008 (Grand River Watershed Viewer, GRCA Web – GIS Viewer).

GRCA established a wetland limit for the wetland in Vegetation Unit 18 on October 28, 2010, following site inspection of the wetland limit staked by Ecoplans. The wetland in Vegetation Unit 16, therefore, is regulated by the GRCA under the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses, Ontario Regulation 150/06 (2013) and subject to the GRCA Wetlands Policy (2003).

Wetland History

Inspection of historical aerial photography and satellite imagery reveals that during the period 1945 to 1963, the wetland in Vegetation Unit 18 was an apparent meadow marsh located in the front yard of a farmstead. In April 2006, the wetland was still present but there were signs of extensive earth movement on the margins of the wetland and the farmstead was no longer present. On April 26, 2006 (air photo date), the wetland contained several small patches of open water. In November 2012, however, the wetland had been planted through with corn and no open water was present. During a field visit on April 23, 2013, corn stubble was visible above the shallow ponded water that was present at the site of the former wetland. No visible remnants of wetland vegetation were apparent at that time.

Subject to verification during the growing season in 2013, it appears that the wetland vegetation in Vegetation Unit 18 has been displaced by agriculture and by modifications to the landform that are visible on the satellite imagery from 2006.

Conclusion

In its apparent present state, the wetland in Vegetation Unit 18 has been transformed by agriculture and no longer satisfies the “50% wetland vegetation” rule for classifying “wetland” (OWES 2013, p.26). The wetland should therefore be declassified to non-wetland status and removed from the Barrie’s Lake – Bauman Creek PSW Complex.

CONSOLIDATED DRAFT PLAN OF SUBDIVISION AND ADDITIONAL LANDS

Legal Description

PART OF LOTS 17 AND 18, CONCESSION 12
TOWNSHIP OF NORTH DUMFRIES
REGIONAL MUNICIPALITY OF WATERLOO

ADDITONAL LANDS OWNED BY
HALLMAN CONSTRUCTION LIMITED

HALLMAN CONSTRUCTION LIMITED
DRAFT PLAN OF SUBDIVISION

BRIAN DOMM
DRAFT PLAN OF
SUBDIVSION

ADDITONAL LANDS OWNED BY
BRIAN DOMM

HALLMAN
CONSTRUCTION
LIMITED
DRAFT PLAN OF
SUBDIVISION

ADDITONAL
LANDS
OWNED BY
HALLMAN
CONSTRUCTION
LIMITED

City of Cambridge
Township of North Dumfries

ROSEVILLE ROAD

Cruickston Creek

WESTCLIFF WAY
HALE CT.
DOMM LANE
WOODPECKER

Surveyed Welland Limit
Surveyed Dripline

LOT 18 CONCESSION 12
LOT 17 CONCESSION 12
ROAD ALLOWANCE BETWEEN LOTS 17 AND 18
NOT A PART OF THIS PLAN

PART 1, PLAN 58R-9072
PART 2, PLAN 58R-9072
PART 3, PLAN 58R-9072
PART 5, PLAN 58R-9072
PART 6, PLAN 58R-9072
PART 7, PLAN 58R-9072
PART 8, PLAN 58R-9072
PART 9, PLAN 58R-9072

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR. KITCHENER, ON. N2B 3X9 | P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Approval Stamp	**Date** September 10, 2020
	File No. 0800C
	Plan Scale 1:1,250 (36x36)
	Drawn By D.G.S.
	Checked By P.B.
Project Westwood Phase 2	**Other**
	north
File Name DRAFT PLAN	**Dwg No.** 1 of 1

Scale Bar 0 5 10 25 50 100m

K:\0800C-Gatestone Developments-North Dumfries Lands\DP\Consolidated Draft Plan September10 2020 for EIS.dwg

ATTACHMENT A

Figures from Relevant Studies

L:\Projects\Ecoplans\3200...\3308CambridgeWest\Maps\FiguresJune2013\CambridgeWest_LandUseCalcsFig1_June2013.mxd 2013\11\18

CITY OF CAMBRIDGE

GRAND RIVER

BLAIR ROAD

ROSSLINN ROAD

WESTCLIFFE WAY

BISMARK DRIVE

CPR

WATERLOO REGION

ROSEVILLE ROAD

BARRIE'S LAKE

BLENHEIM ROAD

CITY OF CAMBRIDGE

Legend

- Development Study Area
- General Study Area
- Agricultural Lands
- Natural Areas
- Urban

	Development Study Area (DSA)		General Study Area (GSA)		Total (DSA + GSA)	
	Area (ha)	% of Total DSA	Area (ha)	% of Total GSA	Area (ha)	% of Total
Natural Areas	16.9	19%	282.6	39%	299.5	36%
Agricultural Lands	73.8	81%	196.1	27%	269.9	33%
Urban	0.0	0%	251.9	34%	251.9	31%
	90.7		730.6		821.3	

ecoplans
A member of MMM GROUP

Cambridge West MESP - Natural Environment Study

Land Use Cover

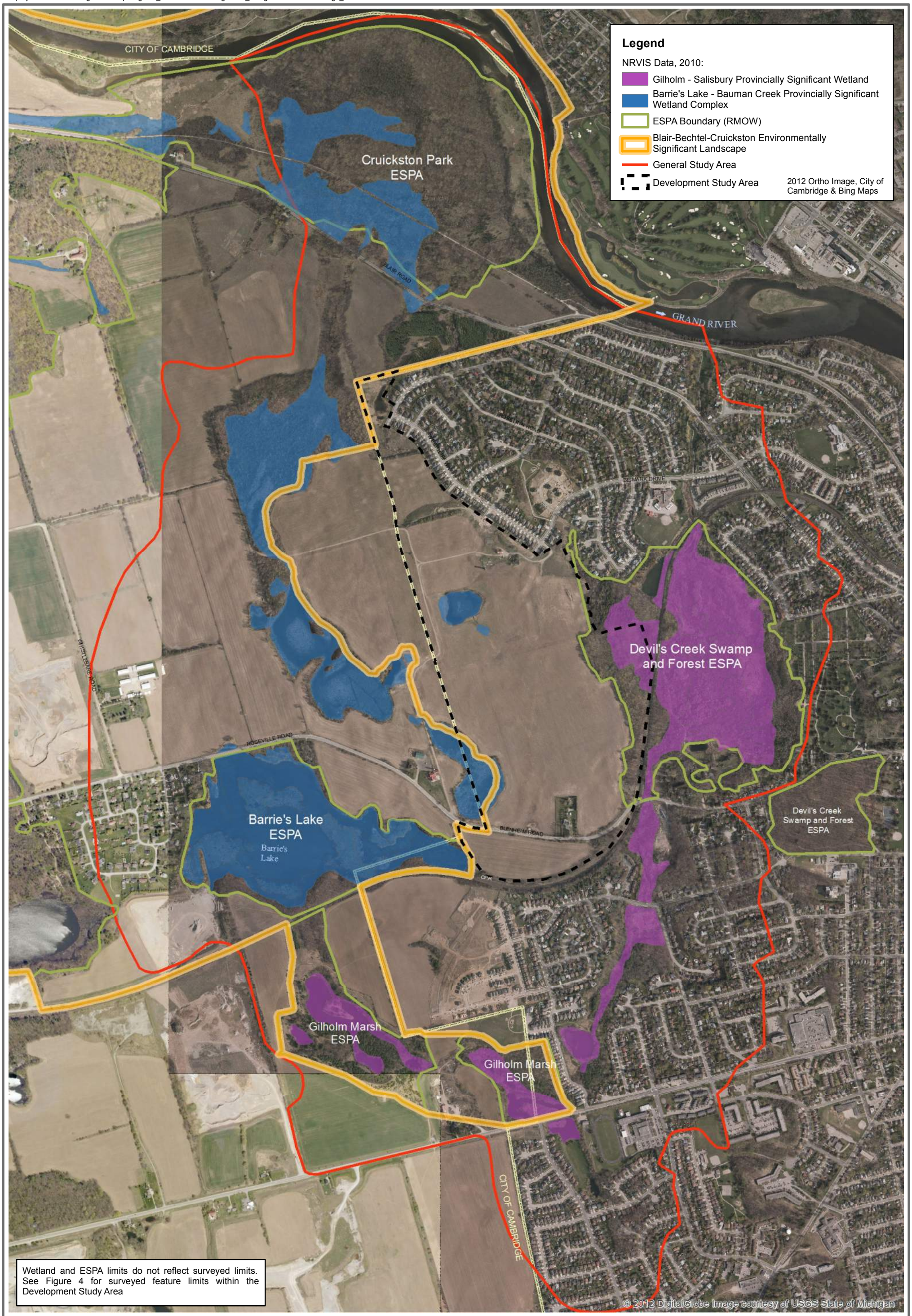
2012 Ortho Image, City of Cambridge & Bing Maps

0 100 200
metres
1:12,500

N

Date: November 2013
Project No: 50-3308
Figure No: 1

L:\projects\3308CambridgeWest\Maps\Figures_June2013\CambridgeWest_DesignatedNatFeaturesFig2_June2013.mxd 2013/11/18



ecoplans
A member of MMM GROUP

Cambridge West MESP - Natural Environment Study

Designated Natural Heritage Features

0 100 200
metres
1:12,500

N

Date: November 2013
Project No: 333308
Figure No: 2

L:\projects\3308CambridgeWest\Maps\Figures_June2013\CambridgeWest_FinalSurveyFig4_June2013.mxd 2013\11\18

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A member of MMM GROUP

Cambridge West MESP - Natural Environment Study

Surveyed Wetland and Dripline Boundaries

2012 Ortho Image City of Cambridge

0 50 100
metres
1:6,000

N

Date: November 2013

Project No: 333308

Figure No: 4

L:\Projects\Ecoplans\3200...\3308CambridgeWest\Maps\Figures_June2013\CambridgeWest_VegCommDSAFig5_June2013.mxd 2013\11\18

ELC Vegetation Communities

Unit 1a	FOD1-4 Dry-Fresh Oak - Hardwood Deciduous Forest FOD3-1 Dry-Fresh Poplar Deciduous Forest CUM1-1 Dry-Moist Old Field Meadow
Unit 1b	SWT3-2 Willow Organic Thicket Swamp SWT3-7 Winterberry Organic Thicket Swamp MAM3-3 Reed-canary Grass Organic Meadow Marsh MAM3-9 Forb Organic Meadow Marsh MAS3-1 Cattail Organic Shallow Marsh SAF3-1 Duckweed Floating-leaved Shallow Aquatic
Unit 2	FOD5-3 Dry-Fresh Sugar Maple – Oak Deciduous Forest
Unit 3	FOD5-2 Dry-Fresh Sugar Maple – Beech Deciduous Forest
Unit 4	SAF3-1 Duckweed Floating-leaved Shallow Aquatic SWT3-7 Winterberry Organic Thicket Swamp
Unit 5	SWM6-1 Birch-Conifer Organic Mixed Swamp
Unit 6	CUM1-1 Dry-Moist Old Field Meadow
Unit 7	FOD5-2 Dry-Fresh Sugar Maple – Beech Deciduous Forest FOD5-3 Dry-Fresh Sugar Maple – Oak Deciduous Forest Inclusions: FOD5-6 Dry-Fresh Sugar Maple Basswood Deciduous Forest
Unit 8	SWD7-2 Yellow Birch Organic Deciduous Swamp Inclusions: SWM6-1 Birch – Conifer Organic Mixed Swamp FOD5-2 Dry-Fresh Sugar Maple – Beech Deciduous Forest
Unit 9	SWC3-1 White Cedar Organic Coniferous Swamp
Unit 10a	SAF3-1 Duckweed Floating-leaved Shallow Aquatic MAS3-1 Cattail Organic Shallow Marsh MAM3-3 Reed-canary Grass Organic Meadow Marsh
Unit 10b	CUM1-1 Dry-Moist Old Field Meadow
Unit 11a	SWT3-2 Willow Organic Thicket Swamp
Unit 11b	SAF3-1 Duckweed Floating-leaved Shallow Aquatic MAS3-1 Cattail Organic Shallow Marsh MAM3-3 Reed-canary Grass Organic Meadow Marsh Inclusions: CUM1-1 Dry-Moist Old Field Meadow CUW1 Mineral Cultural Woodland
Unit 12	SAF3-1 Duckweed Floating-leaved Shallow Aquatic MAM2-2 Reed-canary Grass Mineral Meadow Marsh
Unit 13	SWT3-2 Willow Organic Thicket Swamp Inclusions: MAS3-1 Cattail Organic Shallow Marsh MAM3-3 Reed-canary Grass Organic Meadow Marsh SAF3-1 Duckweed Floating-leaved Shallow Aquatic SWC3-1 White Cedar Organic Coniferous Swamp
Unit 14a	CUM1-1Dry-Moist Old Field Meadow
Unit 14b	CUT1-1 Sumac Cultural Thicket CUT1 Mineral Cultural Thicket CUW1 Mineral Cultural Woodland
Unit 15	CUW1 Mineral Cultural Woodland CUT1 Mineral Cultural Thicket Inclusions: SWT2-5 Red-osier Mineral Thicket Swamp
Unit 16	MAM2-2 Reed-canary Grass Mineral Meadow Marsh Inclusion: MAM2-10 Forb Mineral Meadow Marsh
Unit 17	CUM1-1 Dry-Moist Old Field Meadow
Unit 18	ELC not applicable
Unit 19	CUM1-1 Dry-Moist Old Field Meadow
Unit 20	SAF3-1 Duckweed Floating-leaved Shallow Aquatic SWT3-2 Willow Organic Thicket Swamp CUT1 Mineral Cultural Thicket MAS3 Organic Shallow Marsh
Unit 21	CUM1-1 Dry-Moist Old Field Meadow
Unit 22	FOD5-3 Dry-Fresh Sugar Maple – Deciduous Forest
Unit 23	CUT1-1 Sumac Cultural Thicket Inclusions: CUW1 Mineral Cultural Woodland
Unit 24	SWD4-3 White Birch – Poplar Mineral Deciduous Swamp Inclusion: MAM2-9 Jewelweed Mineral Meadow Marsh
Unit 25	SAS Submerged Shallow Aquatic SAM Mixed Shallow Aquatic FES1-4 Leatherleaf – Forb Shrub Fen MAS3-1 Cattail Organic Shallow Marsh SAF1-1 Water Lily – Bullhead Lily Floating-leaved Shallow Aquatic SWC4-2 Tamarack Organic Coniferous Swamp MAM3-5 Narrow-leaved Sedge Organic Meadow

ecoplans
A member of MMM GROUP

Cambridge West MESP - Natural Environment Study

Vegetation Communities - Development Study Area

2012 Ortho Image, City of Cambridge

0 100 200
metres
1:12,500

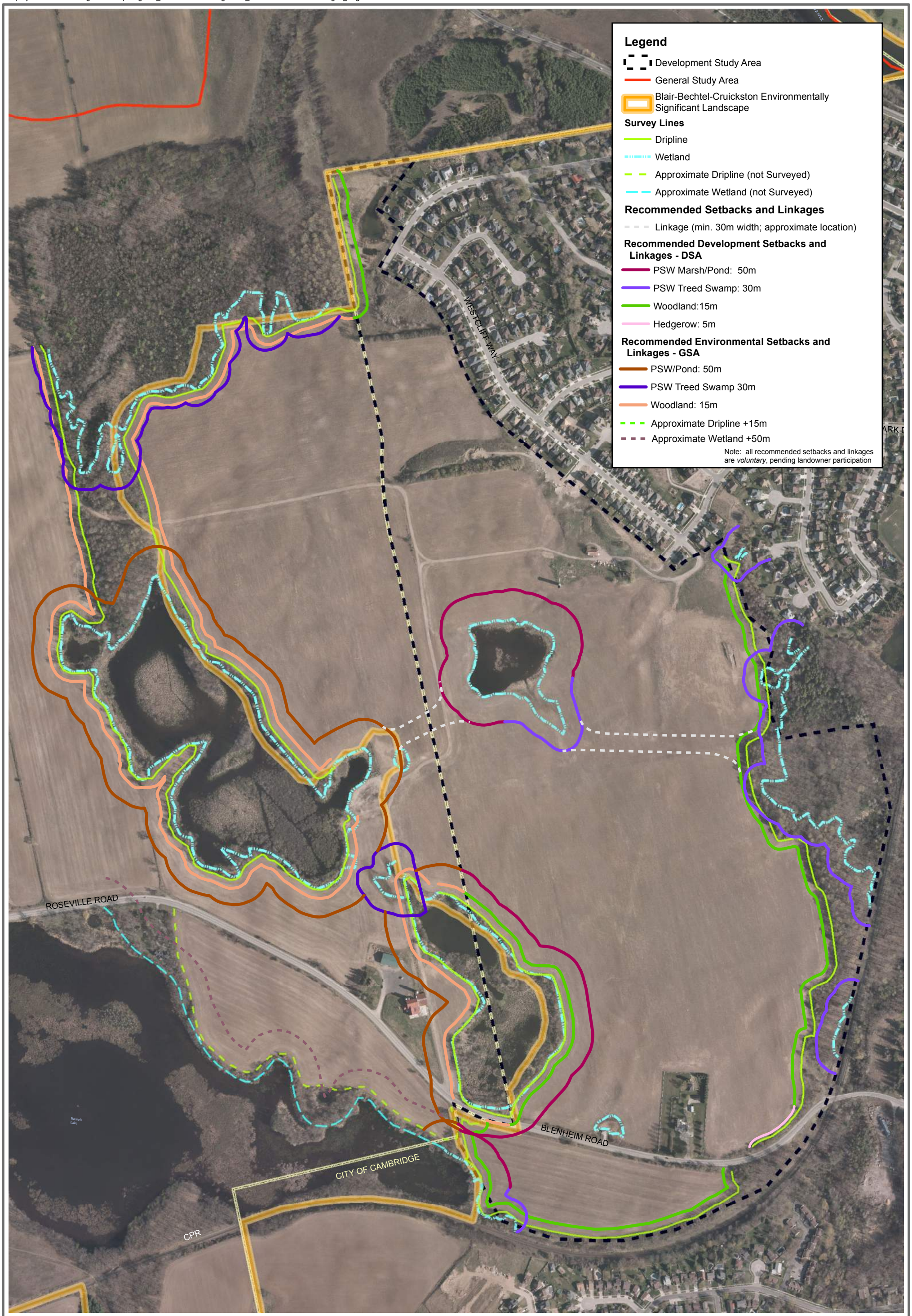
N

Date: November 2013

Project No: 333308

Figure No: 5

L:\projects\3308CambridgeWest\Maps\Figures_June2013\CambridgeWest_EnvironmentalSetbacksFig14_Aug2013.mxd 2013\09\18



ecoplans
A member of MMM GROUP

Cambridge West MESP - Natural Environment Study

Environmental Setbacks

2012 Ortho Image, City of Cambridge

0 50 100
metres
1:6,000

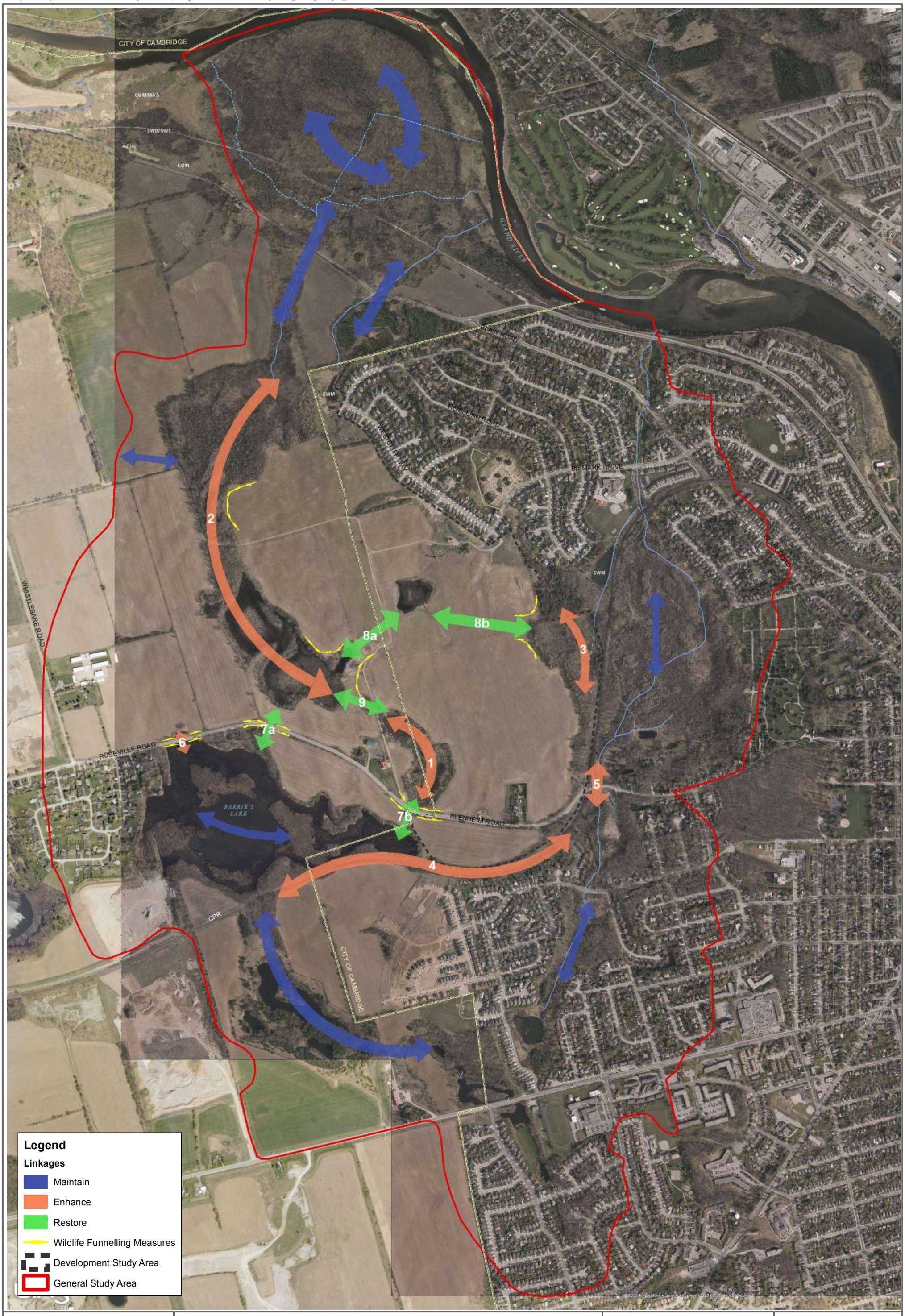
N

Date: November 2013

Project No: 333308

Figure No: 14

L:\Projects\Ecoplans\3200...\3308CambridgeWest\Maps\Figures June2013\CambridgeWest_LinkagesFig16_June2013.mxd 2013\11\19



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Cambridge West MESP - Natural Environment Study

Ecological Linkages

2012 Ortho Image, City of Cambridge & Bing Maps

0 100 200
metres
1:12,500

N

Date: November 2013
Project No: 333308
Figure No: 16

L:\projects\3308CambridgeWest\Maps\FiguresJune2013\CambridgeWest_NatHeritageSystemFig17_July2013.mxd 2013\11\19

Legend

- Development Study Area
- General Study Area

Management Areas

- Core Areas
- Potential Future Enhancement Area (approx.)

Development Study Area

- Buffer/Corridor Management
- Development Limit

General Study Area

- Buffer/Corridor Management
- Environmental Setback
- Environmental Setback (approx.)
- Wildlife Passage (1-7)
- Potential Turtle Nesting Creation Site

WESTCLIFF WAY

BISMARK

ROSEVILLE ROAD

1

2

3

4

5

6

7

Barrie's Lake

BLENHEIM ROAD

CPR

CITY OF CAMBRIDGE

ecoplans
A member of MMM GROUP

Cambridge West MESP - Natural Environment Study

Natural Heritage System

2012 Ortho Image, City of Cambridge

0 50 100
metres
1:6,000

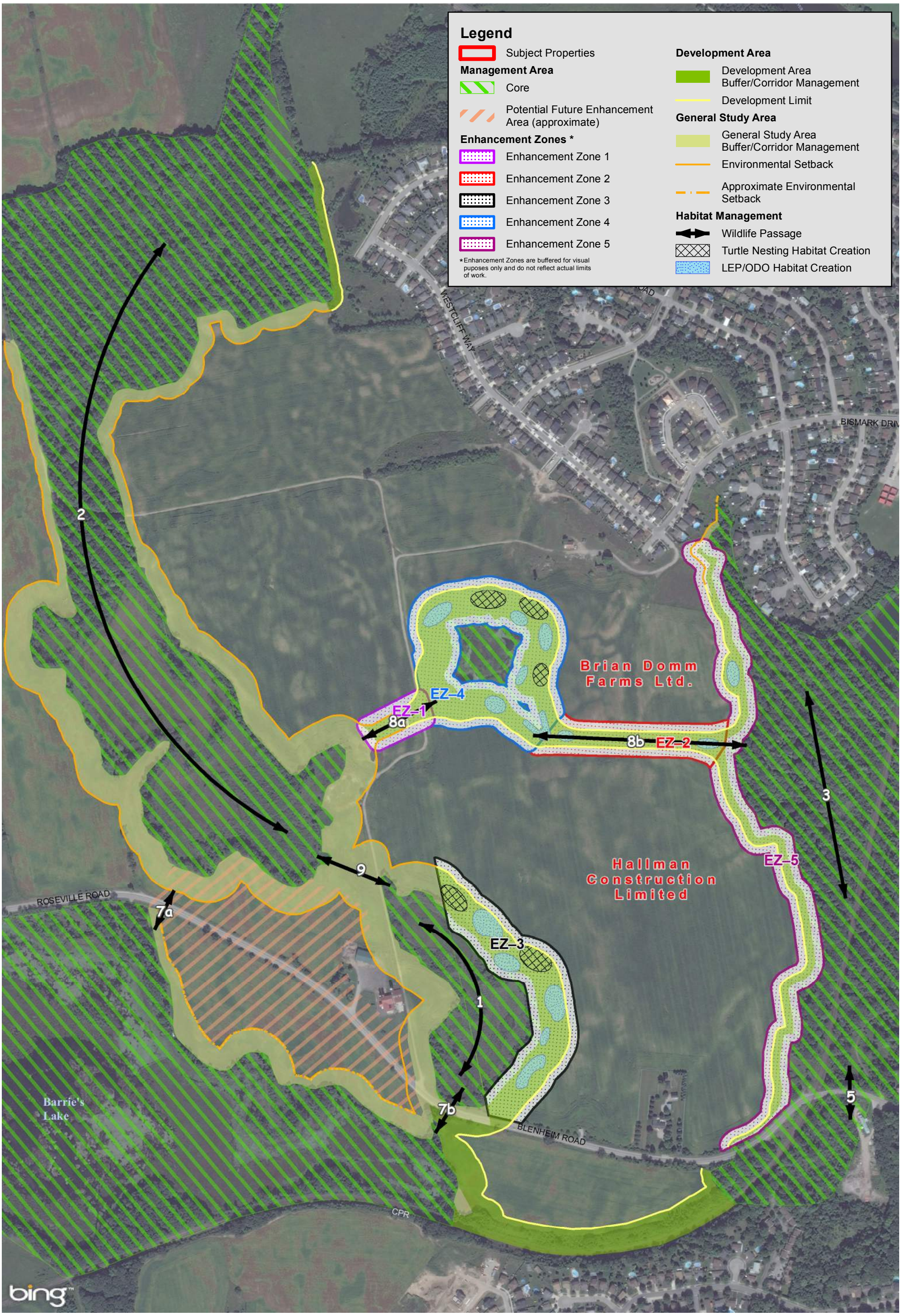
N

Date: November 2013

Project No: 333308

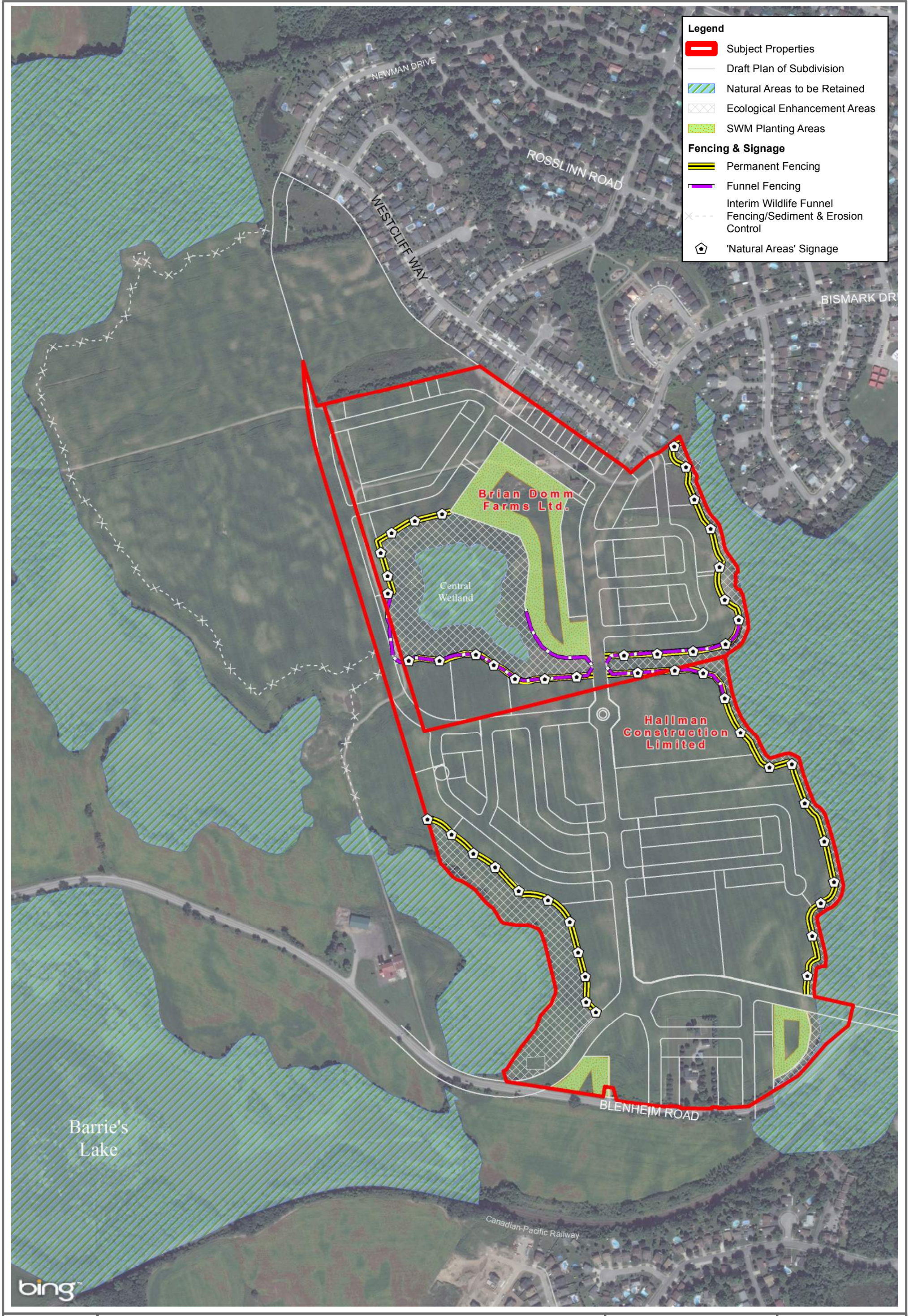
Figure No: 17

L:\Projects\2014\3333080_CambridgeWest_DevilsCreek\Maps\2016January\Fig7CambridgeWest_NatHeritageSystem_2016Jan.mxd 29/03/2016



WSP / MMM GROUP	HALLMAN CONSTRUCTION LIMITED AND BRIAN DOMM FARMS LTD., CAMBRIDGE WEST LANDS – SCOPED ENVIRONMENTAL IMPACT STUDY **Natural Heritage System and Ecological Enhancement Zones**	0 50 100 metres 1:6,000 N	Date: March 2016 Project No: 3333080 Figure No: 7

L:\Projects\2014\3333080_CambridgeWest_DevilsCreek\Maps\2016January\Fig8CambridgeWest_DraftPlan_2016Jan.mxd 29/03/2016



WSP
MMM GROUP

HALLMAN CONSTRUCTION LIMITED AND BRIAN DOMM FARMS LTD.,
CAMBRIDGE WEST LANDS – SCOPED ENVIRONMENTAL IMPACT STUDY
Draft Plan of Subdivision and Ecological Enhancement Measures

0 50 100
metres
1:5,500

N

Date: March 2016
Project No: 3333080
Figure No: 8

ATTACHMENT B

Excerpts from Section 6.1.2.1 of the MESP NES (Ecoplans 2013)

6.1.2.1 Provincially Significant Wetland Evaluation

As noted, all wetlands contiguous to existing PSW within the DSA are recommended for inclusion in the PSWs (i.e., the adjusted wetland limits based on field flagging and agency confirmation, surveyed and shown on Figure 4.

In addition, we have considered the merits of: retaining PSW status for the small wetland in Vegetation Unit 18 that has been displaced by agriculture; and including the small wetland in Vegetation Unit 16 within the Barrie's Lake – Bauman Creek PSW Complex. The merits of reclassifying a third wetland feature to the south of Vegetation Unit 10 are also examined. This evaluation has been completed based on direction provided in the updated Ontario Wetland Evaluation System Southern Manual, 3rd Edition, Version 3.2 (2013), "OWES".

Vegetation Unit 18

Vegetation Unit 18 is a very small (0.07 ha), isolated wetland located in the GSA. It is currently identified as part of the Barrie's Lake – Bauman Creek Provincially Significant Wetland Complex. The wetland is located in an agricultural field at the bend in the farm lane that forms part of the boundary between the GSA and the DSA.

The boundaries of the PSW complex were last evaluated in April 2003. The status and boundaries of the PSW were verified by OMNR on 12 February 2008 (Grand River Watershed Viewer, GRCA Web – GIS Viewer).

GRCA established a wetland limit for the wetland in Vegetation Unit 18 on October 28, 2010, following site inspection of the wetland limit staked by Ecoplans. The wetland in Vegetation Unit 16, therefore, is regulated by the GRCA under the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses, Ontario Regulation 150/06 (2013) and subject to the GRCA Wetlands Policy (2003).

Wetland History

Inspection of historical aerial photography and satellite imagery reveals that during the period 1945 to 1963, the wetland in Vegetation Unit 18 was an apparent meadow marsh located in the front yard of a farmstead. In April 2006, the wetland was still present but there were signs of extensive earth movement on the margins of the wetland and the farmstead was no longer present. On April 26, 2006 (air photo date), the wetland contained several small patches of open water. In November 2012, however, the wetland had been planted through with corn and no open water was present. During a field visit on April 23, 2013, corn stubble was visible above the shallow ponded water that was present at the site of the former wetland. No visible remnants of wetland vegetation were apparent at that time.

Subject to verification during the growing season in 2013, it appears that the wetland vegetation in Vegetation Unit 18 has been displaced by agriculture and by modifications to the landform that are visible on the satellite imagery from 2006.

Conclusion

In its apparent present state, the wetland in Vegetation Unit 18 has been transformed by agriculture and no longer satisfies the “50% wetland vegetation” rule for classifying “wetland” (OWES 2013, p.26). The wetland should therefore be declassified to non-wetland status and removed from the Barrie’s Lake – Bauman Creek PSW Complex.

APPENDIX H

DRAFT PLAN OF SUBDIVISION

Notes

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. BOUNDARY INFORMATION FROM PLAN 58R-20976 PREPARED BY MTE ONTARIO LAND SURVEYORS LTD., NOVEMBER 6, 2020.
3. TOPOGRAPHICAL BASE INFORMATION PROVIDED BY MTE.
4. DRIPLINE AND WETLAND INFORMATION PROVIDED BY WSP.
5. ADJACENT PARCEL FABRIC IS APPROXIMATE.

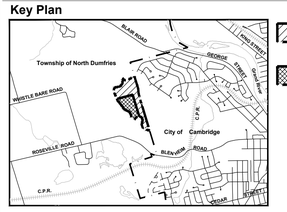
■■■■ DENOTES STAGE LIMITS

CONSOLIDATED DRAFT PLAN OF SUBDIVISION

Legal Description

PART OF LOTS 13 AND 14, CONCESSION 11
AND PART OF ROAD ALLOWANCE BETWEEN CONCESSIONS 11 & 12
TOWNSHIP OF NORTH DUMFRIES
REGIONAL MUNICIPALITY OF WATERLOO

Key Plan



Limits of Hallman Draft Plan

Limits of Domm Draft Plan

north

SCALE: NTS

Source: SLRN, Region of Waterloo

Additional Information Required Under Section 51(17) of the Planning Act R.S.O. 1990, c.P.13 as Amended

A. AS SHOWN	B. AS SHOWN	C. AS SHOWN
D. RESIDENTIAL, MULTIPLE RESIDENTIAL, PARK, WILDLIFE CORRIDOR		
E. AS SHOWN	F. AS SHOWN	G. AS SHOWN
H. MUNICIPAL WATER SUPPLY	I. LOAM	J. AS SHOWN
K. ALL SERVICES AS REQUIRED	L. AS SHOWN	

Area Schedule - Hallman Construction Limited **30T-_____**

	STAGE 1			STAGE 2		
Description	Lots/Blks	Units	Area (ha)	Lots/Blks	Units	Area (ha)
Residential/ Consolidation Block	1-13	83-115	2.809	1-9	82-98	3.745
Park	14		0.217			
Emergency Access	15	1-2	0.070	10	1	0.057
Wildlife Corridor	16		0.246			
0.3m Reserve	17-20		0.004	11,12		0.002
Roads			1.121			1.108
Total	**20**	**84-117**	**4.467**	**12**	**83-99**	**4.912**

	STAGE 3			STAGE 4		
Description	Lots/Blks	Units	Area (ha)	Lots/Blks	Units	Area (ha)
Residential/ Consolidation Block				1-5	37-44	2.024
Multiple Residential/ Consolidation Block	1	59-185	1.857			
Emergency Access				6	1	0.046
0.3m Reserve				7-9		0.005
Roads						0.676
Total	**1**	**59-185**	**1.857**	**9**	**38-45**	**2.751**

	STAGE 5			TOTAL		
Description	Lots/Blks	Units	Area (ha)	Lots/Blks	Units	Area (ha)
Residential/ Consolidation Block	1-4	47-58	2.542	30	249-315	11.120
Multiple Residential/ Consolidation Block				1	59-185	1.857
Park				1		0.217
Wildlife Corridor				1		0.246
Emergency Access				3	3-4	0.173
0.3m Reserve	5		0.001	10		0.012
Roads			0.417			3.322
Total	**5**	**47-58**	**2.960**	**46**	**311-504**	**16.947**

Area Schedule - Brian Domm **30T-_____**

	STAGE 1			STAGE 2		
Description	Lots/Blks	Units	Area (ha)	Lots/Blks	Units	Area (ha)
Residential/ Consolidation Block	1-14	88-104	3.669	1-7	26-30	1.469
Park	15,16		0.886	8		0.074
Emergency Access	17,18	5-6	0.302			
Walkway	19		0.018			
0.3m Reserve	20-22		0.003			
Roads			1.415			0.518
Total	**22**	**93-110**	**6.293**	**8**	**26-30**	**2.061**

	STAGE 3			TOTAL		
Description	Lots/Blks	Units	Area (ha)	Lots/Blks	Units	Area (ha)
Residential/ Consolidation Block				21	114-134	5.138
Multiple Residential/ Consolidation Block	1	0-12	0.126	1	0-12	0.126
Park				3		0.960
Emergency Access				2	5-6	0.302
Walkway				1		0.018
0.3m Reserve				3		0.003
Roads						1.933
Total	**1**	**0-12**	**0.126**	**31**	**119-152**	**8.480**

Total Number of Units Proposed for Entire Plan (Hallman/Domm):430-656

Unit Calculations:

Minimum Unit Yield: 13.716m (45 ft) lots backing onto Open Space
12.192m (40 ft) lots across from those lots backing onto Open Space
10.9728m (36 ft) lots for the remainder
5.5m (18 ft) units from used for street townhouse blocks
Concept Plan used for minimum number of units in multiple blocks

Maximum Unit Yield: 12.192m (40 ft) lots backing onto Open Space
10.9728m (36 ft) lots across from those lots backing onto Open Space
9.0m (30 ft) lots for the remainder
5.5m (18 ft) units from used for street townhouse blocks
100 units/ha used for maximum number of units in multiple blocks

Rev. No.	Date	Issued / Revision	By
1.	Feb.4, 2021	For Submission to Region of Waterloo;	DGS

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR. KITCHENER, ON, N2B 3X9 | P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Approval Stamp

Date	February 4, 2021
File No.	0800C
Plan Scale	1:1,250 (36x36)
Drawn By	D.G.S.
Checked By	P.B.

Project Westwood Phase 2

Applicant
Hallman Construction Limited/
Brian Domm

north

File Name DRAFT PLAN

Dwg No. 1 of 1

Scale Bar 0 5 10 25 50 100m

K:\0800C-Gatestone Developments-North Dumfries Lands\DP\Consolidated Draft Plan February4 2021.dwg

DRAFT PLAN OF SUBDIVISION

Legal Description
PART OF LOTS 13 AND 14, CONCESSION 11
AND PART OF ROAD ALLOWANCE BETWEEN CONCESSIONS 11 & 12
TOWNSHIP OF NORTH DUMFRIES
REGIONAL MUNICIPALITY OF WATERLOO

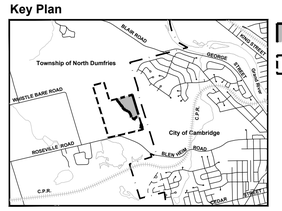
Owner's Certificate
I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

DATE: _____ _____
Brian Domm, Owner

Surveyor's Certificate
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE: _____ _____
Trevor D.A. McNeil, OLS (MTE OLS LTD.)

Key Plan



Subject Lands
Additional Lands Owned by Applicant

SCALE: NTS
Source: SLRN, Region of Waterloo

Additional Information Required Under Section 51(17) of the Planning Act R.S.O. 1990, c.P.13 as Amended

A. AS SHOWN	B. AS SHOWN	C. AS SHOWN
D. RESIDENTIAL, MULTIPLE RESIDENTIAL, PARK, OPEN SPACE		
E. AS SHOWN	F. AS SHOWN	G. AS SHOWN
H. MUNICIPAL WATER SUPPLY	I. LOAM	J. AS SHOWN
K. ALL SERVICES AS REQUIRED	L. AS SHOWN	

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Notes
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3. TOPOGRAPHICAL BASE INFORMATION PROVIDED BY MTE.
4. DRIPLINE AND WETLAND INFORMATION PROVIDED BY WSP.
5. ADJACENT PARCEL FABRIC IS APPROXIMATE.

DENOTES STAGE LIMITS

Rev. No.	Date	Issued / Revision	By
1.	Feb.4, 2021	For Submission to Region of Waterloo;	DGS

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
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Approval Stamp

Date February 4, 2021
File No. 0800C
Plan Scale 1:1,000 (30x36)
Drawn By D.G.S.
Checked By P.B.

Project **Westwood Phase 2**
Other

Applicant
Brian Domm
1359 Dickie Settlement Road
Cambridge, ON. N3H 4R8
P: 519.623.5086 F: 519.623.8547

File Name **DRAFT PLAN**
Dwg No. 1 of 1

Scale Bar 0 10 25 50 75 100m

K:\0800C-Gatestone Developments-North Dumfries Lands\DP\Draft Plan Domm February4 2021.dwg

DRAFT PLAN OF SUBDIVISION

Legal Description

PART OF LOTS 13 AND 14, CONCESSION 11
AND PART OF ROAD ALLOWANCE BETWEEN CONCESSIONS 11 & 12
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REGIONAL MUNICIPALITY OF WATERLOO

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DATE: _____

Paul Grespan, President (Hallman Construction Limited)

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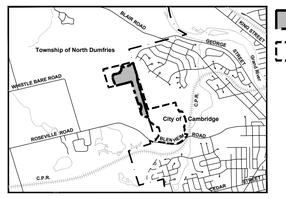
Key Plan



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5. ADJACENT PARCEL FABRIC IS APPROXIMATE.

■■■■ DENOTES STAGE LIMITS

Rev. No.	Date	Issued / Revision	By
1.	Feb. 4, 2021	For Submission to Region of Waterloo;	DGS

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR, KITCHENER, ON, N2B 3X9 | P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Approval Stamp

Date	February 4, 2021
File No.	0800C
Plan Scale	1:1,250 (36x36)
Drawn By	D.G.S.
Checked By	P.B.
Other	

Project **Westwood Phase 2**

Applicant
Hallman Construction Limited
c/o Paul Grespan,
675 Riverbend Drive
Kitchener, ON. N2K 3S3
P: 519.571.8800 F: 519.742.1841

File Name **DRAFT PLAN**

Dwg No. 1 of 1

Scale Bar 0 5 10 25 50 100m

K:\0800C-Gatestone Developments-North Dumfries Lands\DP\Draft Plan Hallman February4 2021.dwg

APPENDIX I

SWM, GRADING & WATER BALANCE

LEGEND

- PROPERTY BOUNDARY
- EXISTING CONTOURS (326)
- MUNICIPAL BOUNDARY
- SUBJECT LANDS (DRAFT PLAN LIMITS)
- LIMIT OF WETLAND
- LIMIT OF WETLAND BUFFER
- GRCA REGULATION LIMIT
- FLOODLINE LIMIT
- EXISTING SWM FACILITY
- 101 / 0.39 — SUB-CATCHMENT NUMBER / AREA (ha.)

GRANDVIEW HILLS SUBDIVISION
BLOSSOMFIELD CRESCENT
DOMM PARK
ROSSLINN ROAD
BISMARK DRIVE
WESTCLIFF WAY
PRINCESS STREET
GRAND RIVER
HALE CRESCENT
NEWMAN CREEK
NEWMAN DRIVE
EX. NEWMAN DRIVE SWM FACILITY
NEWMAN LANDS (30T-16105)
CACHET SUBDIVISION (30T-16103)
WETLAND 2
DEVIL'S CREEK
HALLMAN SUBDIVISION (30T-16104)
200 BLENHEIM RD.
BLENHEIM ROAD
CANADIAN PACIFIC RAILWAY
WETLAND 3
CITY OF CAMBRIDGE
TOWNSHIP OF NORTH DUMFRIES
CRUICKSTON CREEK
East Wetland (Vernal Pond 7)
HALLMAN SUBDIVISION
BRIAN DOMM SUBDIVISION
WETLAND 4
West Wetland (Vernal Pond 1)
BARRIE'S LAKE
GILHOLM MARSH

101	0.39	
102	2.14	
103	2.59	*
104	2.82	*
105	16.40	
108	12.40	
109	12.52	
201	8.07	
202	10.84	
301	16.62	
304	11.93	
305	0.65	
306	4.39	
307	16.53	
308	6.30	
309	1.64	*
311	47.93	
312	31.80	*
313	9.85	
314	11.42	
315	4.92	
316	21.20	
401	2.34	
402	13.37	
403	10.73	
404	11.41	
407	25.55	*
408	5.90	
409	89.14	*
410	1.71	*
501	2.07	
601	4.68	*
602	3.31	*

FIGURE 2.1
Date: DEC.16/20
Scale: 1:4000

WESTWOOD VILLAGE - PHASE 2

EXISTING DRAINAGE AREA PLAN

MTE
Engineers, Scientists, Surveyors

Project No.: 02534-800

January 15, 2021 — 3:51 p.m. — Plotted By: KTaylor

P:\P\02534\800\02534-800-P-F2-SWM.dwg

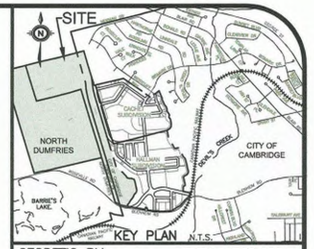
LEGEND

- SITE BOUNDARY
- SILTATION AND EROSION DRAINAGE AREA BOUNDARY
- LIMIT OF GRADING
- GRCA REGULATION LIMIT
- WETLAND LIMIT
- WETLAND BUFFER LIMIT
- EXISTING DRIPLINE
- LIGHT DUTY SEDIMENT CONTROL FENCE (SEE DETAIL 3-ES3.2)
- HEAVY DUTY SEDIMENT CONTROL FENCE (SEE DETAIL 2-ES3.2)
- MODIFIED HEAVY DUTY SEDIMENT CONTROL FENCE (SEE DETAIL 1-ES3.2)
- PROPOSED SUBGRADE SURFACE CONTOURS
- EXISTING CONTOURS
- PROPOSED DRAINAGE DIRECTION
- EXISTING DRAINAGE DIRECTION
- DIRECTION OF SWALE
- OVERLAND FLOW DRAINAGE DIRECTION
- PROPOSED EMBANKMENT (SLOPE AS NOTED) (TOP) 3:1 (BOTTOM)

SEED MIXTURE:
LOW GROW NATIVE PRAIRIE GRASS MIX-SOW AT 50kg/ha:

- 40% LITTLE BLUESTEM
- 20% BLUE GRAMMA
- 20% SANDROP SEED
- 20% SIDE DATS GRAMMA

NOTE: AN ANNUAL RYEGRASS NURSE CROP MUST BE USED WITH THE NATIVE MIX.



GEODETIC BM ELEV. =300.480m
STATION 0011966330B
CONCRETE CYLINDER WITH TOPOGRAPHICAL TABLET ON NORTH SIDE OF GRANT STREET, 10.9m EAST OF INTERSECTION WITH KENMORE AVENUE, IN GRASSED AREA BETWEEN ROADWAY AND SIDEWALK, 1.6m NORTH OF ROADWAY, 1.0m WEST FROM CONCRETE LIGHT STANDARD AND 19.6m FROM CENTRELINE OF DRIVEWAY TO No. 56 GRANT STREET.

SITE BENCHMARK ELEV. =306.341m
CUT CROSS IN CONCRETE SIDEWALK ON EAST CORNER OF BISMARK DRIVE AND WESTCLIFF WAY INTERSECTION, LOCATED APPROX. 14.7m SOUTH EAST ALONG WESTCLIFF WAY CENTRELINE FROM INTERSECTION AND 8.4m NORTH EAST ALONG BISMARK DRIVE CENTRELINE FROM INTERSECTION.

NOTE TO CONTRACTOR :

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No.	REVISION	BY	YYYY-MM-DD
10.	RE-ISSUED FOR CONSTRUCTION	GMK	2020-07-30
9.	Revised Stockpile Location	GMK	2020-06-24
8.	ISSUED FOR CONSTRUCTION	GMK	2020-06-11
7.	ISSUED FOR 4TH. SUBMISSION - AREA GRADING APPROVAL	GMK	2020-04-16
6.	ISSUED FOR AREA GRADING TENDER	GMK	2020-04-02
5.	ISSUED FOR 3RD. SUBMISSION - AREA GRADING APPROVAL	GMK	2020-03-12
4.	Revised As Per GRCA Comments	GMK	2020-03-02
3.	General Revision	GMK	2020-02-10
2.	Revised As Per GRCA Comments	GMK	2019-10-29
1.	ISSUED FOR AREA GRADING APPROVAL	GMK	2019-07-24

CITY of CAMBRIDGE

MTE
Engineers, Scientists, Surveyors
519-743-6500

LICENSED PROFESSIONAL ENGINEER
Aug. 4. 20
G.H. KORBER
100042312
PROVINCE OF ONTARIO

OWNER
HALLMAN CONSTRUCTION LIMITED
675 RIVERBEND DRIVE KITCHENER

PROJECT
TOWNSHIP LANDS
Township of North Dumfries Ontario

DRAWING
EROSION AND SEDIMENT CONTROL PLAN

Project Manager	G.KORBER	Project No.	44719-114
Design By	VAL/AJC	Checked By	GMK
Drawn By	AXH	Checked By	AJC/GMK
Surveyed By	MTE	Drawing No.	ES3.1
Date	Jan.25/19		
Scale	1:1500	Sheet	of

ORIGINAL

P:\(P\44719\114\44719-114-ES1 MTE FILE PATH:

July 30, 2020 - 11:49:56 AM - Plotted By: Bob Schaefer

LEGEND

- PROPERTY BOUNDARY
- EXISTING CONTOURS (326.0)
- PROPOSED CONTOURS (326.0)
- MUNICIPAL BOUNDARY
- SUBJECT LANDS (DRAFT PLAN LIMITS)
- LIMIT OF WETLAND
- LIMIT OF WETLAND BUFFER
- FLOODLINE LIMIT
- MAJOR OVERLAND FLOW ROUTE
- CONVEYANCE INFILTRATION FACILITY
- EXTERNAL DRAINAGE AREA
- INTERNAL DRAINAGE AREA
- EXISTING SWM FACILITY
- 206 / 4.28 — SUB-CATCHMENT NUMBER / AREA (ha.)
- DRAINAGE TO BARRIE'S LAKE
- DRAINAGE TO WETLAND 2/ GRANDRIVER
- DRAINAGE TO WETLAND 3
- DRAINAGE TO WETLAND 4
- DRAINAGE TO DEVIL'S CREEK
- DRAINAGE TO NEWMAN SWM FACILITY
- DRAINAGE TO CRUICKSTON CREEK

GRANDVIEW HILLS SUBDIVISION
316 / 21.01
314 / 11.42
315 / 1.58
311 / 47.93
303 / 32.16
309b / 1.19
OGS
307 / 16.53
DEVIL'S CREEK
CANADIAN PACIFIC RAILWAY
313 / 4.92
308b / 0.28
707 / 0.77
SWM FACILITY #3
306 / 4.90
706 / 4.68
HALLMAN SUBDIVISION (30T-16104)
704 / 3.38
SWM FACILITY #1
709 / 4.46
EX. BLENHEIM ROAD
CANADIAN PACIFIC RAILWAY
703 / 3.06
WESTCLIFF WAY
STREET A
STREET B
STREET C
BISMARK DRIVE
SWM FACILITY #2
702 / 27.88
NEWMAN DRIVE
STREET E
STREET F
STREET G
STREET H
202 / 10.43
NEWMAN CREEK
ROSECLIFF CRESCENT
201a / 6.10
PRINCESS STREET
NEWMAN LANDS (30T-16105)
710 / 6.32
711 / 2.60
EX. NEWMAN DRIVE SWM FACILITY
701 / 8.81
CACHET SUBDIVISION (30T-16103)
WETLAND 2
312 / 5.52
402 / 5.07
705 / 0.43
WETLAND 3
CITY OF CAMBRIDGE
TOWNSHIP OF NORTH DUMFRIES
712 / 1.04
403 / 10.73
201b / 0.29
105 / 4.04
CRUICKSTON CREEK
HALLMAN SUBDIVISION
BRIAN DOMM SUBDIVISION
708 / 17.49
404 / 5.98
WETLAND 4
407 / 25.55
BARRIE'S LAKE

FIGURE 4.1 — Date: DEC.16/20 — Scale: N.T.S.

WESTWOOD VILLAGE - PHASE 2

PROPOSED DRAINAGE AREA PLAN

MTE — Engineers, Scientists, Surveyors

Project No.: 02534-800

January 15, 2021 — 4:08 p.m. — Plotted By: KTaylor

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LEGEND

- PROPERTY BOUNDARY
- EXISTING CONTOURS
- PROPOSED CONTOURS
- LIMIT OF SUBDIVISION
- LIMIT OF WETLAND
- LIMIT OF WETLAND BUFFER
- LIMIT OF DEVELOPMENT
- FLOODLINE LIMIT
- MUNICIPAL BOUNDARY
- INTERNAL DRAINAGE AREA
- DEDICATED 3rd PIPE ROOF LEADER STORM SEWER SYSTEM
- MAJOR OVERLAND FLOW ROUTE
- EXISTING SWM FACILITY
- CONVEYANCE INFILTRATION FACILITY
- ROOF AREA TO WETLAND 2 VIA 3RD PIPE & OVERLAND
- ROOF AREA TO EAST WETLAND VIA 3RD PIPE
- ROOF AREA TO ADJACENT WETLAND (AS NOTED)
- AREA TO CONVEYANCE INFILTRATION FACILITY

CACHET SUBDIVISION (30T-16103)

NEWMAN LANDS (30T-16105)

HALLMAN SUBDIVISION (30T-16104)

BRIAN DOMM SUBDIVISION

STREET A

STREET B

STREET C

STREET D

STREET E

STREET F

STREET G

NEWMAN DRIVE

WETLAND 2

WETLAND 4

CITY OF CAMBRIDGE

TOWNSHIP OF NORTH DUMFRIES

ROOF AREA TO WETLAND 4

1.00ha ROOF AREA TO EAST WETLAND

0.08ha ROOF AREA TO CRUICKSTON CREEK

0.02ha ROOF AREA TO WEST WETLAND

3.71ha AREA TO CIF

0.12ha ROOF AREA TO WETLAND 3

0.81ha ROOF AREA TO WETLAND 4

FIGURE 4.2

Date: DEC.16/20
Scale: 1:2500

WESTWOOD VILLAGE - PHASE 2

CONVEYANCE INFILTRATION AND ROOFWATER COLLECTION STRATEGY

MTE
Engineers, Scientists, Surveyors

Project No.: 02534-800

January 13, 2021 — 12:24 p.m. — Plotted By: AHenderson

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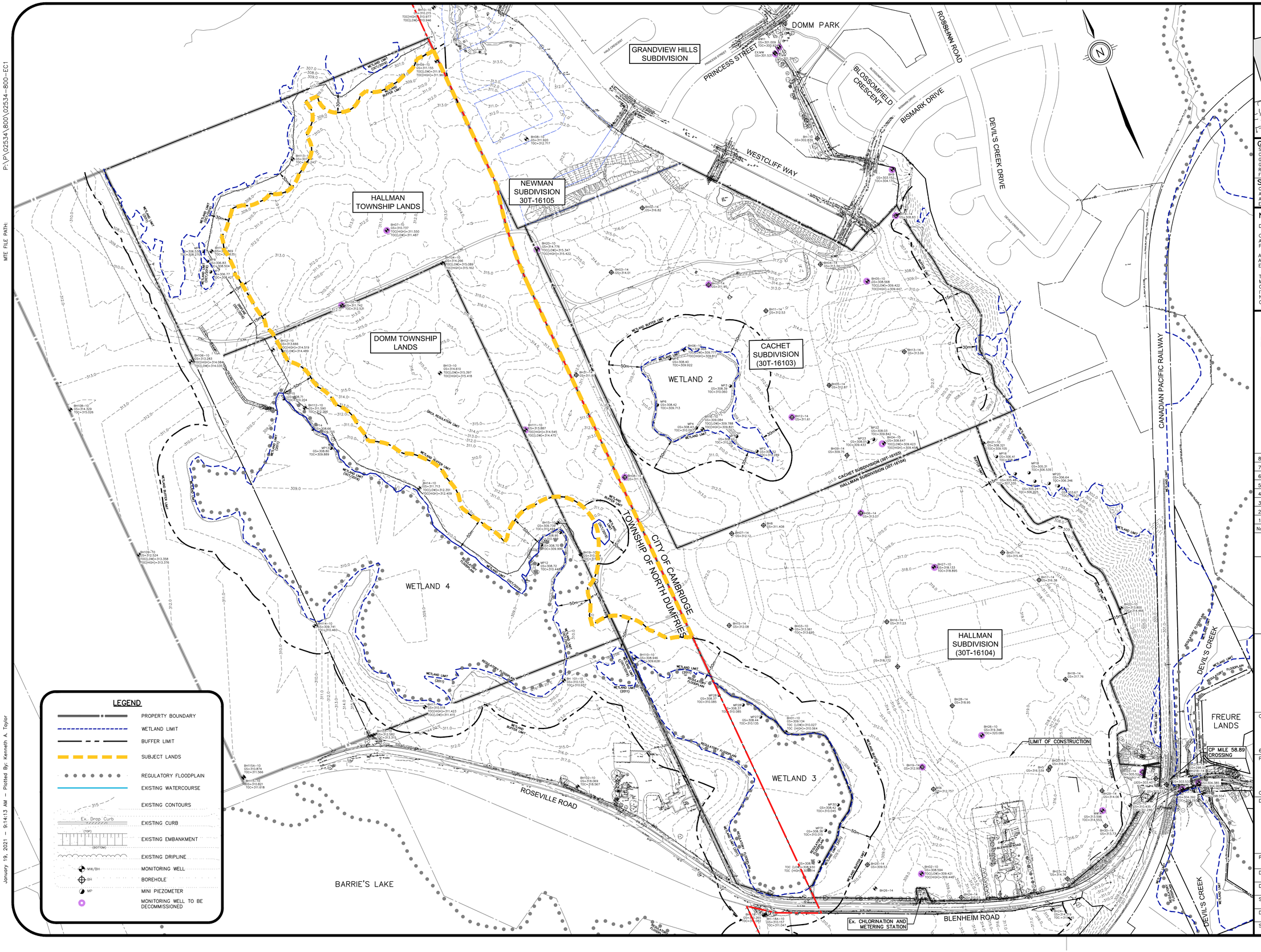

GEODETIC BM ELEV. =300.480m

STATION 0011966308
CONCRETE CYLINDER WITH TOPOGRAPHICAL TABLET ON NORTH SIDE OF GRANT STREET, 10.9m EAST OF INTERSECTION WITH KENMORE AVENUE, IN GRASSED AREA BETWEEN ROADWAY AND SIDEWALK, 1.6m NORTH OF ROADWAY, 1.0m WEST FROM CONCRETE LIGHT STANDARD AND 19.6m FROM CENTRELINE OF DRIVEWAY TO No. 56 GRANT STREET.

SITE BENCHMARK ELEV. =306.341m

CUT CROSS IN CONCRETE SIDEWALK ON EAST CORNER OF BISMARK DRIVE AND WESTCLIFF WAY INTERSECTION. LOCATED APPROX. 14.7m SOUTH EAST ALONG WESTCLIFF WAY CENTRELINE FROM INTERSECTION AND 8.4m NORTH EAST ALONG BISMARK DRIVE CENTRELINE FROM INTERSECTION.

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LEGEND

LIMIT OF BLENHEIM RD. REALIGNMENT CONTRACT

No.	REVISION	BY	YYYY-MM-DD
8.			
7.			
6.			
5.			
4.			
3.			
2.			
1.			

TOWNSHIP of NORTH DUMFRIES

MTE
Engineers, Scientists, Surveyors
519-743-6500

OWNER
HALLMAN CONSTRUCTION LIMITED
675 RIVERBEND DRIVE KITCHENER

PROJECT
WESTWOOD VILLAGE PHASE 2
Cambridge Ontario

DRAWING
EXISTING CONDITIONS PLAN (OVERALL)

Project Manager G.KORBER	Project No. 02534-800
Design By CJC	Checked By
Drawn By KAT	Checked By CJC
Surveyed By MTE	Drawing No. EC1.1
Date Dec.02/20	
Scale 1:2500	Sheet of

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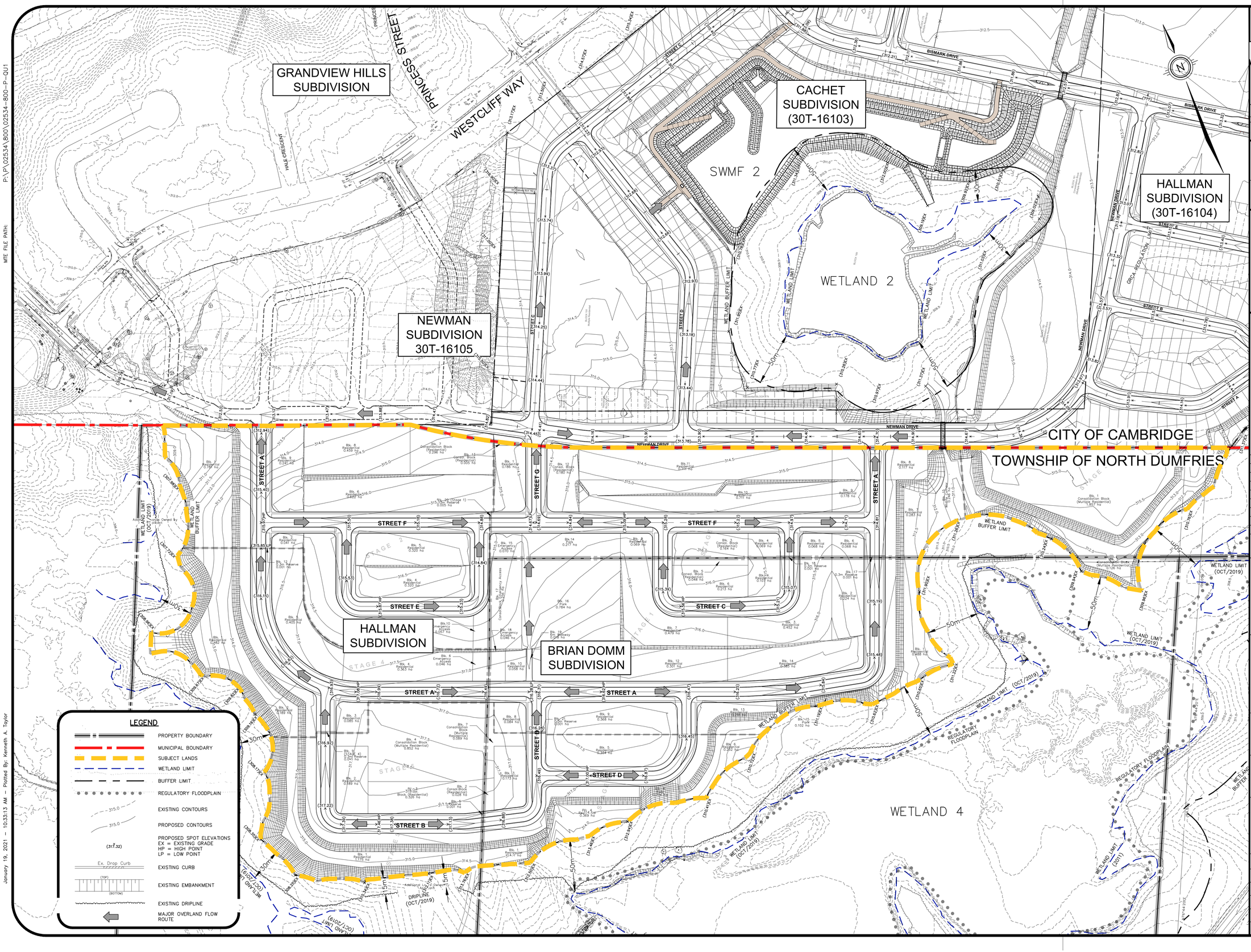
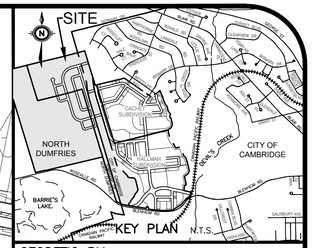
MTE FILE PATH:

January 19, 2021 - 9:14:13 AM - Plotted By: Kenneth A. Taylor





GEODETIC BM ELEV. =300.480m
STATION 0011966308
CONCRETE CYLINDER WITH TOPOGRAPHICAL TABLET ON NORTH SIDE OF GRANT STREET, 10.9m EAST OF INTERSECTION WITH KENMORE AVENUE, IN GRASSED AREA BETWEEN ROADWAY AND SIDEWALK, 1.6m NORTH OF ROADWAY, 1.0m WEST FROM CONCRETE LIGHT STANDARD AND 19.6m FROM CENTRELINE OF DRIVEWAY TO No. 56 GRANT STREET.

SITE BENCHMARK ELEV. =306.341m
CUT CROSS IN CONCRETE SIDEWALK ON EAST CORNER OF BISMARK DRIVE AND WESTCLIFF WAY INTERSECTION. LOCATED APPROX. 14.7m SOUTH EAST ALONG WESTCLIFF WAY CENTRELINE FROM INTERSECTION AND 8.4m NORTH EAST ALONG BISMARK DRIVE CENTRELINE FROM INTERSECTION.

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LEGEND

- PROPERTY BOUNDARY
- MUNICIPAL BOUNDARY
- SUBJECT LANDS
- WETLAND LIMIT
- BUFFER LIMIT
- REGULATORY FLOODPLAIN
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED SPOT ELEVATIONS EX = EXISTING GRADE HP = HIGH POINT LP = LOW POINT
- EXISTING CURB
- EXISTING EMBANKMENT
- EXISTING DRIPLINE
- MAJOR OVERLAND FLOW ROUTE

No.	REVISION	BY	YYYY-MM-DD
8.			
7.			
6.			
5.			
4.			
3.			
2.			
1.			

TOWNSHIP of NORTH DUMFRIES

MTE
Engineers, Scientists, Surveyors
519-743-6500

OWNER
HALLMAN
CONSTRUCTION LIMITED
675 RIVERBEND DRIVE KITCHENER

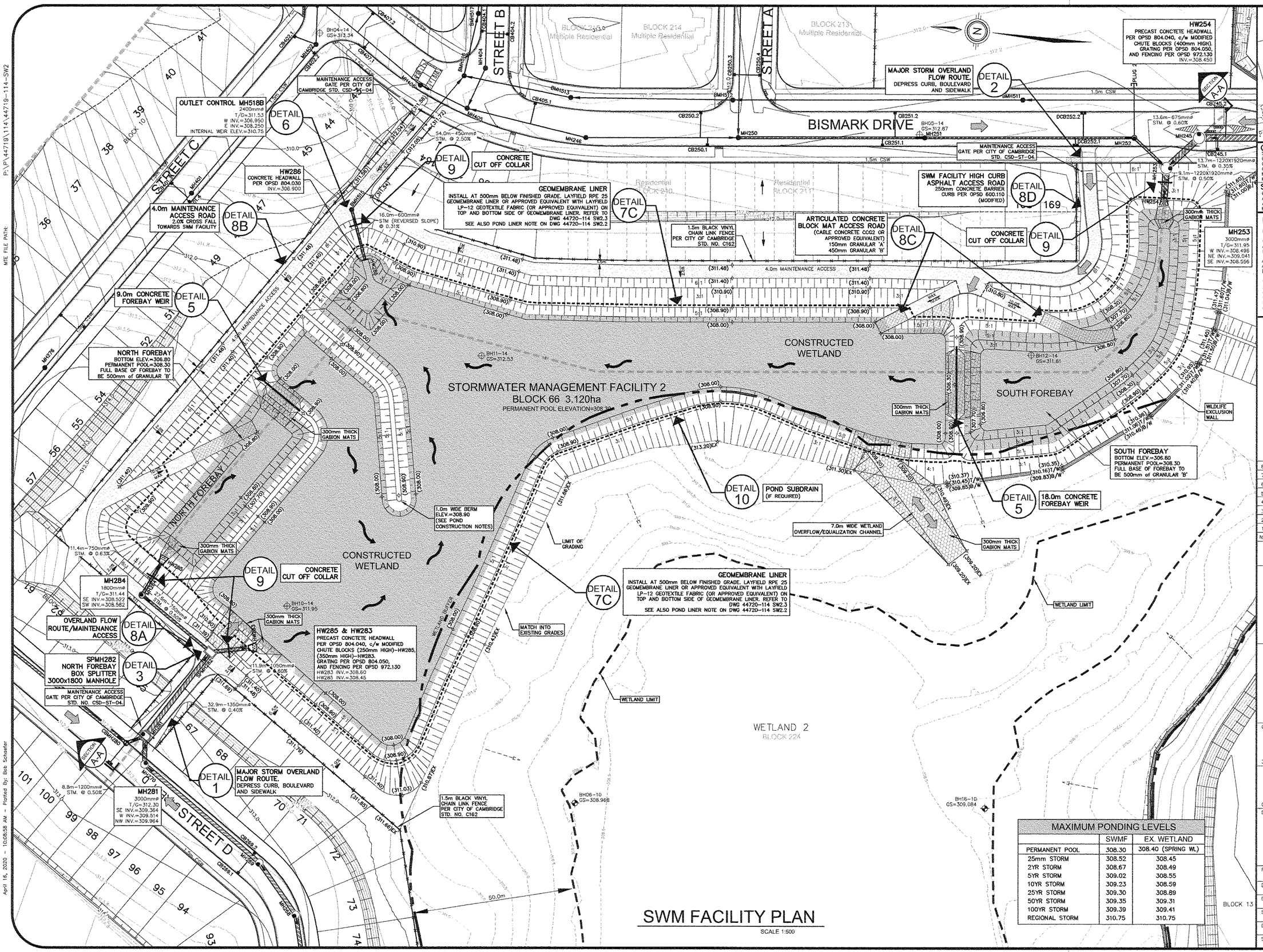
PROJECT
WESTWOOD VILLAGE PHASE 2
Cambridge Ontario

DRAWING
FINISHED GRADE CONTOUR PLAN

Project Manager G.KORBER	Project No. 02534-800
Design By	Checked By
Drawn By KAT	Checked By
Surveyed By MTE	Drawing No. U1.1
Date Dec.16/20	
Scale 1:1500	Sheet of

MTE FILE PATH: P:\PD\02534\800\02534-800-P-QU1

January 19, 2021 - 10:33:13 AM - Plotted By: Kenneth A. Taylor



SWM FACILITY PLAN

SCALE 1:500

GEODETIC BM ELEV. =300.480m

STATION 001196&3308
CONCRETE CYLINDER WITH TOPOGRAPHICAL TABLET ON NORTH SIDE OF GRANT STREET, 10.9m EAST OF INTERSECTION WITH KENMORE AVENUE, IN GRASSED AREA BETWEEN ROADWAY AND SIDEWALK, 1.6m NORTH OF ROADWAY, 1.0m WEST FROM CONCRETE LIGHT STANDARD AND 19.6m FROM CENTRELINE OF DRIVEWAY TO No. 56 GRANT STREET.

SITE BENCHMARK ELEV. =306.341m

CUT CROSS IN CONCRETE SIDEWALK ON EAST CORNER OF BISMARK DRIVE AND WESTCLIFF WAY INTERSECTION, LOCATED APPROX. 14.7m SOUTH EAST ALONG WESTCLIFF WAY CENTRELINE FROM INTERSECTION AND 8.4m NORTH EAST ALONG BISMARK DRIVE CENTRELINE FROM INTERSECTION.

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NOTE:
DRAWING TO BE READ IN CONJUNCTION WITH SW2.2 & SW2.3

MAXIMUM PONDING LEVELS		
	SWMF	EX. WETLAND
PERMANENT POOL	308.30	308.40 (SPRING WL)
25mm STORM	308.52	308.45
2YR STORM	308.67	308.49
5YR STORM	309.02	308.55
10YR STORM	309.23	308.59
25YR STORM	309.30	308.89
50YR STORM	309.35	309.31
100YR STORM	309.39	309.41
REGIONAL STORM	310.75	310.75

No.	REVISION	BY	YYYY-MM-DD
8.			
7.			
6.	General Revisions	GMK	2020-04-16
5.	ISSUED FOR AREA GRADING TENDER	GMK	2020-04-02
4.	ISSUED FOR SERVICING APPROVAL	GMK	2020-03-12
3.	ISSUED FOR 2ND. SUBMISSION – AREA GRADING APPROVAL	GMK	2020-02-10
2.	Revised Overflow Channel	GMK	2019-12-12
1.	ISSUED FOR AREA GRADING APPROVAL	GMK	2019-07-24

CITY of CAMBRIDGE

MTE
Engineers, Scientists, Surveyors
519-743-6500

LICENSED PROFESSIONAL ENGINEER
Gerald Korber
G. M. KORBER
100042312
PROVINCE OF ONTARIO

OWNER
CACHET DEVELOPMENTS (CAM WEST) INC.
361 Connie Crescent, Suite 200 Concord

PROJECT
CAMBRIDGE WEST CACHET SUBDIVISION
Cambridge Ontario

DRAWING
SWM FACILITY No.2 PLAN

Project Manager G.KORBER	Project No. 44720-114
Design By JNJ	Checked By GMK
Drawn By ACH/AXH	Checked By
Surveyed By MTE	Drawing No. SW2.1
Date Mar.05/19	
Scale 1:500	Sheet of

Project No: 02534-800 P:\P02534\800\02534-800_gw1.ggz

GWR1.7

December 16, 2020 - 15:56 - Plotted By: SRedeker

Grand River

Cruickston Creek

Newman Creek

Newman Pond

GEORGE STREET NORTH

ESTHER AVENUE

BLAIR ROAD

NEWMAN DRIVE

HAWTHORNE ROAD

RONALD ROAD

LINNDALE ROAD

ROSSLINN ROAD

LESLIE AVENUE

DIANNE AVENUE

SUNSET BOULEVARD

PRINCESS STREET

WESTCLIFF WAY

BISMARK DRIVE

DEVILS CREEK DRIVE

KENMORE AVENUE

G4A

G4

Wetland 6

Wetland 1

Wetland 2

Wetland 5

Wetland 4

Wetland 3

Wetland 7

Grandview Pond

Township of North Dumfries

6500655

6507266

6507650

500m

WHISTLE BARE ROAD

ROSEVILLE ROAD

ORRS LAKE ROAD

OAKWOOD DRIVE

BROWN AVENUE

Barrie's Lake

Orr's Lake

BLENHEIM ROAD

HILLCREST DRIVE

PARKWOOD DRIVE

SALISBURY AVENUE

HIGHLAND CRESCENT

N

NORTH

N

PROJECT NORTH

Legend

- Subject Lands
- 500m Study Area
- Municipal Boundary
- Proposed Roads
- Roads
- Railroad
- Provincially Significant Wetland
- Waterbody
- Water Courses
- Municipal Well (GRCA)

MOE Wells

- Domestic
- (1) Brian Domm Lands
- (2) Hallman Construction Lands
- (3) Newman Lands
- (4) Cachet Lands (30T-16103)
- (5) Hallman Construction Lands (30T-16104)

Data Sources:

Contains information licensed under the Open Government License Ontario

Contains information made available under Grand River Conservation Authority's Open Data Licence v2.0

0 80 160 240 320 400 m

Scale (11x17): 1:9000

Project CRS: NAD83 / UTM zone 17N

MTE

Engineers,Scientists, Surveyors

Ph. (519) 743-6500

Client: Brian Domm + Hallman Construction Limited

Project: Scoped Hydrogeological Assessment

Site: Township Lands North Dumfries, ON

Title: **Water Users**

Reviewed By	RBM		
Prepared By	EMB	Project No	02534-800
Drawn By	SAR	Figure No	7
Date	December 2020		

Project No: 02534-800 P:\P02534\800\02534-800_gw1.ggz

GWR1.6

December 16, 2020 - 15:57 - Plotted By: SReidever

Grand River

Cruickston Creek

Newman Creek

Newman Pond

GEORGE STREET NORTH

ESTHER AVENUE

BLAIR ROAD

NEWMAN DRIVE

HAWTHORNE ROAD

RONALD ROAD

LINNDALE ROAD

ROSSLINN ROAD

WESTCLIFF WAY

LESLIE AVENUE

DIANNE AVENUE

SUNSET BOULEVARD

BISMARK DRIVE

DEVILS CREEK DRIVE

KENMORE AVENUE

Grandview Pond

Wetland 6

Wetland 1

Wetland 5

Wetland 4

Wetland 3

Wetland 7

Barrie's Lake

Orr's Lake

Township of North Dumfries

WHISTLE BARE ROAD

ROSEVILLE ROAD

ORRS LAKE ROAD

OAKWOOD DRIVE

BROWN AVENUE

BLENHEIM ROAD

PARKWOOD DRIVE

HILLCREST DRIVE

SALISBURY AVENUE

BH1-10 306.62

BH104-10 308.23

BH108-10 309.07

BH112-10 309.07

BH14-10 309.16

BH15-10 308.98

BH114-10 309.12

BH17-10 309.12

BH103-10 309.01

BH115A-10 308.73

BH115-10 308.77

BH110-10 308.78

BH08-10 307.64

MW19-11 299.44

G4A

G4

MW19-9 299.79

BH10-14 308.49

BH05-10 302.9

BH16-10 308.7

BH12-14 308.38

BH21-10 305.71

BH04-10 307.27

BH27-10 304.56

BH03-10 308.71

BH22-10 301.31

BH01-10 308.73

BH19-14 308.57

BH26-10 304.91

BH22-14 300.19

BH02-10 308.4

MW19-14 302.03

BH23-10 301.18

BH25-14 308.43

BH24-10 307.51

BH25-10 307.84

1

2

3

4

5

Legend

- Subject Lands
- 500m Study Area
- Municipal Boundary
- Proposed Roads

Monitoring Locations

- 2019 Borehole Investigation Peto MacCallum, 2019 (Ref. 18KF062)
- 2014 Boreholes/Monitoring Wells LVM, 2014 (Ref. P-0003455-0-09-100-GE-R-0001-00)
- 2010 Mini Piezometer Install LVM, 2010 (Ref. 160-P-036589-0300-HD-R-0001-00)
- 2010-2 Series Boreholes LVM, 2010 (Ref. 160-P-036589-0300-HD-R-0001-00)
- 2010-1 Series Boreholes Citation LVM, 2010 (Ref. 160-P-031655-0300-HD-R-0001-00)
- Provincially Significant Wetland
- Roads
- Railroad
- Waterbody
- Water Courses
- Groundwater Conours (1m Interval)
- Groundwater Flow Direction (Inferred)
- (1) Brian Domm Lands
- (2) Hallman Construction Lands
- (3) Newman Lands
- (4) Cachet Lands (30T-16103)
- (5) Hallman Construction Lands (30T-16104)

Project CRS: NAD83 / UTM zone 17N

0 80 160 240 320 400 m

Scale (11x17): 1:9000

NORTH

PROJECT NORTH

MTE
Engineers,Scientists, Surveyors
Ph. (519) 743-6500

Client: Brian Domm + Hallman Construction Limited

Project: Scoped Hydrogeological Assessment

Site: Township Lands North Dumfries, ON

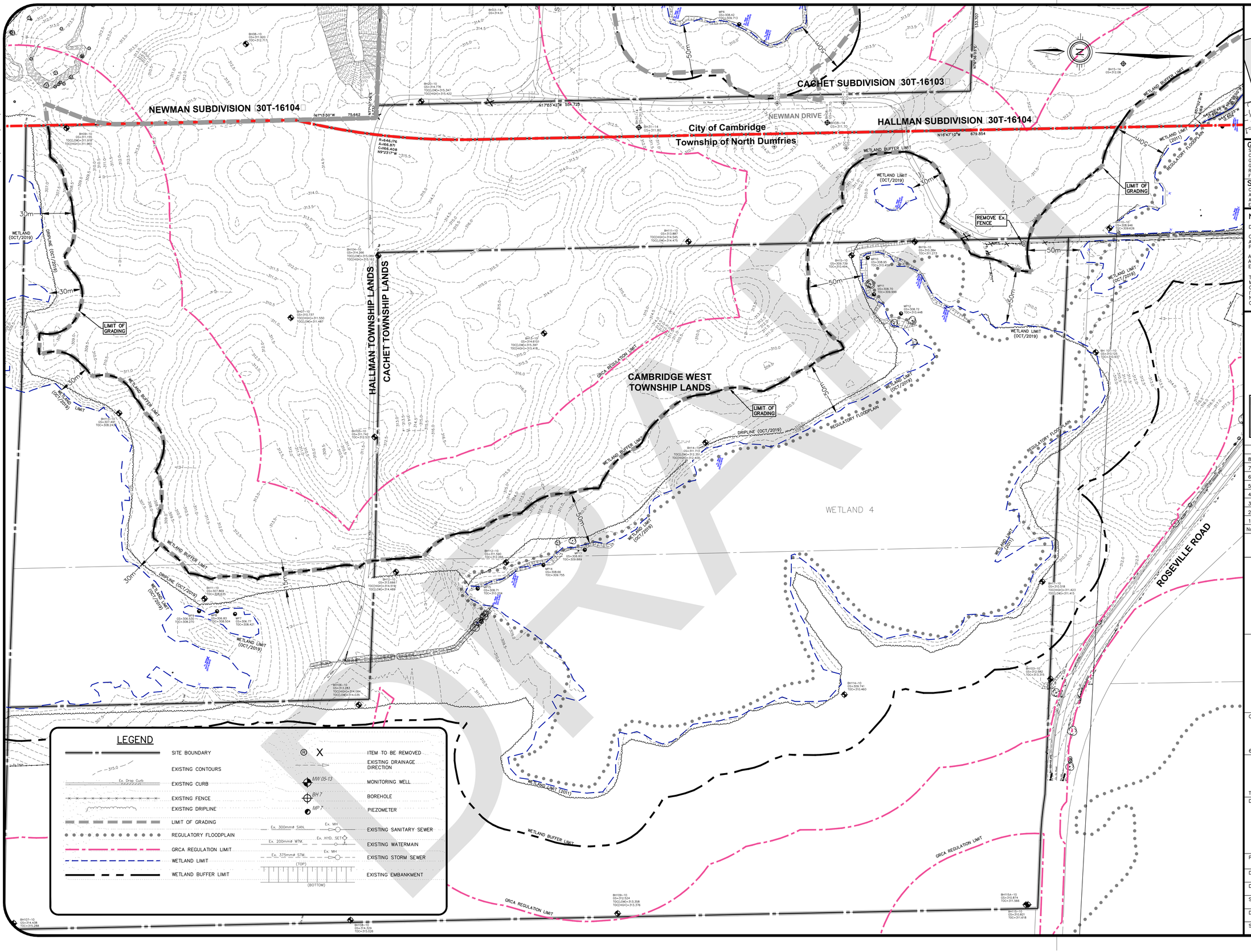
Title: **Interpreted Groundwater Flow Map**

Reviewed By	RBM		
Prepared By	EMB	Project No	02534-800
Drawn By	SAR	Figure No	8
Date	December 2020		

P:\P\44719\114\44719-114-EC1

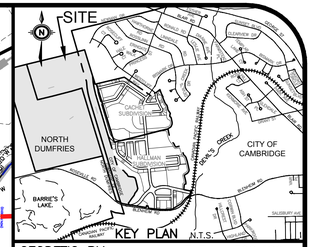
MTE FILE PATH:

June 11, 2020 – 3:50:24 PM – Plotted By: Adam Hewson



LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS
- EXISTING CURB
- EXISTING FENCE
- EXISTING DRIPLINE
- LIMIT OF GRADING
- REGULATORY FLOODPLAIN
- GRCA REGULATION LIMIT
- WETLAND LIMIT
- WETLAND BUFFER LIMIT
- ITEM TO BE REMOVED
- EXISTING DRAINAGE DIRECTION
- MONITORING WELL
- BOREHOLE
- PIEZOMETER
- EXISTING SANITARY SEWER
- EXISTING WATERMAIN
- EXISTING STORM SEWER
- EXISTING EMBANKMENT



GEODETIC BM ELEV. =300.480m
STATION 0011966305
CONCRETE CYLINDER WITH TOPOGRAPHICAL TABLET ON NORTH SIDE OF GRANT STREET, 10.9m EAST OF INTERSECTION WITH KENMORE AVENUE, IN GRASSED AREA BETWEEN ROADWAY AND SIDEWALK, 1.6m NORTH OF ROADWAY, 1.0m WEST FROM CONCRETE LIGHT STANDARD AND 19.6m FROM CENTRELINE OF DRIVEWAY TO No. 56 GRANT STREET.

SITE BENCHMARK ELEV. =306.341m
CUT CROSS IN CONCRETE SIDEWALK ON EAST CORNER OF BISMARK DRIVE AND WESTCLIFF WAY INTERSECTION. LOCATED APPROX. 14.7m SOUTH EAST ALONG WESTCLIFF WAY CENTRELINE FROM INTERSECTION AND 8.4m NORTH EAST ALONG BISMARK DRIVE CENTRELINE FROM INTERSECTION.

NOTE TO CONTRACTOR :

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NOTE:
TREE REMOVAL SHOWN ON THIS PLAN FOR ILLUSTRATION ONLY. REFER TO WSP TREE MANAGEMENT PLAN DRAWINGS FOR COMPLETE TREE PROTECTION FENCING AND TREE REMOVALS.

No.	REVISION	BY	YYYY-MM-DD
8.	ISSUED FOR CONSTRUCTION	GMK	2020-06-11
7.	ISSUED FOR 4TH. SUBMISSION – AREA GRADING APPROVAL	GMK	2020-04-16
6.	ISSUED FOR AREA GRADING TENDER	GMK	2020-04-02
5.	ISSUED FOR 3RD. SUBMISSION – AREA GRADING APPROVAL	GMK	2020-03-12
4.	Revised As Per GRCA Comments	GMK	2020-03-02
3.	ISSUED FOR 2ND. SUBMISSION – AREA GRADING APPROVAL	GMK	2020-02-10
2.	Revised As Per GRCA Comments	GMK	2019-10-30
1.	ISSUED FOR AREA GRADING APPROVAL	GMK	2019-07-24

CITY of CAMBRIDGE

MTE
Engineers, Scientists, Surveyors
519-743-6500

PROFESSIONAL ENGINEER
2020-06-15
G. M. KORBER
100042312
PROVINCE OF ONTARIO

OWNER
HALLMAN CONSTRUCTION LIMITED
675 RIVERBEND DRIVE KITCHENER

PROJECT
TOWNSHIP LANDS
Township of North Dumfries Ontario

DRAWING
EXISTING CONDITIONS AND REMOVALS PLAN No.1

Project Manager: G.KORBER	Project No.: 44719-114
Design By:	Checked By:
Drawn By: ACH	Checked By: GMK
Surveyed By: MTE	Drawing No.: EC3.1
Date: Dec.19/18	
Scale: 1:1500	Sheet of

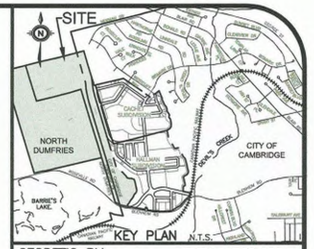
LEGEND

- SITE BOUNDARY
- SILTATION AND EROSION DRAINAGE AREA BOUNDARY
- LIMIT OF GRADING
- GRCA REGULATION LIMIT
- WETLAND LIMIT
- WETLAND BUFFER LIMIT
- EXISTING DRIPLINE
- LIGHT DUTY SEDIMENT CONTROL FENCE (SEE DETAIL 3-ES3.2)
- HEAVY DUTY SEDIMENT CONTROL FENCE (SEE DETAIL 2-ES3.2)
- MODIFIED HEAVY DUTY SEDIMENT CONTROL FENCE (SEE DETAIL 1-ES3.2)
- PROPOSED SUBGRADE SURFACE CONTOURS
- EXISTING CONTOURS
- PROPOSED DRAINAGE DIRECTION
- EXISTING DRAINAGE DIRECTION
- DIRECTION OF SWALE
- OVERLAND FLOW DRAINAGE DIRECTION
- PROPOSED EMBANKMENT (SLOPE AS NOTED) (TOP) 3:1 (BOTTOM)

SEED MIXTURE:
LOW GROW NATIVE PRAIRIE GRASS MIX-SOW AT 50kg/ha:

- 40% LITTLE BLUESTEM
- 20% BLUE GRAMMA
- 20% SANDROP SEED
- 20% SIDE DATS GRAMMA

NOTE: AN ANNUAL RYEGRASS NURSE CROP MUST BE USED WITH THE NATIVE MIX.



GEODETIC BM ELEV. =300.480m
STATION 0011966330B
CONCRETE CYLINDER WITH TOPOGRAPHICAL TABLET ON NORTH SIDE OF GRANT STREET, 10.9m EAST OF INTERSECTION WITH KENMORE AVENUE, IN GRASSED AREA BETWEEN ROADWAY AND SIDEWALK, 1.6m NORTH OF ROADWAY, 1.0m WEST FROM CONCRETE LIGHT STANDARD AND 19.6m FROM CENTRELINE OF DRIVEWAY TO No. 56 GRANT STREET.

SITE BENCHMARK ELEV. =306.341m
CUT CROSS IN CONCRETE SIDEWALK ON EAST CORNER OF BISMARK DRIVE AND WESTCLIFF WAY INTERSECTION, LOCATED APPROX. 14.7m SOUTH EAST ALONG WESTCLIFF WAY CENTRELINE FROM INTERSECTION AND 8.4m NORTH EAST ALONG BISMARK DRIVE CENTRELINE FROM INTERSECTION.

NOTE TO CONTRACTOR :

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No.	REVISION	BY	YYYY-MM-DD
10.	RE-ISSUED FOR CONSTRUCTION	GMK	2020-07-30
9.	Revised Stockpile Location	GMK	2020-06-24
8.	ISSUED FOR CONSTRUCTION	GMK	2020-06-11
7.	ISSUED FOR 4TH. SUBMISSION - AREA GRADING APPROVAL	GMK	2020-04-16
6.	ISSUED FOR AREA GRADING TENDER	GMK	2020-04-02
5.	ISSUED FOR 3RD. SUBMISSION - AREA GRADING APPROVAL	GMK	2020-03-12
4.	Revised As Per GRCA Comments	GMK	2020-03-02
3.	General Revision	GMK	2020-02-10
2.	Revised As Per GRCA Comments	GMK	2019-10-29
1.	ISSUED FOR AREA GRADING APPROVAL	GMK	2019-07-24

CITY of CAMBRIDGE

MTE
Engineers, Scientists, Surveyors
519-743-6500

LICENSED PROFESSIONAL ENGINEER
Aug. 4. 20
G.H. KORBER
100042312
PROVINCE OF ONTARIO

OWNER
HALLMAN CONSTRUCTION LIMITED
675 RIVERBEND DRIVE KITCHENER

PROJECT
TOWNSHIP LANDS
Township of North Dumfries Ontario

DRAWING
EROSION AND SEDIMENT CONTROL PLAN

Project Manager	G.KORBER	Project No.	44719-114
Design By	VAL/AJC	Checked By	GMK
Drawn By	AXH	Checked By	AJC/GMK
Surveyed By	MTE	Drawing No.	ES3.1
Date	Jan.25/19		
Scale	1:1500	Sheet	of

ORIGINAL

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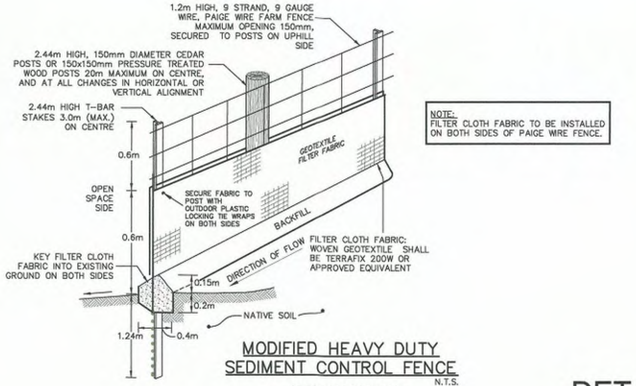
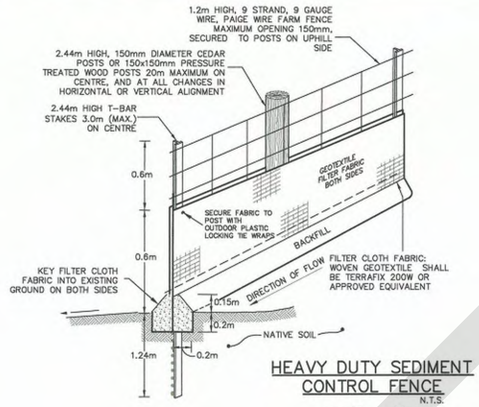


NOTE:
FILTER CLOTH FABRIC TO BE INSTALLED ON BOTH SIDES OF PAIGE WIRE FENCE.

MODIFIED HEAVY DUTY SEDIMENT CONTROL FENCE
N.T.S.

(AS SHOWN ON DRAWINGS)

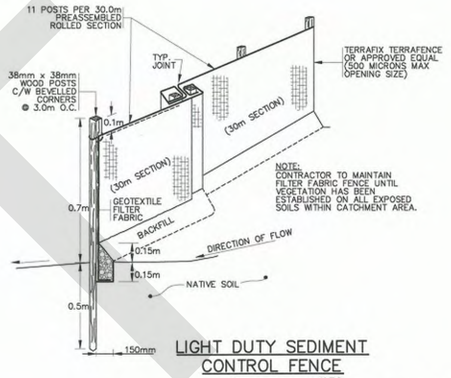
DETAIL 1



HEAVY DUTY SEDIMENT CONTROL FENCE
N.T.S.

(AS SHOWN ON DRAWINGS)

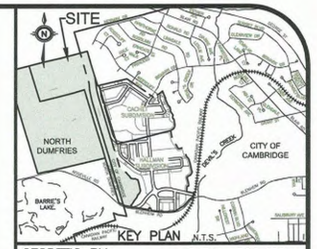
DETAIL 2



LIGHT DUTY SEDIMENT CONTROL FENCE
N.T.S.

(AS SHOWN ON DRAWINGS)

DETAIL 3



GEODETIC BM ELEV. =300.480m
STATION 0011966330B
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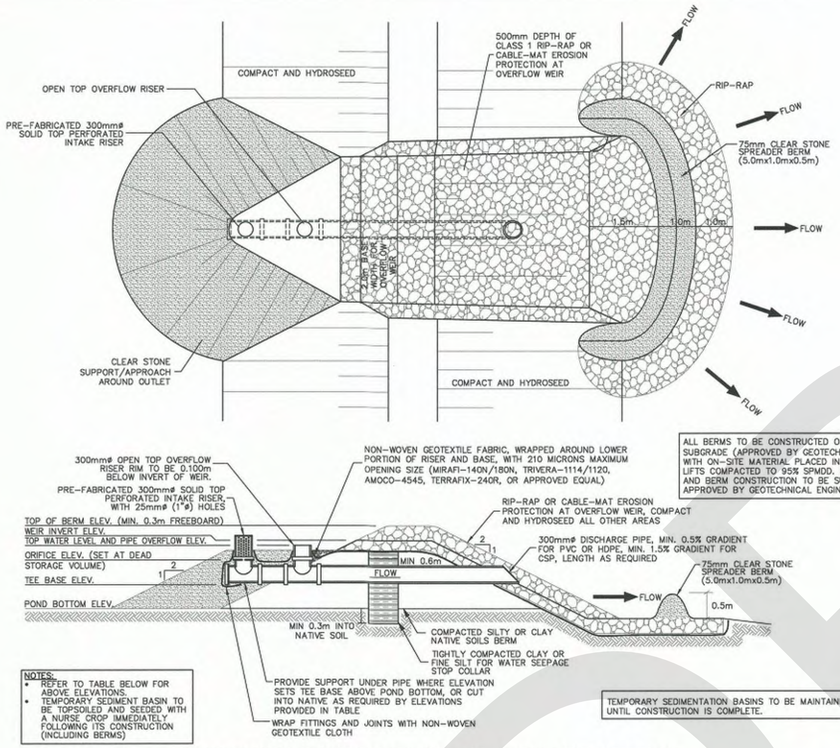
NOTE:
THIS PLAN TO BE READ IN CONJUNCTION WITH DRAWING 44720-114-ES3.1.



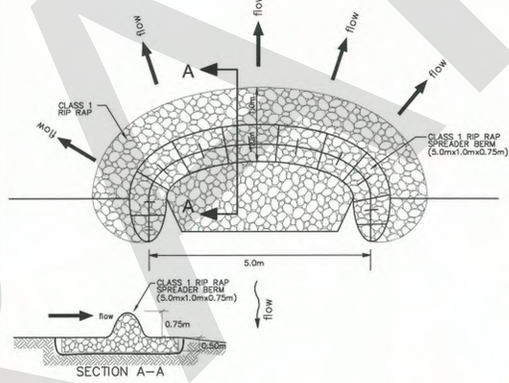
ALL BERMS TO BE CONSTRUCTED ON APPROVED SUBGRADE (APPROVED BY GEOTECHNICAL ENGINEER) WITH ON-SITE MATERIAL PLACED IN MAXIMUM 300mm LIFTS COMPACTED TO 95% SPMDD. BERM MATERIAL AND BERM CONSTRUCTION TO BE SUPERVISED AND APPROVED BY GEOTECHNICAL ENGINEER.

NOTES:
- REFER TO TABLE BELOW FOR ABOVE ELEVATIONS.
- TEMPORARY SEDIMENT BASIN TO BE TOPSOILED AND SEEDED WITH A NURSE CROP IMMEDIATELY FOLLOWING ITS CONSTRUCTION (INCLUDING BERMS)

TEMPORARY SEDIMENTATION BASINS TO BE MAINTAINED UNTIL CONSTRUCTION IS COMPLETE.

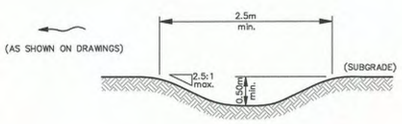
TEMPORARY SEDIMENT BASIN AND BERM OUTLET DETAIL
N.T.S.

DETAIL 4



RIP RAP SPREADER BERM
N.T.S.

DETAIL 5



TEMPORARY INTERCEPTOR SWALE
N.T.S.

DETAIL 6

NOTES :

1. EROSION AND SEDIMENTATION MEASURES TO BE INSTALLED PRIOR TO ANY AREA GRADING OPERATIONS.
2. THE CONTRACTOR SHALL INSPECT EROSION AND SEDIMENT CONTROL MEASURES WEEKLY , AND AFTER EVERY RAINFALL EVENT, AND SHALL REMOVE AND DISPOSE OF ACCUMULATED SEDIMENT OF 0.15m IN DEPTH OR MORE. REPORTS ARE TO BE SUBMITTED WEEKLY TO THE TOWNSHIP OF NORTH DUMFRIES INSPECTOR.
3. ALL EROSION CONTROL MEASURES (INCLUDING SILT FENCE, TEMPORARY SEDIMENT BASINS AND INTERCEPTOR SWALES) ARE TO BE MONITORED BY THE CONTRACTOR AND REPAIRS COMPLETED AS REQUIRED.
4. THE MEASURES AS PROPOSED MAY BE MODIFIED AT THE DISCRETION OF THE ENGINEER TO SUIT THE PROPOSED CONSTRUCTION PROGRAMS. THE GENERAL INTENT OF THE PROPOSED EROSION CONTROL MEASURES WILL BE MAINTAINED AT ALL TIMES.
5. ALL MATERIALS AND EQUIPMENT USED FOR THE PURPOSE OF SITE PREPARATION AND PROJECT COMPLETION SHOULD BE OPERATED AND STORED IN A MANNER THAT PREVENTS ANY DELETERIOUS SUBSTANCE (E.G. PETROLEUM PRODUCTS, SILT, DEBRIS, ETC) FROM ENTERING WETLANDS OR GROUNDWATER.
6. ANY STOCKPILED MATERIALS SHOULD BE STORED AND STABILIZED AWAY FROM THE SEDIMENT BASINS AND WETLANDS. STOCKPILED MATERIALS THAT WILL REMAIN IN PLACE FOR MORE THAN 60 DAYS SHALL BE STABILIZED BY VEGETATIVE COVER, EROSION MATS, OR OTHER MEANS.
7. VEHICLE AND EQUIPMENT REFUELLING AND MAINTENANCE SHOULD BE CONDUCTED AWAY FROM THE SEDIMENT BASINS AND WETLANDS.

EROSION AND SEDIMENT CONTROL STRATEGY :

1. INSTALL SEDIMENT CONTROL FENCE PER MTE DWG 44719-114-ES3.1 AND 44719-114-ES3.2.
2. STRIP TOPSOIL FROM TOWNSHIP LANDS AND STOCKPILE.
3. PERFORM CUT AND FILL OPERATIONS WITHIN TOWNSHIP LANDS INCLUDING IMPORTATION OF FILL MATERIAL FROM HALLMAN & CACHET SUBDIVISIONS. PER MTE DWG 44719-114-AG3.1 TO 44719-114-AG3.3.
4. CONSTRUCT TEMPORARY SEDIMENT BASINS, OUTLETS, SWALES AS PER MTE DWG 44719-114-ES3.1 AND 44719-114-ES3.2.
5. REPLACE STRIPPED TOPSOIL WITHIN TOWNSHIP LANDS TO FACILITATE INTERIM AGRICULTURAL LAND USE.
6. CONTRACTOR TO ENSURE THAT SATISFACTORY DUST PREVENTATIVE MEASURES WILL BE IN PLACE DURING FULL AREA GRADING CONTRACT.
7. ANY DEVIATIONS FROM THE APPROVED STRATEGY MUST BE APPROVED BY THE ENGINEER.
8. RE-VEGETATION OF COMPLETED AREAS AS SOON AS POSSIBLE AFTER CONSTRUCTION, INCLUDING THOSE AREAS NOT SLATED FOR CONSTRUCTION WITHIN 60 DAYS.

OPERATIONS AND MAINTENANCE PROGRAM

CONTACTS

A CONTACT LIST IS TO BE ESTABLISHED AND DISTRIBUTED BY THE ENGINEERING CONSULTANT PROJECT MANAGER AT THE INITIATION OF CONSTRUCTION, AND MAINTAINED THROUGHOUT THE PROJECT. COMPLETE WITH PHONE NUMBERS AND EMAIL ADDRESSES FOR EACH. LIST TO CONSIST OF:

1. PROJECT OWNER
2. ENGINEERING CONSULTANT PROJECT MANAGER
3. ENGINEERING CONSULTANT LEAD CONSTRUCTION INSPECTOR
4. TERRESTRIAL ECOLOGY CONSULTANT
5. GRAND RIVER CONSERVATION AUTHORITY RESOURCE PLANNER
6. CITY OF CAMBRIDGE LEAD CONSTRUCTION INSPECTOR
7. GRADING CONTRACTOR SITE SUPERVISOR (IF APPLICABLE)
8. SERVICING CONTRACTOR SITE SUPERVISOR (IF APPLICABLE)
9. HOME BUILDER SITE SUPERVISOR (ALL HOME BUILDERS IF MORE THAN ONE) (IF APPLICABLE)

RESPONSIBILITIES

THE CONTRACTOR(S), THROUGH THE CONTRACT DOCUMENTS AND AS INDICATED ON THE APPLICABLE DESIGN DRAWINGS, WILL BE RESPONSIBLE FOR CONSTRUCTION, INSPECTION, AND MONITORING OF E&SC MEASURES DURING THEIR CONSTRUCTION PERIOD (WHICH STARTS UPON CONTRACT AWARD AND FINISHES AT SUBSTANTIAL COMPLETION OF THE CONTRACT OR WHEN ALL EQUIPMENT HAS LEFT THE SITE, WHICHEVER IS LATER). SIMILARLY THE CONTRACTOR WILL ALSO BE RESPONSIBLE FOR COMPLETING ANY NECESSARY REPAIRS TO THESE MEASURES.

THE ENGINEERING CONSULTANT WILL BE RESPONSIBLE FOR COMPLETING REGULAR E&SC MONITORING REPORTS, TO BE DISTRIBUTED WEEKLY (YEAR ROUND THROUGH THE ACTIVE CONSTRUCTION PERIOD). THESE WILL SUCCINCTLY DOCUMENT THE RESULTS OF THE INSPECTIONS. INSPECTIONS ARE TO BE COMPLETED AT REGULAR MONTHLY INTERVALS AND FOLLOWING SIGNIFICANT RAINFALL EVENTS.

THE ENGINEERING CONSULTANT WILL BE RESPONSIBLE FOR RECOMMENDING THE IMPLEMENTATION OF ANY ADDITIONAL E&SC MEASURES (BEYOND THOSE INCLUDED IN CONTRACT DOCUMENTS) TO THE PROJECT OWNER, WITH CONSULTATION FROM THE TERRESTRIAL ECOLOGY CONSULTANT AS DEEMED NECESSARY. COMMUNICATION WILL CONSIST OF AN E-MAIL ISSUED AS SOON AS POSSIBLE FOLLOWING DISCOVERY OF AN ISSUE (FAILURE, BREACH, OR OTHER E&SC PERFORMANCE ISSUE THAT CAUSED OR COULD POTENTIALLY CAUSE AN ENVIRONMENTAL IMPACT) TO THE COMPLETE CONTACT LIST FROM THE ENGINEERING CONSULTANT PROJECT MANAGER. A SECOND E-MAIL WILL FOLLOW WITHIN 2 BUSINESS DAYS OF DISCOVERY OUTLINING ANY ADDITIONAL DETAILS REGARDING THE EVENT (LIKELY REASON FOR FAILURE, ETC), AS WELL AS ANY MITIGATION MEASURES IMPLEMENTED FOLLOWING THE EVENT OR PLANNED FOR IMPLEMENTATION.

REMEDIAL ACTIONS

THE ENGINEERING CONSULTANT WILL NOTIFY AND INSTRUCT THE CONTRACTOR TO REPAIR THE SPECIFIED E&SC MEASURES AND/OR IMPLEMENT ADDITIONAL CORRECTIVE E&SC MEASURES AS NECESSARY BASED ON THE RESULTS OF THE PROJECT TEAMS REVIEW. THE PRIORITY WILL BE ON REPAIRING ANY EXISTING MEASURES AS SOON AS REASONABLY POSSIBLE, FOLLOWED BY IMPLEMENTING ADDITIONAL MEASURES AS REQUIRED. ANY REQUIRED ADDITIONAL MEASURES WILL BE IMPLEMENTED AS SOON AS APPROPRIATE RESOURCES AND MATERIALS CAN BE MADE AVAILABLE. WHICH MAY INCLUDED, BUT NOT LIMITED TO , SEEDING, ADDITIONAL FENCING, ROCK CHECK DAMS, CREATION OF PONDS, BERMING, AND OTHER DRAINAGE CONTROL MEASURES.

RESPONSIBILITIES FOR REMEDIAL ACTIONS

a. PROJECT OWNER – ULTIMATE RESPONSIBILITY FOR IMPLEMENTATION, INCLUDING COSTS OF REMEDIAL MEASURES
b. CONTRACTOR(S) – RESPONSIBILITY AS OUTLINED IN CONTRACT DOCUMENTS (CONSTRUCTION OF MEASURES, MATERIALS AND WORKMANSHIP DURING MONITORING PERIOD, INSPECTION AND MONITORING OF E&SC MEASURES, ETC), TIMELY REPAIRS AND IMPLEMENTATION OF REMEDIAL MEASURES.
c. ENGINEERING CONSULTANT – COMMUNICATION TO THE CONTACT LIST, RECOMMENDING THE IMPLEMENTATION OF ANY PROVISIONAL MEASURES INCLUDED IN THE CONTRACT DOCUMENTS OR MEASURES BEYOND THOSE INCLUDED IN CONTRACT DOCUMENTS TO THE PROJECT OWNER
d. TERRESTRIAL ECOLOGY CONSULTANT – PROVIDING TECHNICAL SUPPORT TO THE IMPLEMENTATION TEAM, INCLUDING INTERPRETATION AND ANALYSIS OF FIELD CONDITIONS

TIMING AND SEQUENCE OF REMEDIAL ACTIONS

THE SEQUENCE OF MEASURES AND THE TIMING OF IMPLEMENTATION IS DESCRIBED ABOVE, AND IS SUMMARIZED AS FOLLOWS:
a. COMMUNICATION TO THE CONTACT LIST AS SOON AS POSSIBLE FOLLOWING THE DISCOVERY OF AN ISSUE
b. REPAIRS TO EXISTING MEASURES TO BE COMPLETED AS SOON AS REASONABLY POSSIBLE
c. IMPLEMENTATION OF ANY REQUIRED ADDITIONAL MEASURES (BEYOND EXISTING/SPECIFIED MEASURES) AS SOON AS APPROPRIATE RESOURCES AND MATERIALS CAN BE MADE AVAILABLE
d. COMMUNICATION TO THE CONTACT LIST WITHIN 2 BUSINESS DAYS OF DISCOVERY OF ISSUE OUTLINING ANY ADDITIONAL DETAILS REGARDING THE EVENT, AS WELL AS ANY MITIGATION MEASURES IMPLEMENTED FOLLOWING THE EVENT OR PLANNED FOR IMPLEMENTATION
e. PREPARATION AND DISTRIBUTION OF SUMMARY REPORTS TO BE COMPLETED MONTHLY.

EROSION & SEDIMENT CONTROL
SEDIMENT BASIN SIZING & CONSTRUCTION INFORMATION

Cambridge West Township of North Dumfries Lands
City of Cambridge, Ontario
Date: 4/12/2019
Project Number: 44719-114
Design By: VAL/AJC
\\mte85.local\mte\des\44719\114\Erosion & Sediment Control\44719-114 Temporary Sediment Basins.xls

ID Tag	Basin Area	Sediment Basin Design Volume (1)			Bottom Area	Bottom of Basin	Bottom Elevation	Tee Base Elevation	Orifice Plate		Top Water Level & Overflow Pipe		Weir Invert	Top Berm Elevation	Orifice Diameter	Maximum Orifice Flow	Live Storage Drawdown Time
		Dead	Live	Total					Elevation	Dead Volume	Elevation	Total Volume					
	ha	m^3	m^3	m^3	m^2	flat/sloped	m	m	m	m^3	m	m^3	m	m	mm	m^3/s	hrs
SB-6 (1)	14.51	1,814	1,814	3,628	4650	flat	312.4	312.5	313.0	2985	313.5	5,704	313.6	313.9	130	0.0244	81.3

(1) Dead Storage is based upon minimum 185 m^3 volume per ha drainage area; Live Storage is based upon minimum 185 m^3 volume per ha drainage area.
At TWL, the maximum design storage level for the Dead+Live runoff volume, an open-top overflow pipe will route excess runoff volume past the orifice control, prior to berm-weir outflow, which begins at 0.100m above the TWL. Any excess volumes will then be routed through the berm overflow wier. Refer to Erosion & Sediment Control Details this drawing.
(3) For Sediment Traps a minimum of 125 cubic meters of storage volume per hectare of contributing drainage area was provided.

No.	REVISION	BY	YYYY-MM-DD
8.	RE-ISSUED FOR CONSTRUCTION	GMK	2020-07-30
7.	ISSUED FOR CONSTRUCTION	GMK	2020-06-11
6.	ISSUED FOR 4TH. SUBMISSION – AREA GRADING APPROVAL	GMK	2020-04-16
5.	ISSUED FOR AREA GRADING TENDER	GMK	2020-04-02
4.	ISSUED FOR 3RD. SUBMISSION – AREA GRADING APPROVAL	GMK	2020-03-12
3.	Revised As Per GRCA Comments	GMK	2020-03-02
2.	General Revision	GMK	2020-02-10
1.	ISSUED FOR AREA GRADING APPROVAL	GMK	2019-07-24

CITY of CAMBRIDGE

MTE
Engineers, Scientists, Surveyors

519-743-6500

LICENSED PROFESSIONAL ENGINEER G.M. KORBER 100043312 PROVINCE OF ONTARIO
Aug 4, 20

OWNER
HALLMAN
CONSTRUCTION LIMITED
675 RIVERBEND DRIVE KITCHENER

PROJECT
TOWNSHIP LANDS
Township of North Dumfries Ontario

DRAWING
EROSION AND SEDIMENT CONTROL DETAILS PLAN

Project Manager G.KORBER	Project No. 44719-114
Design By VAL/AJC	Checked By GMK
Drawn By AXH	Checked By AJC/GMK
Surveyed By MTE	Drawing No. ES3.2
Date Jan.25/19	
Scale NTS	Sheet of

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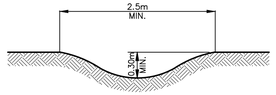
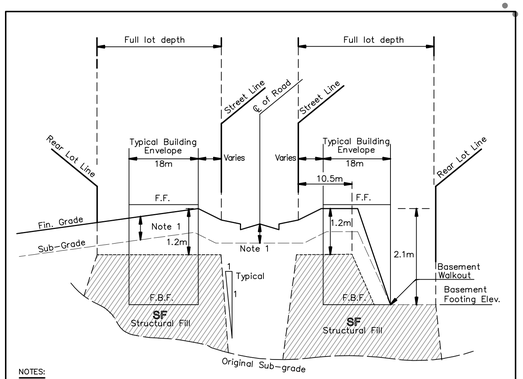
July 30, 2020 - 11:52:44 AM - Plotted By: Bob Schaefer



TYPICAL DRAINAGE SWALE
N.T.S.



NOTES:

FINISH SUBGRADE DEPTHS BELOW FINISHED GRADE:

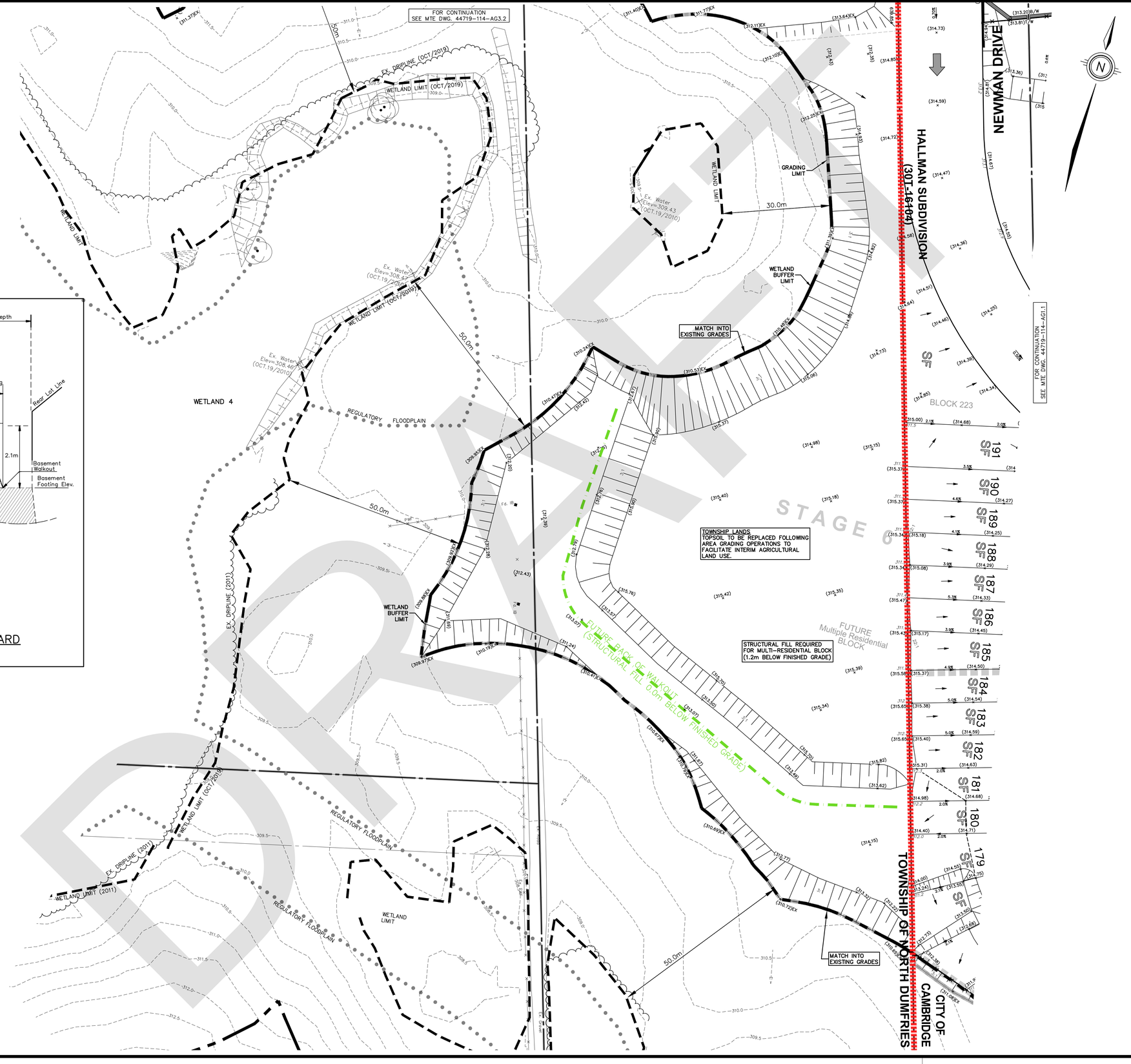
1. Sub-grade 1.10 m below Finished Grade – (Interim Agricultural Land use)
1. Sub-grade 0.0 m below Finished Grade at back of walkout

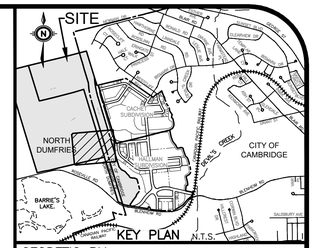
SF STRUCTURAL FILL

STRUCTURAL FILL STANDARD
N.T.S.

LEGEND

- SITE BOUNDARY
- (325.93) 325.0 PROPOSED ELEVATION / EXISTING ELEVATION
- 326 EXISTING CONTOURS
- EXISTING DIRECTION OF DRAINAGE
- (TOP) 3:1 (BOTTOM) PROPOSED EMBANKMENT
- DIRECTION OF DRAINAGE
- 2.0% SWALE (MIN. 0.3m DEEP DRAINAGE SWALE)
- DRAINAGE SPLIT (RIDGE)
- LIMIT OF GRADING
- STAGE LIMIT
- OVERLAND FLOW ROUTE (MAJOR STORM)
- BUFFER LIMIT
- SF STRUCTURAL FILL (SEE DETAIL)
- REAR OF WALKOUT STRUCTURAL FILL 0.0m BELOW FINISHED GRADE.





GEODETIC BM ELEV. =300.480m
STATION 00119663308
CONCRETE CYLINDER WITH TOPOGRAPHICAL TABLET ON NORTH SIDE OF GRANT STREET, 10.9m EAST OF INTERSECTION WITH KENMORE AVENUE, IN GRASSED AREA BETWEEN ROADWAY AND SIDEWALK, 1.6m NORTH OF ROADWAY, 1.0m WEST FROM CONCRETE LIGHT STANDARD AND 19.6m FROM CENTRELINE OF DRIVEWAY TO No. 56 GRANT STREET.

SITE BENCHMARK ELEV. =306.341m
CUT CROSS IN CONCRETE SIDEWALK ON EAST CORNER OF BISMARK DRIVE AND WESTCLIFF WAY INTERSECTION. LOCATED APPROX. 14.7m SOUTH EAST ALONG WESTCLIFF WAY CENTRELINE FROM INTERSECTION AND 8.4m NORTH EAST ALONG BISMARK DRIVE CENTRELINE FROM INTERSECTION.

NOTE TO CONTRACTOR :

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No.	REVISION	BY	YYYY-MM-DD
9.	ISSUED FOR CONSTRUCTION	GMK	2020-06-11
8.	ISSUED FOR 4TH. SUBMISSION AREA GRADING APPROVAL	GMK	2020-04-16
7.	ISSUED FOR AREA GRADING TENDER	GMK	2020-04-02
6.	ISSUED FOR 3RD SUBMISSION – AREA GRADING APPROVAL	GMK	2020-03-12
5.	Revised As Per GRCA Comments	GMK	2020-03-02
4.	ISSUED FOR 2ND. SUBMISSION – AREA GRADING APPROVAL	GMK	2020-02-10
3.	Revised As Per GRCA Comments	GMK	2019-10-29
2.	Added Swale to Block 13	GMK	2019-09-19
1.	ISSUED FOR AREA GRADING APPROVAL	GMK	2019-07-24

CITY of CAMBRIDGE

MTE
Engineers, Scientists, Surveyors
519-743-6500

LICENSED PROFESSIONAL ENGINEER
Date Signed 2020-06-15
G. M. KORBER
100042312
PROVINCE OF ONTARIO

OWNER
HALLMAN CONSTRUCTION LIMITED
675 RIVERBEND DRIVE KITCHENER

PROJECT
TOWNSHIP LANDS
Township of North Dumfries Ontario

DRAWING
AREA GRADING PLAN No. 1

Project Manager G.KORBER	Project No. 44719-114
Design By BDS	Checked By GMK
Drawn By ACH/AXH	Checked By
Surveyed By MTE	Drawing No. AG3.1
Date Jan.18/19	
Scale 1:500	Sheet of

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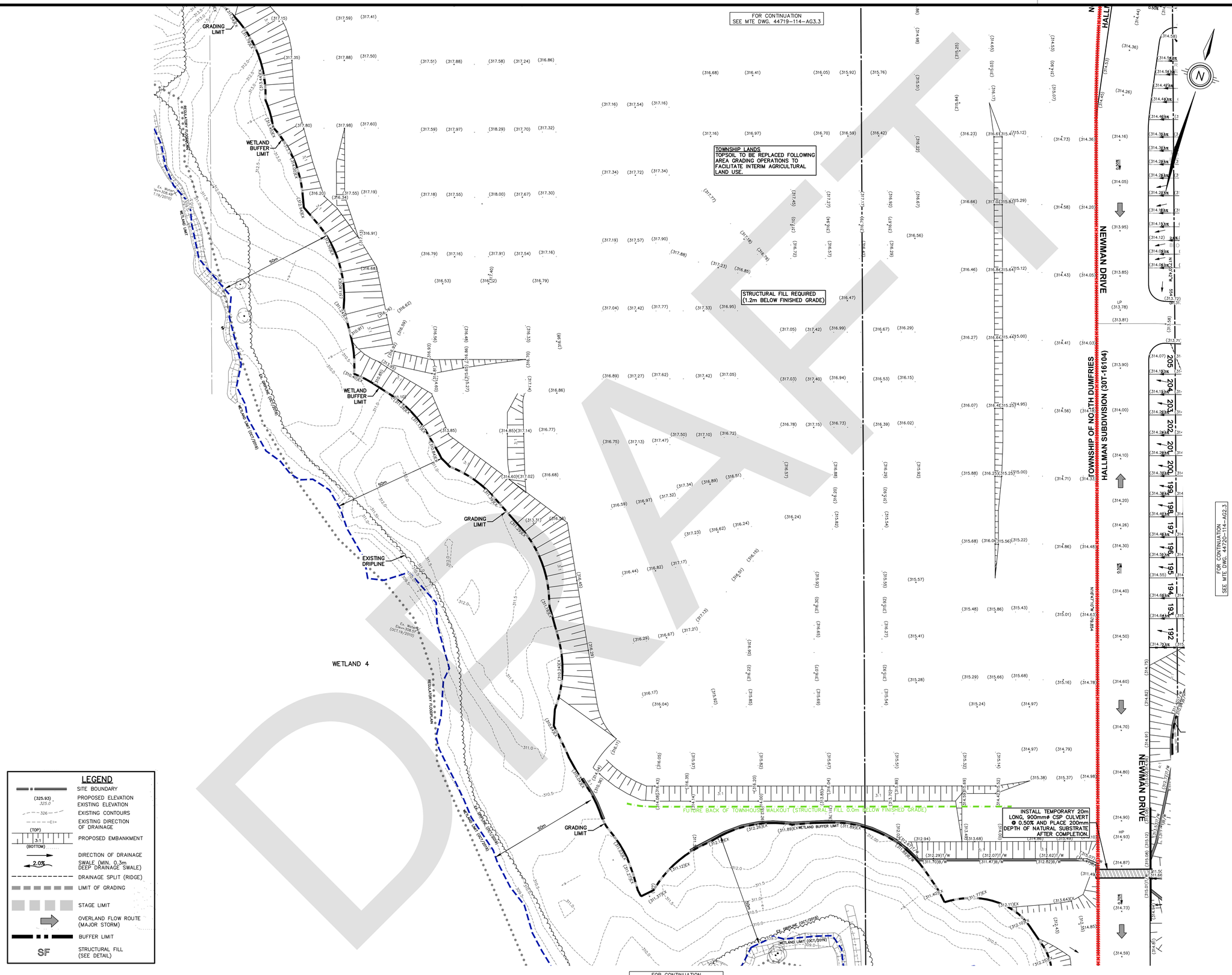
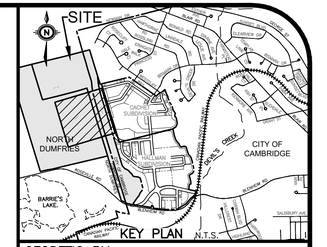


LEGEND

- SITE BOUNDARY
- (325.93) 325.0 — PROPOSED ELEVATION / EXISTING ELEVATION
- 326 — EXISTING CONTOURS
- EXISTING DIRECTION OF DRAINAGE
- (TOP) 3:1 (BOTTOM) — PROPOSED EMBANKMENT
- DIRECTION OF DRAINAGE
- 2.0% — SWALE (MIN. 0.3m DEEP DRAINAGE SWALE)
- DRAINAGE SPLIT (RIDGE)
- LIMIT OF GRADING
- STAGE LIMIT
- OVERLAND FLOW ROUTE (MAJOR STORM)
- BUFFER LIMIT
- SF — STRUCTURAL FILL (SEE DETAIL)



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No.	REVISION	BY	YYYY-MM-DD
9.			
8.	ISSUED FOR CONSTRUCTION	GMK	2020-06-11
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4.	Revised As Per GRCA Comments	GMK	2020-03-02
3.	ISSUED FOR 2ND. SUBMISSION - AREA GRADING APPROVAL	GMK	2020-02-10
2.	Revised As Per GRCA Comments	GMK	2019-10-29
1.	ISSUED FOR AREA GRADING APPROVAL	GMK	2019-07-24

CITY of CAMBRIDGE

MTE
Engineers, Scientists, Surveyors
519-743-6500

LICENSED PROFESSIONAL ENGINEER — 2020-06-15 — G. M. KORBER 100042312 — PROVINCE OF ONTARIO

OWNER
HALLMAN CONSTRUCTION LIMITED
675 RIVERBEND DRIVE KITCHENER

PROJECT
TOWNSHIP LANDS
Township of North Dumfries Ontario

DRAWING
AREA GRADING PLAN No. 2

Project Manager: G.KORBER	Project No.: 44719-114
Design By: BDS	Checked By: GMK
Drawn By: ACH/AXH	Checked By:
Surveyed By: MTE	Drawing No.: AG3.2
Date: Jan.18/19	
Scale: 1:750	Sheet of

MTE FILE PATH: P:\P\44719\114\44719-114-AG1

June 11, 2020 – 5:20:14 PM – Plotted By: Adam Hewson

LEGEND

- SITE BOUNDARY
- (325.93) 325.0 — PROPOSED ELEVATION / EXISTING ELEVATION
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- (TOP) 3:1 (BOTTOM) — PROPOSED EMBANKMENT
- DIRECTION OF DRAINAGE
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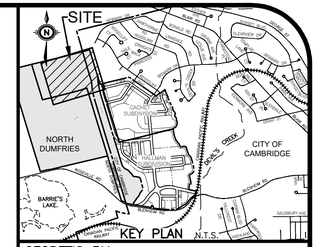
- DRAINAGE SPLIT (RIDGE)
- LIMIT OF GRADING
- STAGE LIMIT
- OVERLAND FLOW ROUTE (MAJOR STORM)
- BUFFER LIMIT
- SF — STRUCTURAL FILL (SEE DETAIL)
- REAR OF WALKOUT STRUCTURAL FILL 0.0m BELOW FINISHED GRADE.

WETLAND LIMIT (OCT/2019)
EX. DRIPLINE (OCT/2019)
EXISTING DRIPLINE
GRADING LIMIT
WETLAND BUFFER LIMIT
FUTURE BACK OF TOWNHOUSE WALKOUT (STRUCTURAL FILL 0.0m BELOW FINISHED GRADE)
STRUCTURAL FILL REQUIRED (1.2m BELOW FINISHED GRADE)
TOWNSHIP LANDS TOPSOIL TO BE REPLACED FOLLOWING AREA GRADING OPERATIONS TO FACILITATE INTERIM AGRICULTURAL LAND USE.
HALLMAN TOWNSHIP LANDS
DOMM TOWNSHIP LANDS
NEWMAN SUBDIVISION (30T-16105)
HALLMAN SUBDIVISION (30T-16104)
TOWNSHIP OF NORTH DUMFRIES
PARK
15m
FOR CONTINUATION SEE MTE DWG. 44719-114-AG3.2



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2.	Revised As Per GRCA Comments	GMK	2019-10-29
1.	ISSUED FOR AREA GRADING APPROVAL	GMK	2019-07-24

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LICENSED PROFESSIONAL ENGINEER
Date of Original 2020-06-15
G. M. KORBER
100042312
PROVINCE OF ONTARIO

OWNER
HALLMAN CONSTRUCTION LIMITED
675 RIVERBEND DRIVE KITCHENER

PROJECT
TOWNSHIP LANDS
Township of North Dumfries Ontario

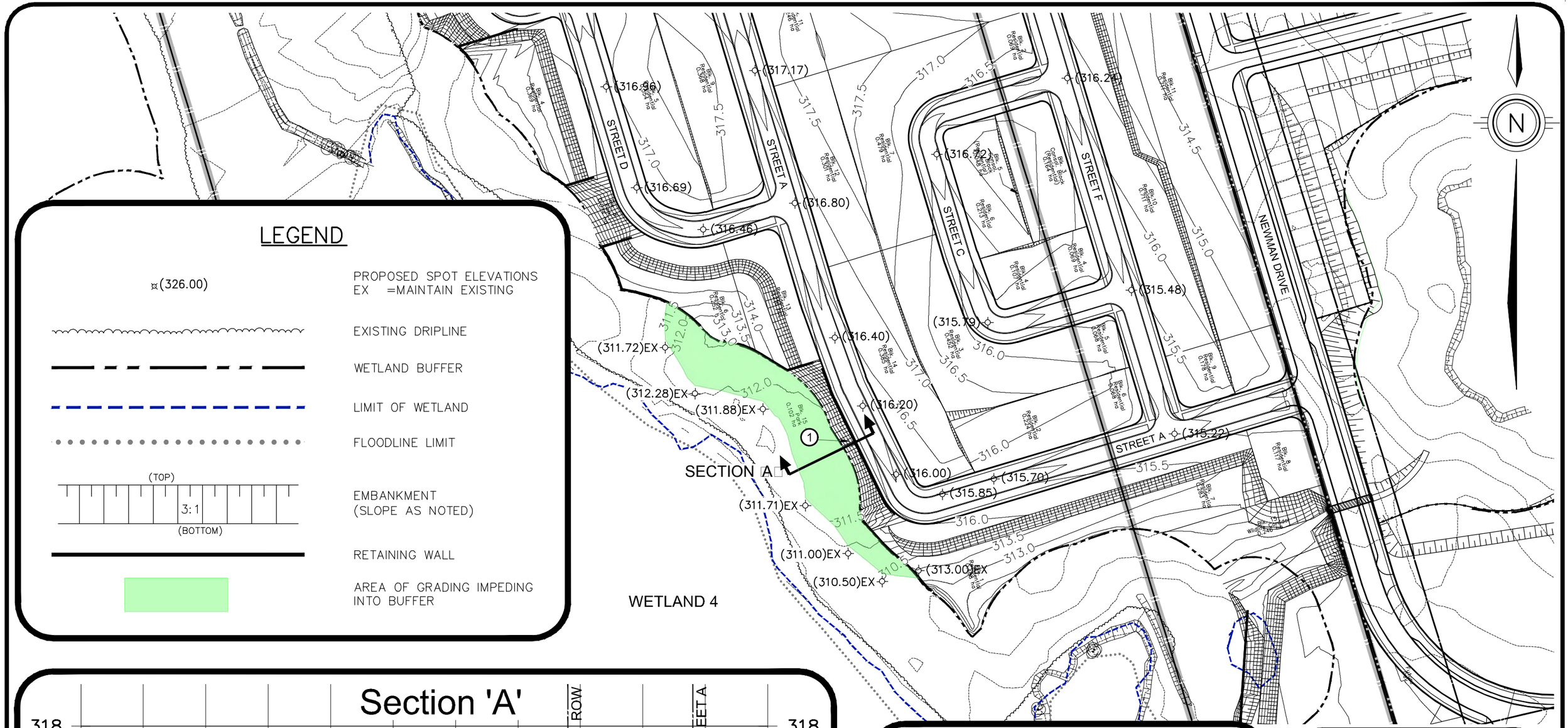
DRAWING
AREA GRADING PLAN No. 3

Project Manager G.KORBER	Project No. 44719-114
Design By BDS	Checked By GMK
Drawn By ACH/AXH	Checked By GMK
Surveyed By MTE	Drawing No. AG3.3
Date Jan.18/19	
Scale 1:750	Sheet of

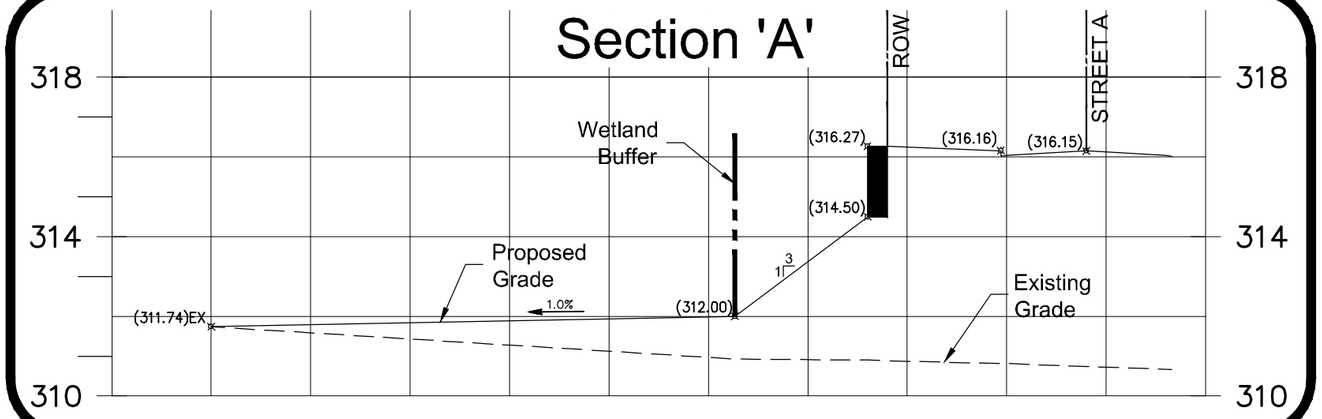
LEGEND

¤(326.00)	PROPOSED SPOT ELEVATIONS EX =MAINTAIN EXISTING
	EXISTING DRIPLINE
	WETLAND BUFFER
	LIMIT OF WETLAND
	FLOODLINE LIMIT
(TOP) 3:1 (BOTTOM)	EMBANKMENT (SLOPE AS NOTED)
	RETAINING WALL
	AREA OF GRADING IMPEDING INTO BUFFER

WETLAND 4



Section 'A'



AREA OF GRADING ENCROACHMENT INTO BUFFER

AREA I.D. No.	AREA (sq.m)
1	4123.5 sq.m

FIGURE AG1.1 Date: DEC.16/20 Scale: 1:750

WESTWOOD VILLAGE - PHASE 2

GRADING IMPACTS TO WESTERN BUFFER

MTE Engineers, Scientists, Surveyors

Project No.: 02534-800

Table E1

SUMMARY OF BUFFER ENCROACHMENTS

Date: May 4, 2018

ID No.	LOCATION	BUFFER ENCROACHMENT TYPE	AREA (m^2)	ENCROACHMENT DESCRIPTION
1	Wetland 3/ Block 24	Wetland	47	Grading encroachment due to proposed minimum road grades and minimum servicing slopes of Street 'A'. Walk-out type lots utilized to minimize area of encroachment into buffer area.
2	Wetland 3/ Block 24	Wetland	20	Grading encroachment due to proposed minimum road grades and minimum servicing slopes of Street 'A'. Walk-out type lots utilized to minimize area of encroachment into buffer area.
3	Wetland 3/ Block 24	Wetland	179	Grading encroachment due to proposed minimum road grades and minimum servicing slopes of Street 'A'. Walk-out type lots utilized to minimize area of encroachment into buffer area.
4	Wetland 3/ Block 23	Wetland	81	Grading encroachment due to proposed minimum road grades and minimum servicing slopes of Street 'A'. Walk-out type lots utilized to minimize area of encroachment into buffer area.
5	Wetland 3/ Block 23	Wetland	1310	Encroachment into buffer due to maximum slope constraint of 3:1
6	Wetland 2/ Block 5	Wetland	376	Grading encroachment due to proposed minimum road grades and minimum servicing slopes of Newman Drive. Walk-out type lots utilized to minimize area of encroachment into buffer area
7	Wetland 2/ Block 5	Wetland	421	Grading encroachment as a result of funnel wall location
8	Wetland 2/SWM Facility 2	Wetland	4104	Grading encroachment as a result of SWM Facility 2 construction
9	Block 20/DCSF ESPA	Dripline	5	Grading encroachment to meeting Trail Design guidelines
10	Block 20/DCSF ESPA	Dripline	139	Grading encroachment to meeting Trail Design guidelines
11	Block 20/DCSF ESPA	Dripline	449	Grading encroachment to meeting Trail Design guidelines
12	Block 20/DCSF ESPA	Dripline	88	Grading encroachment to meeting Trail Design guidelines
13	Block 20/DCSF ESPA	Dripline	447	Grading encroachment to meeting Trail Design guidelines
14	Block 20/DCSF ESPA	Dripline	1423	Grading encroachment to meeting Trail Design guidelines

APPENDIX J

JESA AWARENESS INFORMATION & ENCOUNTER RESPONSE PLAN

JEFFERSON SALAMANDER

Awareness Information

Westwood Village

Cambridge West

Prepared by: WSP Canada Group Limited, April 2020

Recognizing Jefferson Salamander

- **Grey / brown above and lighter below**, sometimes with **blue flecks** on the sides and limbs.
- Adults are **12-20 cm long** – long tail (1/2 total length)
- Adults **live in deciduous forests** - in moist, loose soil, under logs or in leaf litter.
- **Live underground** (in rodent burrows, under rocks and stumps) for much of the year; **travel to woodland ponds** to breed **in early spring** (March-April).
- Lay eggs in clumps attached to underwater vegetation.
- Jefferson Salamanders (JESA) look very similar to Blue-spotted Salamander (BSSA) and Blue-spotted-Jefferson Complex Salamanders (BJCS)

Endangered Status and Threats

- Designated as "**Endangered**" – they live in the wild in Ontario but are facing imminent extinction or extirpation.
- Individuals and their habitat are protected under the Ontario Endangered Species Act (2007).

Minimizing Harm to JESA and Damage to JESA Habitat

- Review Amphibians excerpt from SAR Handling Memo (Ministry of Natural Resources and Forestry).

- Verify Erosion and Sediment Control (ESC) fencing is in working condition and installed adjacent to natural areas as per the Erosion and Sediment Control Plan prior to works taking place. Inspect fencing, perform necessary repairs (to maintain in working condition).

- Verify machinery access, parking and refueling locations per Spills Management Plan, ESC Plan or other relevant plans.

- Complete daily pre-activity searches for JESA along ESC fencing delineating grading / construction areas.

- Confirm no materials or equipment are within natural areas (except where previously isolated with fencing).

- If any salamander that is potentially a Jefferson Salamander is encountered:

    - Take close up photos for subsequent ID

    - Capture and release in closest appropriate natural area

    - Cease construction until animal is safely released and ESC fencing is confirmed in working condition

    - Notify MTE Consultants immediately for further direction

    - Notify WSP Canada Group Limited

- Conduct equipment refueling, washing and maintenance outside of natural areas in accordance with industry standard best management practices.

- Store construction equipment and materials at least 30 metres from natural areas. Operation and parking of equipment done in a manner that prevents any deleterious substances from entering natural areas.

- Confirm Spills Management Plan is accessible and required equipment / materials to implement plan are on site and easily accessible.

Contacts

MTE Consultants

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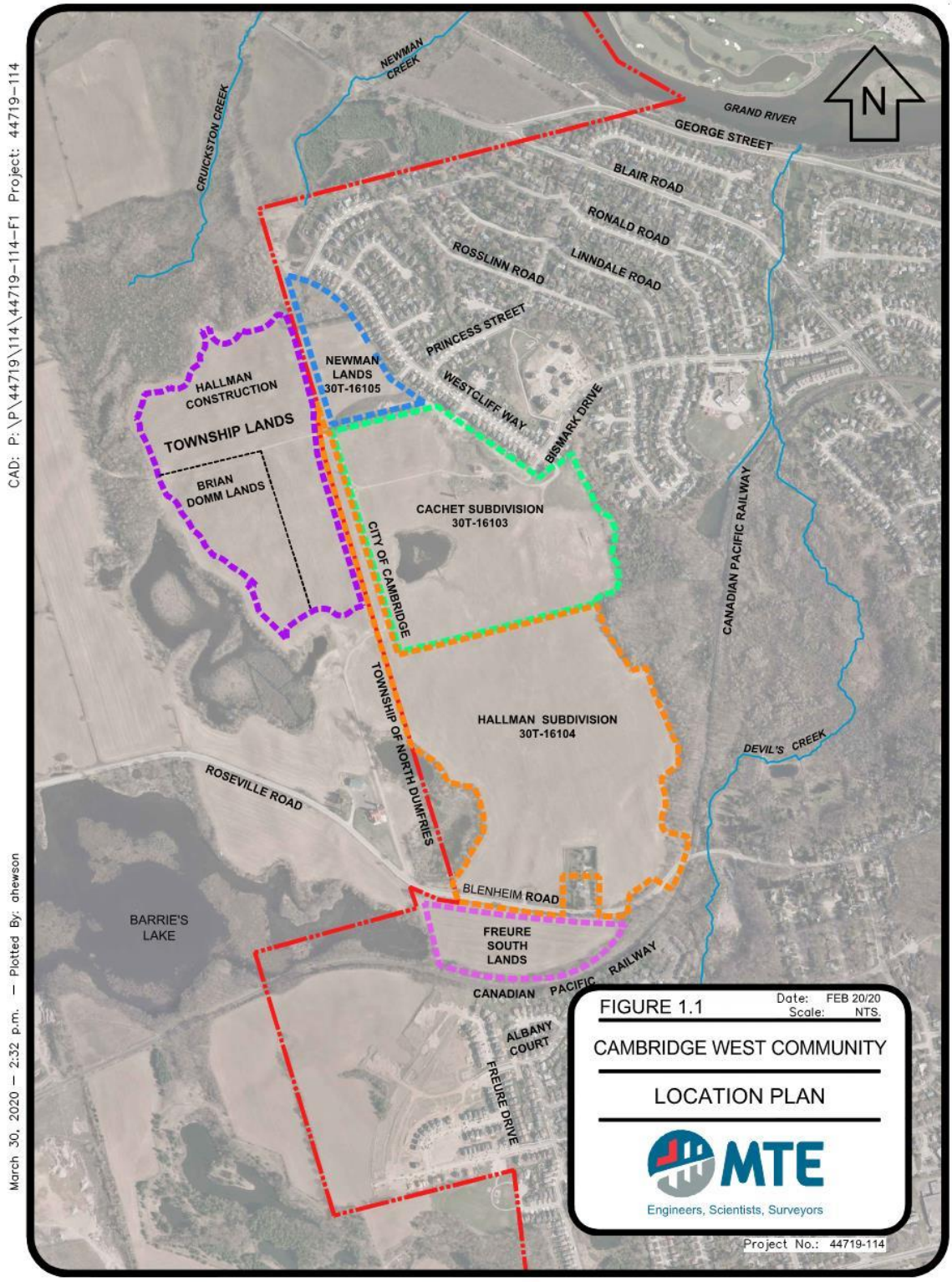
Contract Administrator
cell: 519-502-6492
curbina@mte85.com

WSP Canada Group Limited

Jeff Gross
Senior Project Manager
519-904-1757
jeff.gross@wsp.com

Teresa Piraino
Ecologist
519-904-1800
teresa.piraino@wsp.com

Figure 1. Key Plan



ATTACHMENT A. “AMPHIBIANS” EXCERPT FROM THE SAR HANDLING MANUAL

4. Safe Handling of Amphibians

Important Note: Many amphibian species absorb oxygen through their skin as well as breathing with lungs; some species rely completely on their skin for respiration. If their skin dries out, they can suffocate. Therefore, careful handling of amphibians (especially salamanders) includes ensuring that their skin is kept moist.

4.1 Materials

a) The following materials are required for the handling, capture, temporary safe keeping and transport of amphibians:

- A pail, bucket or large plastic bin with a lid that has air holes (for frogs). Ensure both the side of the container and the lid are well marked “live animal”.
- Plastic kitchen-style container lined with paper towel (needs to be wet when used) with a lid that has air holes (for salamanders and toads). Ensure both the side of the container and the lid are well marked “live animal”.
- Thermometer
- SAR Notification/Contact Schedule
- SAR Encounter Reporting Form
- Net (optional)

b) Equipment must be acquired and maintained on each job site.

4.2 Capture and handling of salamanders, toads and frogs

Note: Eastern Newts have toxins in their skin and some salamanders may release a white, mildly toxic substance from their skin and tail. If ingested, these toxins may cause mild nausea. There is no risk associated with handling Ontario’s amphibians, provided you wash your hands afterwards. Toads will not give you warts.

Safely handle, move or capture a salamander, toad or frog by following these steps:

a) Always make sure your hands are clean and free of insect repellent, antibacterial hand sanitizer, sunscreen, etc. Amphibians have very wet, porous skin through which they absorb oxygen and other compounds. Harmful chemicals (such as bug repellent) are quickly absorbed through an amphibian’s skin and can cause serious damage to the animal.

b) If possible, wet your hands before picking up salamanders in order to avoid drying out their skin. Some species rely completely on their skin for respiration. If their skin dries out, they can suffocate and die. You can also ensure dampness is maintained by picking up some wet soil with the salamander.

c) Keep handling times to a minimum as oil produced by human skin can easily clog amphibian pores, causing suffocation in some species.

d) Always handle amphibians gently and slowly. Rough handling may cause injury or stress to the animal. Salamanders can drop their tail as an anti-predator defence, and may do so if they feel threatened (even if you are not holding them by the tail).

e) Never grab or pick up a salamander by the tail. This may cause the salamander to drop its tail (even if you are being gentle) and can be detrimental to the survival of the animal.

f) Capture a **frog or toad** using a net or pick it up with your hands by:

I. Cupping your hands over the frog or toad while it is on the ground. (You have to be quick!)

II. Closing your hand(s) to create a “cage” around the animal and picking it up. Note that they are slippery and can fit through small holes between your fingers.

III. If it is necessary to identify the species after picking it up, carefully allow it to partially crawl out of your hand between your thumb and forefinger and then gently tighten your grip around its back legs (near its waist), holding onto both back legs. Support its front legs with your other hand.

g) Pick up a **salamander or newt** by scooping it up in one or two hands and then closing your hands to create a “cage”. Note that these animals are slippery and can fit through small holes between your fingers.

h) Use a net, container or your hands to catch frog tadpoles or salamander larvae. A net is easiest.

4.3 Moving amphibians out of harm's way (distance under 25 metres)

a) If it is necessary to move an amphibian more than 25 metres, refer to section 4.5 on amphibian relocation.

b) Amphibians should only be moved when they are in imminent, unavoidable danger.

c) Salamanders do not move large distances and will tend to hide whenever possible. If there is the need to move a salamander, you will have to pick it up and move it (refer to section 4.2).

d) If possible, allow a frog and a toad to move on its own by walking toward it in the direction that you want it to move. If the frog or toad does not move on its own, you will have to pick it up and move it (see section 4.2).

e) When moving an amphibian out of harm's way, such as across a road, move it in the direction that it was heading, regardless of what the habitat looks like. These animals often make intentional movements to specific areas and if you put them back where they started they will simply turn around and start their journey again. If it is not clear which direction the animal was headed, move it to the closest suitable habitat that will not be disturbed. Suitable habitat includes: any shoreline habitat in the case of frogs; leaf litter, rocks or logs in a vegetated/forested area that the animal can hide under in the case of salamanders; any cover, such as rocks or vegetation, in the case of toads.

4.4 Temporary safe keeping and transportation of amphibians

a) You are responsible for this animal. Remember, once you have put it in a container, it depends on you to keep it safe, moist and at the right temperature.

b) Make sure that all containers that will be housing amphibians are thoroughly washed and rinsed and do not contain any soap or chemical residue.

c) Keep **frogs** in a pail, bucket or large plastic bin with a lid that has adequate air holes. Always create the air holes before putting the animal in the container. Fill the container with less than one inch of water. Frogs should never be fully submerged, or they will drown.

d) Keep **toads** in a pail, bucket, large plastic bin or plastic kitchen-style container with a lid that has adequate air holes. Always create the air holes before putting the animal in the container. Line the bottom of the container with wet paper towels.

e) Keep **salamanders** in a plastic kitchen-style container with a lid that has adequate air holes. Line the bottom of the container with wet paper towels.

f) Keep **newts and mudpuppies** in a pail, bucket, large plastic bin or plastic kitchen-style container with a lid, and fill the container with water. Replace water twice daily to ensure proper aeration, as these animals breathe through gills (like fish).

g) It is extremely important to monitor the air temperature regularly in the container to ensure it **never exceeds 25°C or drops below 5°C**. Never leave the container in direct sunlight or in a closed vehicle parked in the sun, as this will cause the animal to overheat and could be fatal.

h) **Never leave the container unattended** in an unsecured location (e.g., side of road).

4.5 Relocation of amphibians

a) Amphibians should only be relocated if the destruction of their habitat is unavoidable, or if it is not possible to release the animal at the capture location.

b) Transport and release it within one hour of capture in order to minimize stress on the animal.

c) Amphibians should not be relocated during their over-wintering season. This varies depending on the species and location, but is generally from October to May. If you are unsure whether you should relocate the animal or take it to a wildlife custodian, contact MNR for further direction using the SAR Notification/ Contact Schedule.

d) If it is not possible to relocate the animal due to the time of year (October to May) or other conditions, transport it to a wildlife custodian per the SAR Notification/Contact Schedule.

e) **Amphibians should never be moved more than 100 metres** from the location where they were found. Only move the amphibian as far as necessary to avoid potential harm to the amphibian, and avoid moving amphibians more than 50 metres unless absolutely necessary. If it is not possible to relocate the animal within 100 metres of the capture location, contact MNR for further direction using the SAR Notification/Contact Schedule.

f) Release amphibians as close as possible to the capture site.

g) Always release frogs and larvae in the same water body where they were found, or in the same type of natural habitat as the capture site.

h) Release salamanders and toads in the same type of natural habitat as the capture site.

i) If possible, release frogs, toads and salamanders near a retreat site, which is somewhere the animal can seek shelter from the elements and avoid predators (vegetation, rocks, logs or leaf litter in the case of salamanders; water or vegetation in the case of frogs). Do not release them in the open where they could be exposed to inclement weather, extreme sunlight or predators.

j) To release frogs, toads and salamanders, remove the lid and gently tip the container onto its side and allow the animal to leave on its own. If necessary, gently tip the container on an angle to slide the animal out of the container.

4.6 Injured amphibians

a) Use the methods outlined in section 4.2 to handle injured amphibians whenever possible. If those methods are not applicable due to the animal's injuries, use a shovel or other thin, flat object to pick up the animal. Ensure that any injured areas are supported.

b) Place the amphibian in a small container with a lid that has air holes and line the bottom of the container with wet paper towels. Always create the air holes before putting the animal in the container.

c) Newspaper or paper towels may be added to the container to give the amphibian something to hide in. Do not place water, other animals, food or anything else in the container with the individual.

d) Thoroughly wash your hands after handling injured amphibians.

e) Immediately transport the injured animal to a veterinarian or wildlife custodian per the SAR Notification/Contact Schedule, in order to increase its chances of survival.

December 5 2016

Mr. Dave Marriot
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RE: Cambridge West Lands – Jefferson Salamander (*Ambystoma jeffersonianum*) Encounter Response Plan – Revised

This letter addresses a condition imposed by the Ministry of Environment and Climate Change (MOECC) in a letter dated October 2, 2015 to April Souwand (former Senior Environmental Planner at the City of Cambridge) with respect to the proposed development of the Cambridge West lands, City of Cambridge.

The MOECC October 2, 2015 letter was prepared in response to three Part II Order requests made on the submission of the Cambridge West Lands Master Environmental Servicing Plan (City of Cambridge and Landowners 2013) which addressed Phases 1 & 2 of the Municipal Class Environmental Assessment (EA) process. Specifically, this included the following "Projects":

- Establishment of new Stormwater Management Facilities.
- Establishment of new storm sewer – development lands to Princess Street.
- Extension of new sanitary services.

The Part II Order requests asked that a more comprehensive Individual Environmental Assessment (IEA) be undertaken. As identified in the letter, the MOECC decision was that an IEA would not be required given that certain conditions were met. One of these conditions, addressed herein, relates to Jefferson Salamander:

> *"In consultation with MNRF, the City will prepare a Response Plan for Jefferson Salamander, in the event that the species is encountered in the Plan area."*

To address the above noted commitment, MMM Group, with City of Cambridge staff, prepared a *draft* 'Response Plan' for encounters of Jefferson Salamander within the Draft Plan areas and circulated to MNRF on February 11, 2016. MNRF provided suggested edits via email on February 16, 2016, which were incorporated into a revised version re-circulated to MNRF on August 31, 2016. MNRF provided suggested revisions to the plan via email on October 18 2016, which have been incorporated verbatim in the current document.

Comprehensive, multi-year targeted Jefferson Salamander surveys were undertaken as part of the Cambridge West Master Environmental Servicing Plan (MESP) Study (City of Cambridge and Landowners 2013). Guelph district MNRF staff were consulted throughout the study including: determining survey methodology; obtaining collection permits; as well as discussion and interpretation of survey results. Substantial numbers of Ambystomid salamanders (Spotted Salamander, Blue-spotted Salamander and Blue-spotted dominant polyploids) were captured and sampled for genetic analysis; none was determined to be a Jefferson Salamander or Jefferson-dominant polyploid. Based on those results, Guelph district MNRF concluded that no habitat regulated under the ESA was present within the Development Study Area (DSA) lands. .

Subsequent to submission of the MESP, the *rare* Charitable Research Reserve *('rare')* undertook surveys for salamanders on lands adjacent to the draft plan lands, as described in a report entitled SAR Inventory: Jefferson Salamander. rare Charitable Research Reserve. 2014-2015 Report (rare, undated). In that study, 'cover board' and pond trapping surveys were undertaken in fall 2014 and spring 2015 in two woodlands: Indian Woods (1350 m or greater from the draft plan lands); and the 'hogsback' woods (290 m or greater from the draft plan lands). Based on results of collected DNA samples: no confirmed pure or Jefferson Salamander-dominated polyploids were recorded in the hogsback woods; and 8 Jefferson Salamander-dominated polyploids (i.e., LJJ genotype) were recorded in Indian Woods. The rare report, in so far as its relevance to the Development Study Area is concerned, is consistent with the conclusion reached by the MNRF with respect to the Development Area.

Although no regulated habitat for Jefferson Salamander was identified within the draft plan lands, landowners, in cooperation with *rare* and the MNRF, authorized additional salamander study of the MESP-sampled ponds and adjacent *rare* lands in the spring of 2016. Results of the 2016 trapping surveys and DNA analysis further support the previous conclusion that Jefferson Salamanders are not present within the Cambridge West DSA lands (Plan Area), including the adjacent *rare* 'hogsback' woodland.

Jefferson Salamander Encounter Response Plan:

Should a study of salamander breeding be undertaken on lands adjacent to the Plan Area prior to or during the time of construction, and Jefferson Salamander is documented, all construction activities will cease until the MNRF Guelph District Office has been contacted to discuss the potential implications of the ESA.

Yours truly,

MMM Group

Jeff Gross
Senior Ecologist/Project Manager
Ecology Department

cc: Graham Buck, Ministry of Natural Resources and Forestry

APPENDIX K

WILDLIFE CROSSING DESIGN

NEWMAN DRIVE

WETLAND 2

WETLAND 3

STAGE 5

Blk.15
Open Space

Blk.13
Multiple Residential

Open Space

HEAVY DUTY SILT FENCE

25.0m–1200x3600mm BOX CULVERT FOR WILDLIFE CROSSING

WILDLIFE FUNNEL WALL

(314.61) (314.41) (314.69) (315.07) (312.94) (312.39) (310.25)EX

(314.95) (314.75) (314.90) (312.82) (311.24)

(314.91) (315.03) (311.50) (315.08)

(310.32)EX (311.50)

(313.11)EX (313.71) (315.45)

(311.51)EX (312.59) (315.08)

(310.98)EX (314.83)

(314.85) (314.65) (314.80)

(311.00)EX

8.2%

10.4%

1.7%

7.3%

5% MAX

3:1 MAX

LEGEND

- SITE BOUNDARY
- x(326.00) PROPOSED SPOT ELEVATIONS EX =MAINTAIN EXISTING
- MUNICIPAL BOUNDARY
- ENVIRONMENTAL BUFFER
- LIMIT OF WETLAND
- EMBANKMENT (SLOPE AS NOTED) (TOP) 3:1 (BOTTOM)
- WILDLIFE FUNNEL WALL (MIN. 0.6m)
- HEAVY DUTY SILT FENCE

FIGURE XS1.3 Date: SEP.30/20 Scale: 1:1000

CAMBRIDGE WEST COMMUNITY

NEWMAN DRIVE WILDLIFE CROSSING PLAN

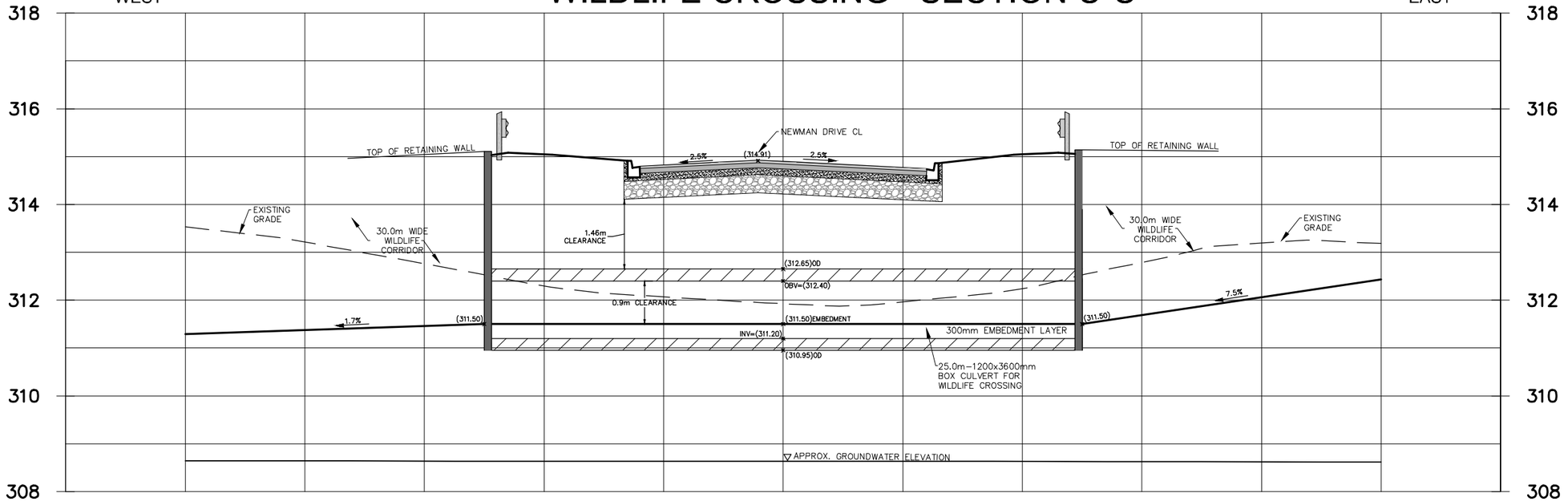
MTE
Engineers, Scientists, Surveyors

Project No.: 02534-800

September 23, 2020 — 11:23 a.m. — Plotted By: ccarre

P:\P\02534\800\02534-800-P-MS3.dwg

WILDLIFE CROSSING - SECTION C-C



WILDLIFE CROSSING - SECTION D-D

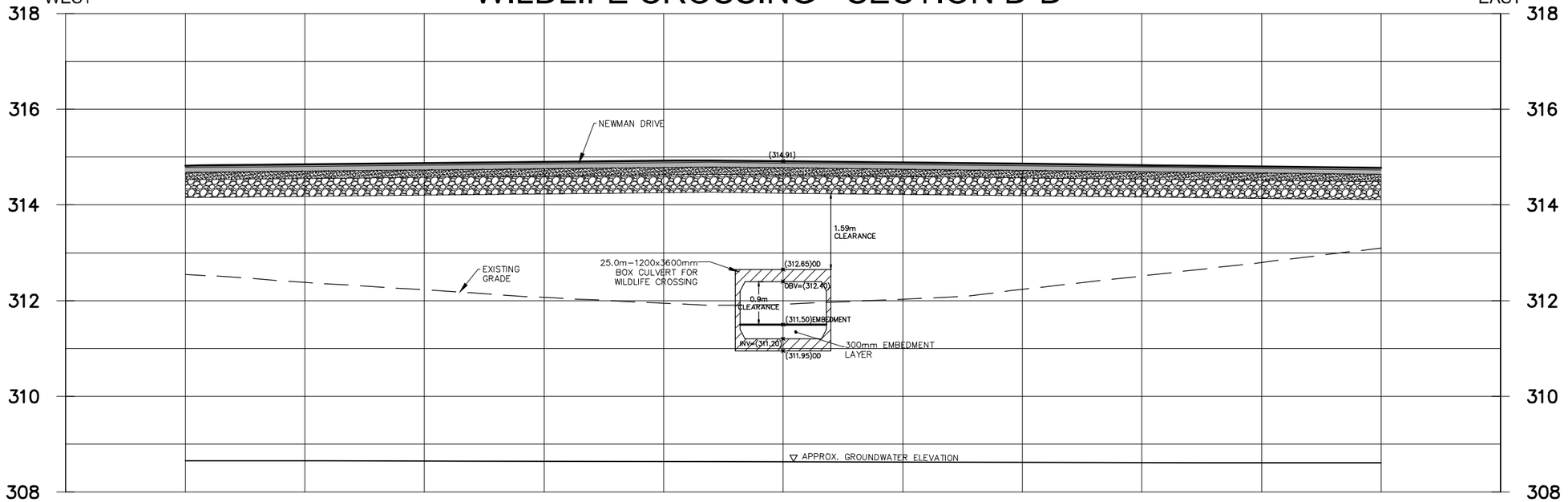


FIGURE XS1.4
Date: SEP.30/20
Scale: H-1:200, V-1:100

WESTWOOD PHASE 2

NEWMAN DRIVE WILDLIFE CROSSING
CROSS-SECTION

MTE
Engineers, Scientists, Surveyors

Project No.: 02534-800