

Ecological Community Advisory Committee

Report

4th Meeting of the Ecological Community Advisory Committee
March 16, 2023

Attendance PRESENT: S. Levin (Chair), P. Baker, S. Evans, S. Hall, R. McGarry, K. Moser, G. Sankar, S. Sivakumar and V. Tai and H. Lysynski (Committee Clerk)
 ABSENT: E. Dusenge, T. Hain, B. Krichker, K. Lee, M. Lima and S. Miklosi,
 ALSO PRESENT: A. Curtis, S. Butnari, M. Shepley, B. Page, B. Westlake-Power and E. Williamson
 The meeting was called to order at 4:33 PM

1. Call to Order

1.1 Disclosures of Pecuniary Interest

That it BE NOTED that no pecuniary interests were disclosed.

2. Scheduled Items

None.

3. Consent

3.1 3rd Report of the Ecological Community Advisory Committee

That it BE NOTED that the 3rd Report of the Ecological Community Advisory Committee, from its meeting held on February 16, 2023, was received.

4. Sub-Committees and Working Groups

None.

5. Items for Discussion

5.1 Environmental Impact Study - 735 Southdale Road West

That a Working Group BE ESTABLISHED consisting of S. Levin (lead), S. Evans, S. Hall and G. Sankar, to review the Environmental Impact Study and the Hydrogeological Study for the property located at 735 Southdale Road West.

a. (ADDED) Hydrogeological Study

5.2 Activities Members would like to Undertake while on the Ecological Community Advisory Committee

That it BE NOTED that the Ecological Community Advisory Committee held a general discussion with respect to the activities the members would like to undertake.

5.3 (ADDED) 38 Exeter Road

That it BE NOTED that the Scoped Environmental Impact Study for the property located at 38 Exeter Road was received.

a. (ADDED) Scoped Environmental Impact Study

- a. (ADDED) Maps and Appendices of the Scoped Environmental Impact Study

6. Adjournment

The meeting adjourned at 5:01 PM.

Ecological Community Advisory Committee

Report

3rd Meeting of the Ecological Community Advisory Committee
February 16, 2023

Attendance PRESENT: S. Levin (Chair), P. Baker, E. Dusenge, S. Evans, T. Hain, S. Hall, M. Lima, R. McGarry, G. Sankar, S. Sivakumar and V. Tai and H. Lysynski (Committee Clerk)

ABSENT: B. Krichker, K. Lee, S. Miklosi and K. Moser

ALSO PRESENT: S. Butnari, S. Corman, A. Denomme, K. Edwards, J. Fullick, K. Grabowski, M. Shepley, R. Wilcox and E. Williamson

The meeting was called to order at 4:31 PM

1. Call to Order

1.1 Disclosures of Pecuniary Interest

That it BE NOTED that no pecuniary interests were disclosed.

2. Scheduled Items

2.1 Kensington Bridge Environmental Assessment

That it BE NOTED that the presentation appended to the Ecological Community Advisory Committee Agenda by J. Pucchio, AECOM, with respect to the Kensington Bridge Environmental Assessment, was received.

2.2 2023-2027 Strategic Plan

That it BE NOTED that the presentation appended to the Ecological Community Advisory Committee Agenda by R. Wilcox, Director, Strategy and Innovation, with respect to the 2023-2027 Strategic Plan, was received.

3. Consent

3.1 2nd Report of the Ecological Community Advisory Committee

That it BE NOTED that the 2nd Report of the Ecological Community Advisory Committee, from its meeting held on January 19, 2023, was received.

4. Sub-Committees and Working Groups

None.

5. Items for Discussion

5.1 Response to ECAC Comments - Western Road, Philip Aziz and Sarnia Road Improvements - Environmental Impact Study

That it BE NOTED that the response from J. Pucchio, AECOM, to the Ecological Community Advisory Committee comments relating to the

Western Road, Philip Aziz and Sarnia Road Improvements Environmental Impact Study, were received.

5.2 Notice of Planning Application - Amendment to the h-5 Holding Zone

That it BE NOTED that the Ecological Community Advisory Committee held a discussion with respect to potential impacts to future heritage implications relating to the Notice of Planning Application dated February 1, 2023, from S. Filson, Site Development Planner, relating to an amendment to the h-5 Holding Zone, was received.

5.3 2023 Ecology Work Plan

That it BE NOTED that the Ecological Community Advisory Committee heard a verbal presentation from K. Edwards, Manager, Long Range Planning, Research and Ecology, and held a general discussion with respect to the 2023 Ecology Work Plan.

6. Adjournment

The meeting adjourned at 5:51 PM.



Environmental Impact Study

Project Location: 735 Southdale Road West

Prepared for: 2425293 Ontario Inc.

Prepared by:

MTE Consultants

123 St. George Street

London, ON N6A 3A1

May 27, 2022

MTE File No.: 42128-200



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1.0 Introduction

2425293 Ontario Inc. (the 'Proponent') has initiated the Zoning By-Law Amendment and Official Plan Amendment approval process for a high-density residential development (the 'Project') on a 3.8 ha Legal Parcel located at 735 Southdale Road West in the City of London. The property is located on Concession ETR Part Lot 78. The property is along a section of Southdale Road West that has previously been proposed to be widened by the City of London to accommodate increased traffic volume that is expected to result from proposed developments in the region (AECOM, 2018).

The area of proposed development is referred to as the Subject Lands throughout this report and this includes the entire Legal Parcel [Figure 1]. The Study Area for the EIS includes the Subject Lands (which were the focus of field investigations) and adjacent lands within 120 m.

Life science data collection within the Subject Lands was completed by MTE Consultants between 2018 and 2020. This report compiles the data collection for those years. In addition, data collected for other assessments within the Study Area by other parties will be included where appropriate. This will include the 2009 North Talbot Wetland Evaluation completed by the Ministry of Natural Resources (MNR), Upper Thames River Conservation Authority (UTRCA), and BioLogic (now part of MTE Consultants). Data collected and reported by AECOM for the Southdale Road West Improvements Environmental Impact Study (2018) will also be referenced in this Environmental Impact Study (EIS).

1.1 Report Objective

This report is an Environmental Impact Study (EIS), with the first sections meeting the Subject Lands Status Report (SLSR) requirements to identify features on site. A combined EIS/SLSR was requested by the City of London and Upper Thames River Conservation Authority (UTRCA) [Appendix A]. The objective of the SLSR component of the report is to describe the natural heritage features, based on field surveys and background information, and to identify functions to be protected or replicated on the Subject Lands. An EIS also provides this overview and will evaluate the potential for impacts to natural heritage features and functions to result from the Project, and provides recommendations for avoidance or mitigation of impacts, potential restoration and enhancement measures, and a monitoring program to protect significant natural heritage features and functions.

The process and reporting is also designed to provide a support document for additional approvals that may be required, including Conservation Authority Act permit applications that may be submitted to the Upper Thames River Conservation Authority (UTRCA).

1.2 Format

Natural heritage features and functions identified in this EIS are evaluated through a review of the Natural Heritage Reference Manual (NHRM, 2010) for policy 2.1 of the Provincial Policy Statement (MMAH, 2020), and Section 6 (Environmental Policies) of The London Plan (May 2021).

This report will be circulated to the City of London and UTRCA for agency review and comment on the findings and recommendations.

This EIS contains the following components, in accordance with the standards noted above:

- Section 2.0 Land Use Settings
- Section 3.0 Triggers for EIS
- Section 4.0 Description of the Natural Environment
- Section 5.0 Natural Heritage Policy Considerations

Section 6.0	Description of the Development
Section 7.0	Impacts and Mitigation
Section 8.0	Summary and Conclusion

1.3 Background Documents

The following additional studies were used to review the current environment.

- Upper Thames River Source Protection Area Assessment Report (Thames-Sydenham and Region Source Protection Committee, 2015)
- Southdale Road West Improvements – Pine Valley to Colonel Talbot Road – Environmental Impact Study (AECOM, 2018) [This EIS is in support of the Southdale Road West Improvements Municipal Class EA]
- Hydrogeological Assessment – Western Prestige Village (EXP Services Inc., 2022)
- North Talbot Community Plan Area Ecological Resource Inventory and Analysis (BioLogic, 1998)
- Southwest Area Plan (SWAP, 2019)
- 735 Southdale Road West Preliminary Servicing Report (Development Engineering, 2016)

1.4 Pre-Consultation

An information request for records of species protected under the *Endangered Species Act* (ESA) in the general area of the Subject Lands was submitted to MNRF by MTE Consultants in 2019. A response was received from Jason Webb (MNRF) on February 1, 2019 [Appendix A]. Shortly after receiving the response, responsibility for administering the ESA was transferred from MNRF to MECP. However, the data and response remain valid. This background review will be incorporated into this Environmental Impact Study.

A Scoping Meeting for this project was held on February 1, 2019 with James McKay (City of London Ecologist Planner), Sandi Levin (EEPAC), Jeff Bruin (City of London), Christine Creighton (UTRCA), and Dave Hayman (MTE). A Scoping Checklist was submitted January 20, 2020 [Appendix A]. The Upper Thames River Conservation Authority (Tara Tchir) provided comments on May 11, 2020. UTRCA accepted the scoping checklist provided a scoped hydrogeological study is completed using the UTRCA checklist, flora and fauna are identified per ELC community, and significant wildlife habitat (SWH) is evaluated. These comments will be addressed in this EIS.

An updated Initial Proposal Report (IPR) was prepared by Zelinka Priamo Ltd., EXP, and MTE Consultants in June 2020. A Proposal Review Meeting was held on July 15, 2020, and James McKay provided comments on the proposed plan and potential natural heritage concerns [Appendix A]. These comments will be addressed in this EIS. A new development plan has been completed since this meeting, and this updated Site Plan will be described in Section 6.0.

2.0 Land Use Settings

The Subject Lands are located at 735 Southdale Road West, Concession ETR, Part Lot 78, City of London [Figure 1]. The Subject Lands are comprised of agricultural and residential lands, as well as cultural and natural vegetation communities.

The area of the Subject Lands is primarily existing residential lands with agricultural lands to the southwest. Part of the North Talbot Provincially Significant Wetland (PSW) is located along the south edge of the Subject Lands and other natural features are interspersed in the surrounding landscape.

2.1 The London Plan

The London Plan (2021a) includes environmental policies that provide direction for the long-term protection and conservation of natural heritage features and areas and the ecological functions, processes, and linkages that they provide in the City of London. The general environmental goals of the London Plan include, but are not limited to, the following:

- Achieve healthy terrestrial and aquatic ecosystems in the city's subwatersheds.
- Provide for the identification, protection, rehabilitation, and management of natural heritage features and areas and their ecological functions.
- Protect, maintain, and improve surface and groundwater quality and quantity by protecting wetlands, groundwater recharge areas and headwater streams.
- Maintain, restore, monitor and improve the diversity and connectivity of natural heritage features and areas and the long-term ecological function and biodiversity of Natural Heritage Systems.
- Provide opportunities for appropriate recreational activities based on the ecological sensitivities of the area.

Natural Heritage features are identified and mapped on Map 5 of the London Plan (May 2021a). Development and site alteration is not permitted within or adjacent to Unevaluated Wetlands, Provincially Significant Wetlands, Significant Valleys and Woodlands, Habitat of Endangered or Threatened Species, Areas of Natural and Scientific Interest, and Environmentally Significant Areas unless evaluated by a professional and proven to have no negative impacts on the features or ecological functions.

2.1.1 Place Type Designations (London Plan, Map 1)

The Subject Lands are designated as Neighbourhoods on Map 1 of the London Plan (2021a) [Figure 2]. Adjacent lands to the north and south are similarly designated Neighbourhoods, except for areas of Green Space along the south property boundary (North Talbot PSW) and across Southdale Road West to the northeast (Southwest Optimist Park and Stormwater Management Pond).

2.1.2 Environmental Classifications (London Plan, Map 5)

Map 5 of the London Plan (2021a) indicates there is a Provincially Significant Wetland (North Talbot PSW) that borders the south of the Subject Lands [Figure 3]. Two small Unevaluated Wetlands are also shown within the southwest and northeast corners of the Subject Lands. These features were not identified in the SWAP (2019). A Valleyland is located approximately 100 metres to the south of the Subject Land. No other natural heritage features are identified within 120 metres of the Subject Lands. The Southwest Optimist SWM Pond is located about 30 metres north across Southdale Road West.

2.2 The Southwest Area Secondary Plan (Updated December 2019)

The Southwest Area Secondary Plan (SWAP) applies to lands (~2,700 ha) in the southwest portion of London bounded by Southdale Road West, White Oak Road, Exeter Road, Wellington Road South, Green Valley Road and the London Urban Growth Boundary. The purpose of the Secondary Plan is to establish policies and principles for the development of the specified planning area that consider a range of residential forms, sustainability practices, preservation of cultural heritage, and high quality urban design among other factors. The Southwest Area Secondary Plan provides a greater level of detail than the more general policies in the London Plan.

The Subject Lands are located in the North Talbot Residential Neighbourhood, as shown on Schedule 12 of the Southwest Area Secondary Plan. The Subject Lands are designated Medium Density Residential on this schedule, with the adjacent PSW designated Open Space and Environmental Review [Figure 4]. Adjacent lands are designated Low and Medium Density Residential. The SWAP mapping supersedes the London Plan (2021a).

2.3 City of London Zoning Bylaws

The Subject Lands are zoned Residential (R5-2, R6-4, R8-4) with holding provisions (h-2, h-30, h-53, h-75) [Figure 5]. A zoning by-law amendment will be required for the proposed development application to accommodate 8-12 storey residential apartment buildings to be consistent with the London Zoning By-law Z.-1.

2.4 Upper Thames River Conservation Authority (UTRCA) Regulation

The Upper Thames River Conservation Authority (UTRCA) regulates lands within its watershed under Ontario Regulation 157/06, pursuant to Section 28 of the *Conservation Authorities Act*. The UTRCA has jurisdiction over riverine flooding and erosion hazards, wetlands and the surrounding area, and requires that landowners obtain written approval from the Authority prior to undertaking any site alteration or development within the regulation limit.

The UTRCA has indicated that it regulates the central portion of the Subject Lands under Ontario Regulation 157/06. This regulation area is a 120 m distance associated with the North Talbot PSW to the south. The regulation area is also identified as a Dingman Creek Screening Area (under review) by the UTRCA online regulatory mapping (2018).

2.5 Planning Act

The Provincial Policy Statement (PPS; MMAH, 2020) was issued under the *Planning Act, 1990* to provide direction to regional and local municipalities regarding planning policy, ensuring that decisions made by planning authorities were consistent with provincial policy. With respect to natural heritage features and resources, the PPS defines seven natural heritage features:

- Significant Wetlands and Significant Coastal Wetlands
- Significant Woodlands
- Significant Valleylands
- Significant Wildlife Habitat (SWH)
- Significant Areas of Natural and Scientific Interest (ANSI's)
- Fish Habitat, and,
- Habitat of Endangered and Threatened Species

The Subject Lands are within Ecoregion 7E where no development or site alteration is permitted in Provincially Significant Wetlands or Coastal Wetlands. Development and site alteration are not permitted in Habitat of Endangered or Threatened Species or Fish Habitat or, except in accordance

with provincial and federal legislation. For the remaining features, development and site alteration shall not be permitted unless it has been demonstrated through an EIS that there will be no negative impacts on the features or their ecological functions.

While not all features and functions of provincial interest noted above are provided on provincial maps, a review of the Make a Natural Heritage Map (NHIC, 2019) suggests there are no additional mapped features not already covered by the Official Plan Maps. However, the policies noted above are reviewed later in this report supported by site specific field work and consultation with the municipal review agencies.

2.6 Endangered Species Act

The *Endangered Species Act, 2007* protects species listed as Threatened, Endangered or Extirpated in Ontario (SARO, 2007) from killing, harm, harassment or possession, and also protects their habitats from damage or destruction. Activities that may impact a protected species or its habitat require prior authorization from the Ministry of Environment, Conservation and Parks (MECP), unless the activities are exempt under Ontario Regulation 242/08.

An information request for records of species protected under the *Endangered Species Act* (ESAct) in the general area of the Subject Lands was submitted to MNRF by MTE Consultants in 2019. A response was received from Jason Webb (MNRF) on February 1, 2019 [Appendix A] indicating Barn Swallow [THR] and Butternut [END] may be present in the area. Shortly after receiving the response, responsibility for administering the *ESAct* was transferred from MNRF to MECP. However, the data and response remain valid. This background review will be incorporated into this Environmental Impact Study.

2.7 Fisheries Act

The federal *Fisheries Act, 1985* (amended 2019) manages fisheries resources, as well as conserves and protects fish and fish habitat, including by preventing pollution. Protections apply to all fish and fish habitat in Canada. There are no identified waterbodies within the Subject Lands that provide fish habitat, therefore the *Fisheries Act, 1985* will not apply.

2.8 Migratory Birds Convention Act

The federal *Migratory Birds Convention Act, 1994* aims to protect and conserve migratory birds as populations and individual birds in Canada and the United States. No work is permitted to proceed that would result in the destruction of active nests (nests with eggs or young birds), or the wounding or killing of bird species protected under the Migratory Birds Convention Act, 1994 and/or Regulations under that Act. Many bird species not protected by the MBCA (e.g. raptors) are protected under the FWCA.

2.9 Fish and Wildlife Conservation Act

The *Fish and Wildlife Conservation Act, 1997* (FWCA) regulates hunting, trapping, fishing, and related activities in Ontario in order to address the conservation of fish and wildlife resources in the province, including mammals, birds, reptiles, amphibians and fish. Under the Act, a person that hunts or traps wildlife requires a license administered by the Ministry of Natural Resources and Forestry (MNRF). Deliberate capture of wildlife or fish for the purpose of salvage and relocation is regulated under the FWCA.

3.0 Triggers for EIS

When a development proposal requires a Planning Act application (e.g. Draft Plan of Subdivision, or amendments to the Official Plan and/or zoning by-law), the City of London requires an EIS if the proposed development or site alteration is within or adjacent to Natural Heritage System in accordance with the features and distances set out in Table 13 (Areas Requiring Environmental Study) of the London Plan (2021a).

The proponent is proposing a medium density residential development at 735 Southdale Road West in London, ON. Based on the London Plan Maps 1, 5 and 6 (2021) and considering the presence of unmapped natural areas addressed by London Plan policy, the triggers for the Environmental Impact Study (EIS) are as follows:

- Proposed development within 120 m of a Provincially Significant Wetland
- Proposed development within 120 m of Unevaluated Wetlands
- Proposed development within 120 m of Valleylands

As well, application for a permit under the UTRCA Ontario Regulation 157/06 may require an EIS

- Portions of the Subject Lands are within the UTRCA's regulation limits for the PSW to the south

In addition, the *Endangered Species Act* (2007) protects species and their habitats which have not been mapped in Official Plans or on provincial mapping. To be consistent with the Provincial Policy Statement (Ministry of Municipal Affairs and Housing (MMAH), 2020), the requirements for an additional study can be triggered without any adjacent features identified on the London Plan Maps.

The following section (Section 4.0) describes the natural heritage existing conditions of the Subject Lands.

4.0 Description of the Natural Environment

The following section reviews the abiotic and biotic features on and within 120 m of the Subject Lands that contribute to the overall natural heritage features and functions of the Subject Lands and Adjacent Lands. This review provides relevant background information for interpreting environmental features and functions for evaluation in Section 5.0. Areas outside the property limits were studied from the edge of the property or using satellite imagery.

4.1 Physical Setting

4.1.1 Physiography

The Subject Lands are underlain by Middle Devonian-aged limestone, dolostone, and shale of the Dundee Formation (Ontario Geological Survey, 1991). Bedrock is not exposed at this site, and it was not encountered during drilling by EXP Services (2022).

The Subject Lands are within the Mount Elgin Ridges physiographic region and are located on the Ingersoll Till Moraine (Chapman & Putnam, 1984). The quaternary geology on site consists of glaciofluvial outwash deposits with gravel and sand (Barnett et al., 1981).

4.1.2 Soils

The predominate soil type in the area of the Subject Lands is Muriel that consists of Muriel, Gobles and Kelvin associates. Muriel soil type is described as silty clay loam, silty clay, and occasionally clay loam glacial till deposited by glaciation from the Lake Erie basin (Hagerty & Kingston, 1992). These soils typically exhibit moderately well to imperfect drainage characteristics. Bennington soils are also present in the region. This soil type has well to imperfect drainage and is described as 40-100 cm of glaciolacustrine loam, silt loam, and occasionally very fine sandy loam overlying clayey glaciolacustrine deposits.

The OGSEarth Surficial Geology mapping provided by the Ministry of Energy, Northern Developments, and Mining (2017) identifies this region as having 5d till (clay to silt-textured till derived from glaciolacustrine deposits or shale).

Based on site investigations by EXP Services, the Subject Lands are overlain by a layer of topsoil and covered with a low-permeability silty clay till that thins in the west of the site. The till also has occasional wet sands and silt pockets. MECP Well Records suggest an extensive dry sand stratum underlies the till at elevations ranging from 253 m to 272 m. The sand was located at depths of 5.0 m to 8.6 m below ground in the area of the PSW. The sand stratum is likely connected to a fluvial terrace extending to the west Adjacent Lands (EXP, 2022).

4.1.3 Topography

In the general vicinity of the Subject Lands, the topography is very gently sloping (Hagerty & Kingston, 1992). On a site-specific scale, the property is generally sloped towards the southeast (EXP, 2022). Site elevations range between 282 and 274 metres (EXP, 2022).

4.1.4 Surface Water

The Subject Lands are located in the Dingman Creek Subwatershed. Surface drainage generally follows the site topography, draining towards the PSW to the south and the Unevaluated Wetlands (EXP, 2022). These wetlands have ponded surface water after rainfall due to the low permeability soils. The PSW had seasonal fluctuations between dry surface conditions in summer/fall and up to one metre of standing water. The PSW is primarily influenced by rainfall and surface water that drains south from the west Subject Lands (EXP, 2022).

A tiled drain is shown to extend to the south from the south edge of the PSW on UTRCA mapping (2018) and AgMaps (2022). This was not investigated in the field as it is outside the property boundary.

4.1.5 Hydrogeology

The Subject Lands are located in the Upper Thames River Source Protection Area. The Subject Lands are not within a wellhead protection zone, nor a significant groundwater recharge area (SGRA), nor a highly vulnerable aquifer (HVA) (TSRSPC, 2015). Hydrogeological investigations by EXP services were consistent with the absence of a SGRA and HVA (EXP, 2022).

Four groundwater monitoring wells were installed by EXP Services in November 2019 and groundwater elevations were collected for one year. Groundwater elevations are relatively high (seasonal high of 0.5 mbgs in April 2020). Local shallow groundwater flow is anticipated to follow local topography, generally draining southwest towards Dingman Creek (EXP, 2022). Additional groundwater monitoring details and a water balance are provided in the Hydrogeological Assessment (EXP, 2022).

4.2 Biological Setting

Life science data were collected on the Subject Lands and Adjacent Lands by MTE Consultants between 2018 and 2020. This section summarizes the background review of the Subject Lands, data collection methods, and the results of field investigations.

4.2.1 Designated Natural Heritage Features

The Land Information Ontario (LIO) mapping (MNRF, 2021), Natural Heritage Information Centre (NHIC) online database (2021) and London Plan Map 5 were reviewed for natural heritage features in the Study Area.

Map 5 of the London Plan (2021) identifies a Provincially Significant Wetland (PSW) partially on and within the south boundary of the Subject Lands. No Areas of Natural and Scientific Interest (ANSI) or Environmentally Significant Areas (ESA) are located on or within 120 m of the Subject Lands. A review of the LIO mapping identifies the North Talbot Wetlands (PSW) similarly to Map 5 (City of London, 2021), but this wetland boundary differs slightly from the SWAP boundaries. This is discussed further in this EIS.

4.2.2 Protected Species and Species of Conservation Concern Records

Protected Species are those listed as Endangered or Threatened on the Species at Risk in Ontario (SARO) List of the Endangered Species Act (ESAct, 2007). Only Protected Species and their habitats receive protection under the ESAct. Species of Conservation Concern (SOCC) are those listed as Special Concern on the SARO list and species with a provincial ranking of S1-S3. Provincial status rankings for plants, vegetation communities, and wildlife are based on the number of occurrences in Ontario and have the following meanings:

S1: critically imperiled; often fewer than 5 occurrences

S2: imperiled; often fewer than 20 occurrences

S3: vulnerable; often fewer than 80 occurrences

S4: apparently secure

S5: secure

S?: unranked, or, if following a ranking, rank uncertain (e.g. S3?)

Provincial status rankings are established by the NHIC and do not provide an indication of regional abundance or rarity (i.e. species uncommon in the province may still be locally abundant in some regions).

A review of the Ontario Natural Heritage Information Centre (NHIC) database and an information request submitted to MNRF in 2018 [Appendix B] identified several Protected Species as potentially present in the area of the Subject Lands. These sources display data for a broad area (e.g. per 10 km atlas square) and therefore provide only a general potential for species presence on or near the Subject Lands:

- American Badger (Southwestern Ontario pop.) [END]
- American Chestnut [END]
- Butternut [END]
- Eastern Flowering Dogwood [END]
- False Hop Sedge [END]
- Barn Swallow [THR]
- Bobolink [THR]
- Eastern Meadowlark [THR]

In addition to the above list, there are a number of other species that can be commonly found in the area but, while protected under the *ESA*, are not always listed in the database and information sources. These additional species to consider include bat species (Little Brown Myotis [END], Northern Myotis [END], Tri-coloured Bat [END] and Eastern Small-footed Myotis [END]).

An assessment of habitat for these Protected Species and SOCC, along with targeted surveys where suitable habitat was present, was conducted by MTE on the Subject Lands as part of the current EIS. Survey methods and results are discussed in Sections 4.3 and 4.4.

4.3 Vegetation and Floral Inventories

4.3.1 Vegetation

The vegetation communities within the Subject Lands were assessed by Will Huys, certified to conduct ELC in Southern Ontario, on October 17, 2018, and May 13, June 4, June 19, and August 1, 2019 [Figure 6] using protocols outlined in the Ecological Land Classification (ELC) System for Southern Ontario (Lee et al., 1998). ELC information sheets are provided in Appendix C. Provincial significance of vegetation communities is based on the rankings assigned by the NHIC (2020). All communities listed in Table 1 are secure in Ontario [Table 1].

Table 1: Ecological Land Classifications for the Subject Lands and Adjacent Lands

Community Type	Polygon	ELC Code	Description	S-rank	Area (ha)
Wetland					
	1a	MAM2	Mineral Meadow Marsh Ecosite inclusion	n/a	0.08
	A2a	SWT1	Mineral Swamp Thicket Ecosite	n/a	0.03
	3	SAS1	Submerged Shallow Aquatic Ecosite	n/a	0.25
	4	MAS2	Mineral Shallow Marsh Ecosite	n/a	0.10
	5	SWD3	Maple Mineral Deciduous Swamp Ecosite	n/a	0.30
Cultural					
	1	CUM1-1	Dry-Moist Old Field Meadow Type	n/a	1.9
	2	CUM1-1	Dry-Moist Old Field Meadow Type	n/a	0.83
Anthropogenic					
	A1	-	Residential Home and Yard	n/a	0.50
	A2	-	Active Horse Pasture	n/a	0.23

* Measured area within the Subject Lands only.

Community A1 (0.50 ha), within the centre portion of the Subject Lands, is a residential property with a single-family home, driveway, storage shed and mowed lawn.

Community A2 (0.23 ha) is an active horse pasture located in the east Subject Lands between communities 2 and 3. This community includes a small (0.03 ha) SWT1 Mineral Swamp Thicket Ecosite inclusion (A2a) that is dominated by White Willow, Rough Cocklebur, and Devil's Beggarticks.

Community 1 (1.9 ha) is a CUM1-1 Dry-Moist Old Field Meadow Type located in the west Subject Lands. Community 1 is a meadow with scattered trees throughout. The west portion of this community is dominated by occasional Shagbark Hickory and Oak trees in the canopy. The remainder of the community has Black Walnut in the canopy along with Eastern Cottonwood and Shagbark Hickory. The understory is primarily White Willow, with Canada Thistle, Smooth Brome, Fescue species, and Canada Goldenrod in the ground layer. Community 1 was observed to have mowed pathways through it on October 27, 2021. A small (0.08 ha) Mineral Meadow Marsh inclusion (1a) is located in Community 1 along the south property boundary. This inclusion includes Devil's Beggarticks, Lance-leaved Aster, Rough Cocklebur, and European Buckthorn. Inclusion 1a also contains Skunk Cabbage which can be a groundwater indicator, but may also just grow in wet areas. The lack of other indicators suggests there is no groundwater influence. This inclusion was observed to be seasonally dry in the summer and this is consistent with what was observed by EXP (2022).

Community 2 (0.83 ha) is also a CUM1-1 Dry-Moist Old Field Meadow Type, and is located in the east Subject Lands. This vegetation community is dominated by Smooth Brome, Creeping Wildrye, Canada Goldenrod, and Everlasting Pea. Other abundant floral species include New England Aster and Curly Dock.

Community 3 (0.25 ha total, 0.10 ha on site) is a SAS1 Submerged Shallow Aquatic Ecosite in the east corner of the Subject Lands. The canopy surrounding the wetland is dominated by White Willow. The ground layer around the edge of the pond is primarily Creeping Bentgrass and Devil's Beggarticks; Narrow-leaved Cattail and Redtop are also notably present. This community has surface water all year and is supported by surface runoff and flows from a pond north of the road through a culvert. This is supported by monitoring by EXP (2022). No floral groundwater indicators were observed in this community.

Community 4 is a 0.10 ha Mineral Shallow Marsh Ecosite (MAS2) that is located in a topographic low in adjacent lands, approximately 65 metres south of the Subject Lands. This community is the south section of a PSW that is part of the North Talbot Wetland Complex. Community 4 is dominated by Broad Cattail, Creeping Bentgrass, Hemp Dogbane, Devil's Beggarticks, and Ditch-stonecrop. The community is wet in the spring, but was observed to be dry by August.

Community 5 is a 0.34 ha Maple Mineral Deciduous Swamp Ecosite (SWD3) located adjacent to the south edge of the Subject Lands. This community is part of the same North Talbot Wetland Complex PSW as Community 4, although there appears to be no hydrological surface connection with Community 4 or any other wetland. No floral groundwater indicators were observed in this community. The canopy of Community 5 is strongly dominated by Silver Maple, but White Willow is also present. The understory is dominated by Eastern Buttonbush, Common Buckthorn, and Gray Dogwood. Community 5 has occasional non-native species growing throughout it with flooding in the spring and little to no standing water by mid-July or August. The wetland boundary differs marginally from LIO mapping along the north boundary based on site investigations. The site specific boundary has been used in this report as it reflects field investigations and refinement and more closely matches the boundary identified in SWAP.

4.3.2 Floral Inventory

A three-season floral inventory within the Subject Lands was completed by Will Huys on October 17, 2018, and May 13, June 4, June 19, and August 1, 2019 [Appendix D]. Communities 4 and 5 were not inventoried as they are outside of the Legal Parcel. The provincial status of all plant species is based on the Species at Risk in Ontario (SARO) List under Ontario Regulation 230/08 (2007). Locally rare and uncommon flora and fauna species were identified using the List of Vascular Plants of Ontario's Carolinian Zone (Oldham, 2017). No floral Protected Species or SOCC were observed within the Subject Lands.

Based on the floral inventories, vegetation communities were assessed using SOFIA (Southern Ontario Floral Inventory Analysis) (Lebedyk, 2018). Community 1 (CUM1-1) had a total of 90 species with 73% native species. Community 2 (CUM1-1) had 28 floral species recorded, with 64% being non-native. Community 3 (SAS1) had 42 species with exactly 50% being native and introduced.

SOFIA also provides several values based on floral inventories to evaluate the value and natural quality of vegetation communities. These values are provided in Table 2. The Coefficient of Conservatism (CoC) is a value (0-10) assigned to each species based on the species' degree of fidelity to certain ecological parameters (Oldham, Bakowsky & Sutherland, 1995). Plants found in a wide range of vegetation communities are assigned low values while those that are found in a narrow range of parameters are assigned high values. For a community, the mean Coefficient of Conservatism (CoC) is calculated between all species observed, and this provides a measure of floristic quality (Lebedyk, 2018). A community with a Mean CoC that is >3.5 is of sufficient floristic quality to be of remnant natural quality. Another measure is the Floristic Quality Index (FQI). FQI is intended to indicate the overall vegetative quality of a community, and is calculated by multiplying the mean CoC by the square root of the number of species present (Oldham, Bakowsky & Sutherland, 1995). As a point of reference, a community with a FQI <20 is considered to have minimal significance from a natural quality perspective, and a community with a FQI >35 has sufficient conservatism and richness to be floristically important from a Provincial perspective.

Table 2: Southern Ontario Floral Inventory Analysis (SOFIA) Results

Vegetation Community	Mean CoC	FQI	Comments
Community 1 Dry-Moist Old Field Meadow Type (CUM1-1)	2.3	18.7	<ul style="list-style-type: none"> Poor floristic quality, no natural quality. Has the highest FQI, but it is still not high enough to indicate significant floristic quality.
Community 1a Mineral Meadow Marsh Ecosite inclusion (MAM2)	2.3	17.0	<ul style="list-style-type: none"> Poor floristic quality, no natural quality.
Community 2 Dry-Moist Old Field Meadow Type (CUM1-1)	0.8	0	<ul style="list-style-type: none"> Poor floristic quality, no natural quality. Has the lowest Mean CoC and FQI values.
Community 3 Submerged Shallow Aquatic Ecosite (SAS1)	1.5	9.4	<ul style="list-style-type: none"> Poor floristic quality, no natural quality. It should be noted that species observed around the edge of this community were included in the analysis.

Two floral species listed as regionally rare (Middlesex County) were identified during field investigations (Oldham, 2017): Cockspur Hawthorn (*Crataegus crus-galli*) and Larger Straw Sedge (*Carex normalis*). It should be noted that these species were not considered rare within Middlesex County in *Rare Vascular Plants of Ontario, Fourth Edition* (Oldham & Brinker, 2009), and no sources dated after 2009 were referenced for Middlesex County in the 2017 *List of Vascular Plants of Ontario's Carolinian Zone* (Oldham, 2017). Therefore, there is a lack of published evidence supporting the rarity of these species in Middlesex County. In addition, both species are frequently observed by MTE throughout the London area. It is MTE's opinion is that the regional rarity is due to under-reporting rather than actual species presence and distribution, based on surveys

conducted in the London region. Regardless, background information for these species is provided below.

Cockspur Hawthorn was found in Communities 1 (CUM1-1) and 2 (CUM1-1). This Hawthorn species is considered common and secure in Ontario and is one of the most common Hawthorn species found throughout Ontario (MNRF, 2021). Cockspur Hawthorn can be found in many areas, including along streams and riverbanks, in forest edges, on sandy hillsides, on roadsides, in fields or pastures, in thickets, and sometimes in wet ground (Reznicek, Voss & Walters, 2011).

Larger Straw Sedge was found in Communities 1a (MAM2) and 3 (SAS1), and is also common and secure in Ontario and can be found in moist fields, thickets, open forests, and occasionally drier areas (Reznicek, Voss & Walters, 2011).

Regionally rare species are not protected under the *Endangered Species Act* (2007), however potential opportunities for mitigating impacts to these species will be discussed in Section 7.0.

4.4 Significant Wildlife Habitat

MNRF Significant Wildlife Habitat (SWH) Criteria Schedules for Ecoregion 7E (January 2015) uses ELC ecosite codes and habitat criteria (e.g. size of ELC polygon, proximity to other natural features) to define candidate SWH. Additional candidate SWH types for the City of London were obtained from the London Plan (Policy 1354, 2021a). An assessment of candidate SWH was completed for the Subject Lands using a combination of desktop analysis, satellite imagery interpretation and field observations, and is provided in Appendix H.

Candidate Specialized Habitats of Wildlife Considered SWH

Waterfowl Nesting Area – North Talbot PSW (SWD3), MAM2 inclusion

Amphibian Breeding Habitat (Woodlands) – North Talbot PSW (SWD3), MAM2 inclusion

Amphibian Breeding Habitat (Wetlands) – SAS1

Terrestrial Crayfish – MAM2 inclusion, North Talbot PSW (SWD3), MAS2

Candidate Habitats for Species of Conservation Concern Considered SWH

Terrestrial Crayfish – Community 1 (SWD4), Adjacent Lands (SWD/SWT)

Special Concern and Rare Wildlife Species - Green Dragon [SC], Snapping Turtle [SC], and Hoary Tick-trefoil [S2].

Candidate features were further evaluated using the results of targeted field investigations to determine if SWH was confirmed based on criteria such as species presence, abundance, and diversity. Results of the assessment of significance for SWH are presented in Section 5.0.

4.5 Faunal Site Investigations

A breeding bird survey, an amphibian breeding survey, a bat maternity roost survey, and general observations of habitat suitability for American badger [END] were completed on the Subject Lands.

4.5.1 Avifauna

Will Huys conducted breeding bird surveys on June 4 and June 19, 2019 guided by the protocols outlined in the Ontario Breeding Bird Atlas (OBBA) (Cadman *et al.*, 2007). A combination of point counts and area searches were used in each community within the Subject Lands. The number of individuals and the highest level of breeding evidence were recorded for all avian species observed.

Pastures and meadows in adjacent lands previously supported breeding Bobolink [THR] and Eastern Meadowlark [THR] (BioLogic, 1998; AECOM, 2018), but the majority of the adjacent lands have since been transitioned to row crops. Communities 1 and 2 remain as potentially suitable CUM1-1 Old Field Meadow Types, however opportunities for nesting by Eastern Meadowlark [THR]

and Bobolink [THR] have been limited by the adjacent changes in agricultural land use. No Bobolink or Eastern Meadowlark were observed during breeding bird surveys. A shed is present on the Subject Lands in the residential yard (A1) and a search for Barn Swallow [THR] nests was conducted on October 28, 2021. No nests were present on the outside or on the first level of the shed, but the top floor could not be accessed. The top floor appeared to be fully closed off from the outside and therefore is unlikely to provide suitable nesting habitat for Barn Swallows [THR]. No Barn Swallows [THR] were observed during breeding bird surveys.

No other avian Protected Species or SOCC were observed within the Subject Lands [Appendix E]. The most common species observed were Red-winged Blackbird, Song Sparrow, House Sparrow, Common Grackle, and Mallard.

4.5.2 Amphibians

Will Huys conducted amphibian call surveys on April 8, May 16, and June 12, 2019, guided by the Marsh Monitoring Program (MMP) protocol (BSC, 2009). A summary of observations is provided in Table 3, below. The call code (1 to 3) is provided along with the number of individuals heard in brackets where applicable. Complete field data are provided in Appendix F.

Table 3: Amphibian Call Count Code Results

Species	Station A (Community 5 – SWD3)			Station B (Community 3 – SAS1)		
	April	May	June	April	May	June
Spring Peeper	3	3; 2(18)		3; 3*	3	
Gray Treefrog		3*	1(3); 1(2)			1(1)
Green Frog						1(4)
American Toad					2(3)	

* indicates the call heard was outside the 100 m station area.

Station A was located in Community 1, facing south towards features 1a (MAM2) and the North Talbot PSW (SWD3). Spring Peepers were heard at call code 3 from the PSW (Community 5) in both April and May. Gray Treefrog was also heard at call code 3 from the PSW in May, and in smaller numbers (five individuals) from approximately the same location in June. No frogs were identified in Community 1a.

Station B was farther east along Southdale Road West and faced south towards A2a (SWT1) and Community 3 (SAS1). Spring Peepers were heard at call code 3 in April and May from Community 3. Three American Toads were heard from this community in May, and one Gray Treefrog and four Green Frogs were heard in June from Community 3 as well. No frogs were identified in Community A2a.

4.5.3 Bat Maternity Roost Habitat

A bat maternity roost survey was conducted by Will Huys on May 13, 2019 according to MECP protocols (“Treed Habitats – Maternity Roost Surveys”, 2021) and MNRF survey guidelines (“Survey Protocols for Species at Risk Bats within Treed Habitats”, 2017) to identify potential habitat for Endangered bat species. Although this survey was completed outside the recommended timing window (fall to early spring), the tree leaves had not yet fully emerged so foliage was not significantly obscuring the view of tree cavity and bark features. Five candidate maternity roost trees were located near the west and south edge of Community 1 (CUM1-1) [Figure 7]. All five trees are Shagbark Hickory (*Carya ovata*), which is a species with loose peeling bark, and are described as alive and healthy (decay class 1) [Appendix G].

4.5.4 Mammal Burrows

Two animal burrows were identified west of the Subject Lands during life science inventories [Figure 7]. These burrows likely belonged to groundhogs. No evidence of American Badger [END] (e.g. large burrows with lateral claw marks or soil piles) was present within the Subject Lands.

4.5.5 Terrestrial Crayfish

A single Terrestrial Crayfish chimney was observed in the 1a inclusion (MAM2) during field investigations [Figure 7]. Two chimneys were also observed along the edge of Community 5 (SWD3). Terrestrial Crayfish could also be present in Community 4 (the south portion of the North Talbot PSW), however this community could not be searched as it is outside the Legal Parcel.

4.5.6 Reptiles

NHIC and the 2018 MNRF information request did not identify any Protected reptiles in the area. No potential hibernaculum features (i.e. burrows, rock piles, crevices) were identified within the Subject Lands. The SAS1 pond (Community 3) is likely too shallow for overwintering turtles and not suitable for Snapping Turtle, Northern Map Turtle, Eastern Musk Turtle, Softshell Turtle, or Blanding's Turtle (AECOM, 2018). No turtles were observed during a targeted reptile basking survey completed by MTE staff on May 1, 2020 nor during any of the other life science investigations. The adjacent North Talbot PSW is also unlikely to support turtles as it did not support permanent standing water through the winter months or during the summer.

No incidental observations of snakes were recorded during site investigations in the Subject Lands.

4.5.7 Aquatic

There is a permanent pond (Submerged Shallow Aquatic Ecosite) located in the northeast corner of the Subject Lands. This pond has no surface connections to other watercourses and is not considered fish habitat. No watercourses are present within the Subject Lands.

A review of the Fisheries and Oceans Canada (DFO) Species at Risk mapping did not identify any aquatic species at risk nor critical habitat for species at risk within 1 km of the Subject Lands (DFO, 2020).

5.0 Natural Heritage Policy Considerations

Provincial and municipal natural heritage policies provide guidelines that determine appropriate land uses on and adjacent to natural heritage features and functions. This section reviews the provincial, municipal and Conservation Authority regulatory policies which apply to Natural Heritage features and functions of the Subject Lands and larger Study Area.

Policies and regulations that may pertain to the Subject Lands include:

- the 2020 Provincial Policy Statement, Section 2.1, issued under the *Planning Act, 1990*
 - these have been reviewed in conjunction with the Natural Heritage Reference Manual (NHRM) (OMNR, 2010),
- the London Plan, Section 6 – Environmental Policies (May 28, 2021a),
- the Southwest Area Secondary Plan (City of London, 2019),
- the City of London Environmental Management Guidelines (2021b),
- the UTRCA Regulations (*Conservation Authorities Act*, Section 28 – *Ontario Regulation 157/06*).
- the *Endangered Species Act, 2007*
- the *Migratory Birds Convention Act, 1994*

The policies above are applied to natural features and functions identified in Section 4.0 of this EIS in order to determine which components of the natural heritage system will require additional consideration.

5.1 Provincial Policy

The Provincial Policy Statement (PPS; MMAH, 2020) was issued under the *Planning Act, 1990* to provide direction to regional and local municipalities regarding planning policy, ensuring that decisions made by planning authorities were consistent with provincial policy. With respect to natural heritage features and resources, the PPS defines seven natural heritage features:

- Significant Wetlands and Significant Coastal Wetlands,
- Significant Woodlands,
- Significant Valleylands,
- Significant Wildlife Habitat (SWH),
- Significant Areas of Natural and Scientific Interest (ANSI's),
- Fish Habitat, and
- Habitat of Endangered and Threatened Species.

These features are described in the Natural Heritage Reference Manual (MNR, 2010), a technical document intended to support the PPS which also provides guidance to help assess these natural heritage features. Section 2.1.4 of the PPS states that development and site alteration are not permitted in Significant Wetlands or Significant Coastal Wetlands in Ecoregion 7E, where the Subject Lands are located. Section 2.1.5 states that development and site alteration shall not be permitted in Significant Woodlands, Significant Valleylands, SWH or ANSI's unless it has been demonstrated through an EIS that there will be no negative impacts on the features or their ecological functions. Development and site alteration are not permitted in Fish Habitat or habitat of Endangered or Threatened species, except in accordance with provincial and federal legislation.

5.1.1 Significant Wetlands

A Provincially Significant Wetland that is part of the North Talbot Wetland Complex is located along the south edge of the Subject Lands. This report suggests a minor boundary adjustment could occur as the wetland does not encroach into the Subject Lands as suggested by the MNR map (2021). The actual wetland boundary has been assessed by MTE in the field and is shown on Figure 6. The PSW boundary more closely matches the PSW boundary shown on SWAP mapping (2019) and a wetland boundary revision is being submitted.

5.1.2 Significant Woodlands

No woodland communities are present on the Subject Lands. No vegetation within the Legal Parcel has been identified as Significant Woodlands on Map 5 of the London Plan (May 2021).

5.1.3 Significant Valleylands

There are no Significant Valleylands within the Subject Lands (London Plan, 2021a). A Valleyland is located in adjacent lands, approximately 100 metres to the south, and was not investigated for this report.

5.1.4 Significant Wildlife Habitat

Candidate significant wildlife habitat (SWH) is based on ELC communities that were identified in Section 4.4. Confirmed significant wildlife habitat is determined through appropriate field investigations and evaluation of species use in accordance with specific criterion outlined in the Ecoregion Criteria Schedules 7E (MNR, 2015). Candidate SWH identified on or adjacent to the Subject Lands is assessed below.

Waterfowl Nesting Areas

Breeding bird surveys completed in 2019 did not identify any nesting waterfowl in the 1a inclusion (MAM2). Twelve young-of-year Mallards and a mating pair were observed in Community 3 (SAS1), but this does not meet the minimum criteria for community size or number of Mallard nesting pairs. Incidental encounters during 2018 spring field surveys identified several adult Wood Ducks in Community 5, but multiple nests or pairs of target species were not observed.

Not SWH – Confirmed Not Significant (North Talbot PSW)

Amphibian Breeding Habitat (Woodland)

The adjacent North Talbot PSW (Community 5) is a Maple Mineral Deciduous Swamp. Amphibian breeding monitoring completed in 2019 confirmed the presence of two listed frog species (Gray Treefrog and Spring Peeper) with call codes of 3 within the North Talbot PSW, therefore the PSW meets the defining criterion for significance.

Confirmed SWH – Community 5 (North Talbot PSW)

Amphibian Breeding Habitat (Wetlands)

Community 3 (SAS1) and the 1a inclusion (MAM2) are >500m² and >120m from woodland ecosites. Amphibian breeding monitoring completed in 2019 confirm that the criteria for significance are not met.

Not SWH – Confirmed Not Significant (SAS1 and MAM2)

Terrestrial Crayfish

Observations made in 2019 and 2020 during completed life science inventories confirmed the presence of Terrestrial Crayfish chimneys (burrows) in the MAM2 inclusion and the North Talbot PSW (SWD3). Therefore, the defining criterion for significance is met in these communities. Features beyond 30m from property limit were not surveyed for this site.

Confirmed SWH – MAM2 and North Talbot PSW (SWD3)

Candidate SWH – Unconfirmed in Community 4 (MAS2)

Special Concern and Rare Wildlife Species

NHIC identified several Special Concern or rare species as potentially present within the area of the Subject Lands. These include Green Dragon [SC], Snapping Turtle [SC], and Hoary Tick-trefoil [S2]. None of these or any other SOCC were identified within the Subject Lands during site investigations. Habitat for SOCC on Adjacent Lands (including the North Talbot PSW) could not be confirmed as site investigations were restricted to the Legal Parcel.

Not SWH – Confirmed Not Significant (Subject Lands)

Candidate SWH – Unconfirmed in North Talbot PSW (Adjacent Lands)

5.1.5 Areas of Natural and Scientific Interest

There are no ANSI's within or adjacent to the Subject Lands.

5.1.6 Fish Habitat

Detailed scale Fish Habitat considers Fish Habitat within the Subject Lands. There is no suitable habitat for fish within the Subject Lands.

Broad scale Fish Habitat considers downstream fisheries. Based on orthographic imagery interpretation and review of drainage maps (OMAFRA, 2020), an unnamed ephemeral flowpath may exist south of the adjacent North Talbot PSW, but if present it would flow south to be collected by a stormwater management system downstream. No fish habitat is present.

5.1.7 Habitat of Endangered or Threatened Species

No floral or faunal species protected under the *ESA* (2007) were observed within the Subject Lands during completed site investigations.

Five candidate bat maternity roost trees (all decay class 1 Shagbark Hickory) were identified in Community 1 (CUM1-1) of the Subject Lands. These trees may provide suitable habitat for Little Brown Myotis [END], Northern Myotis [END], or Tri-coloured Bat [END], although use of the candidate roost trees was not confirmed. It should be noted that Little Brown Myotis prefer buildings or building-associated features for maternity roosting rather than natural features (Gerson, 1984; Humphrey & Fotherby, 2019).

5.2 Municipal Policy

The municipal Natural Heritage policy considerations are based on the London Plan, May 28 2021, Chapter 6 - Environmental Policies. Many natural heritage policies in the London Plan protect features from the PPS (MMAH, 2021) and are discussed in Section 5.1, however the assessment of significance for these features will be repeated here for clarity. Additional municipal Natural Heritage policy not addressed in Section 5.1 is provided below. The relevant policy sections are included in brackets. The Subject Lands are included in the Southwest Area Secondary Plan (SWAP; City of London, 2019a), however no additional natural heritage features are identified in SWAP that are not already addressed in the London Plan.

5.2.1 Provincially Significant Wetlands, Wetlands, and Unevaluated Wetlands (1330-1336)

As noted in Section 5.1.1, a portion of the North Talbot PSW Complex is located along the south edge of the Subject Lands. A small section of the PSW is shown within the Subject Lands on Map 5 of the London Plan (2021a), but the actual wetland boundary has been assessed by MTE in the field and better matches the PSW boundary shown on SWAP mapping (2019). An MNRF wetland boundary revision request has been submitted to revise the PSW boundary based on MTE field investigations.

Two Unevaluated Wetlands (Community 3 and inclusion 1a) are located in the Subject Lands and shown on Map 5 of the London Plan. An additional wetland inclusion (A2a - Mineral Swamp Thicket Ecosite) was identified during ELC investigations in the northeast Subject Lands. Only Community 3 exceeds 0.1 ha in size.

5.2.2 Significant Woodlands and Woodlands (1337-1343)

As noted in Section 5.1.2, no vegetation community within 120 metres of the Subject Lands has been identified as Significant or Unevaluated Woodlands based on ELC or designated on Map 5 of the London Plan (May 2021).

5.2.3 Significant Valleylands and Valleylands (1344-1351)

As noted in Section 5.1.3, there are no Significant Valleylands within the Subject Lands (London Plan, 2021). A Valleyland is located in adjacent lands, approximately 100 metres to the south, and was not investigated for this report.

5.2.4 Significant Wildlife Habitat (1352-1355)

An assessment of candidate and confirmed SWH as determined by the provincial Ecoregion 7E Criteria Schedule is provided in Section 5.1.4. Additional SWH defined in the London Plan are described below.

Community 3 in the northeast Subject Lands is a Submerged Shallow Aquatic Ecosite. This community type is considered an under-represented habitat type by the City of London (Policy 1354), however this review was based on mapped wetlands at the time of the subwatershed studies in the 1990's, which were typically greater than 0.5 ha. Community 3 is very small (0.25 ha) and would not have been considered in the representative review. It is our opinion that small ponds such as these are not under represented in London and not biologically important to be considered in this context. In addition, Community 3 does not have a high diversity of species that are of value for research, conservation, education and passive recreation opportunities, and it does not qualify as SWH according to the Ecoregion 7E Criteria Schedule. This community will not be considered significant wildlife habitat in this EIS.

5.2.5 Areas of Natural and Scientific Interest (1356-1360)

There are no ANSI's within or adjacent to the Subject Lands.

5.2.6 Fish Habitat (1323-1324)

As noted in Section 5.1.6, there is no aquatic habitat within or adjacent to the Subject Lands to support fish species.

5.2.7 Habitat of Endangered Species and Threatened Species (1325-1329)

As noted in Section 5.1.7, no floral or faunal species protected under the *ESA* (2007) were observed within or adjacent to the Subject Lands. Potential maternity roost habitat for Little Brown Myotis [END], Northern Myotis [END], or Tri-coloured Bat [END] is present in five Shagbark Hickory trees within Community 1 (CUM1-1) of the Subject Lands. It should be noted these trees are not in woodland habitat and Little Brown Myotis tend to prefer buildings instead of trees for maternity roosts (Gerson, 1984; Humphrey & Fotherby, 2019).

5.2.8 Water Resource Systems (1361-1366)

The Subject Lands are located within the Upper Thames River Source Protection Area. The Thames-Sydenham and Region Source Protection Committee indicate the Subject Lands are not within a SGRA or HVA (TSRSPC, 2015). No watercourses are present within the Subject Lands.

Water inputs (quality and quantity) to the adjacent North Talbot PSW and Community 3 (SAS1) need to be managed during and post-construction, however this will be discussed in the context of wetlands. Management of water resources will be discussed in greater detail in the EXP Services Hydrogeological Assessment.

5.2.9 Environmentally Significant Areas (1367-1371)

There are no Environmentally Significant Areas (ESAs) within or adjacent to the Subject Lands.

5.2.10 Upland Corridors (1372-1377)

There are no Upland Corridors identified on Map 5 of the London Plan (2021a) within or adjacent to the Subject Lands.

5.2.11 Potential Naturalization Areas (1378-1381)

There are no Potential Naturalization Areas identified on Map 5 of the London Plan (2021a) within or adjacent to the Subject Lands.

5.2.12 Vegetation Patches Larger Than 0.5 Hectares (1385-1386)

There are no forested vegetation patches larger than 0.5 ha within or adjacent to the Subject Lands that need to be evaluated. A band of trees borders the west edge of the property but this community is smaller than 0.5 ha. Community 1 and 2 are larger than 0.5 ha, however these are Dry-Moist Old Field Meadow Types that are not forested (Community 1 only contains some scattered trees) and both communities are culturally impacted, historically anthropogenic (pasture lands), and have low floristic quality.

5.2.13 Other Drainage Features (1387)

There are no other drainage features (i.e., municipal or agricultural drains, intermittent streams, headwater streams, manmade or natural ponds) located within or adjacent to the Subject Lands.

5.3 Conservation Authority Regulations

The UTRCA Regulated Area Screening Map (2018) suggests there is a UTRCA regulation limit within the Subject Lands as a result of the proximity to the adjacent North Talbot Wetland. This area is also identified by the UTRCA as a Dingman Creek Screening Area (under review). The regulation area extends to adjacent lands to the south. Based on this mapped regulation limit, the UTRCA would require a Section 28 Permit Application from the UTRCA. However, since the wetland has no direct contribution through a surface connection, the definition for this regulation has not been met under the Conservation Authorities Act (Section 28(25)):

- (b) directly contributes to the hydrological function of a watershed through connection with a surface watercourse (Conservation Authorities Act, 2021)

As a result, the requirement for a permit under section 28 should be more fully reviewed through the detailed engineering phase.

5.4 Summary of Identified Features and Functions

Table 4 presents a summary of features and functions of the Subject Lands and Adjacent Lands that have been identified through the policy review, above, as requiring further consideration in an EIS. Policy-protected features under Provincial Policy are not re-stated under the London Plan.

Table 4: Environmental Considerations for the Subject Lands

Policy Category	Policy-protected Feature	Description of Feature
Provincial Policy	Provincially Significant Wetlands	North Talbot PSW (adjacent lands to the south).

Policy Category	Policy-protected Feature	Description of Feature
Statement	Significant Wildlife Habitat	<ul style="list-style-type: none"> Confirmed terrestrial crayfish SWH – Subject Lands (1a inclusion) and Adjacent Lands (SDW3 North Talbot PSW) Candidate terrestrial crayfish SWH – Adjacent Lands (MAS2 North Talbot PSW) Confirmed breeding amphibian habitat (woodland) SWH – Adjacent Lands (North Talbot PSW) Unconfirmed candidate special concern/rare species SWH – Adjacent Lands (North Talbot PSW)
	Habitat of Endangered or Threatened Species	Five candidate bat maternity roost trees in Community 1 (CUM1-1) of the Subject Lands may provide suitable habitat for Little Brown Myotis [END], Northern Myotis [END], or Tri-coloured Bat [END].
The London Plan	Wetlands, and Unevaluated Wetlands	<ul style="list-style-type: none"> Two Unevaluated Wetlands (1a inclusion and Community 3) identified on Map 5 One additional wetland inclusion (A2a) observed in the northeast during site investigations
UTRCA Regulations	Regulated Area and Screening Area	Under review - Associated with the adjacent North Talbot PSW.

5.5 Ecological Buffers and Pre-Development Considerations

Based on the above review, the main components of the natural heritage system are the North Talbot PSW to the south and the Unevaluated Wetlands within the Subject Lands. The North Talbot PSW in particular provides the majority of candidate and confirmed significant wildlife habitat.

5.5.1 Public Ownership/Acquisition

In policy section 1404-1407 of the London Plan (2021a), the City recognizes not all natural heritage areas will be brought into public ownership, or shall be open and accessible for public use. Section 20.5.3.6 of the Southwest Area Secondary Plan (SWAP, 2019a) states that lands delineated as ecological buffers for natural heritage features may be acquired by the City, pursuant to the City of London Official Plan. In the case of this development, the buffer area of the North Talbot PSW within the Subject Lands will remain in private ownership.

5.5.2 Ecological Buffers

The London Plan (2021a) policies 1412-1416 state that ecological buffers are meant to protect natural heritage features and their functions and processes to maintain the ecological integrity of the Natural Heritage System. Buffer requirements are determined as part of an EIS and guided by Section 5 of the *City of London Environmental Management Guidelines* (City of London, 2021b). The *Environmental Management Guidelines* (EMGs) suggest minimum buffers for different natural heritage features (ex: Significant Woodlands, Woodlands, Wetlands, etc.), and then these buffer widths are adjusted (larger or smaller) through the EIS process based on the size, sensitivity, and functions of the existing feature, as well as the characteristics of the site and potential impacts of the proposed development (2021b).

Based on the review in Section 5.3, the most critical component of the natural heritage system is the North Talbot PSW to the south. The EMG suggests a minimum buffer width of 30 metres between development and wetlands, with adjustments based on the sensitivity and value of the wetland functions (2021b). A 30 m buffer is suggested by the EMGs for the North Talbot PSW as it is a significant community that is relatively large with wildlife habitat, hydrological functions, and SWH (Terrestrial Crayfish, breeding amphibians, unconfirmed SOCC).

Several small Unevaluated Wetland pockets are also present within the Subject Lands. The small (<0.5 ha) wetland inclusions and the northeast SAS1 pond are proposed for removal and therefore will not require buffers, although the relocated SAS1 pond should be provided with a 10 m naturalized buffer based on an agreement with the City for the property to the south.

Recommended buffers are shown on Figure 8 and will be discussed in Section 7.0 in the context of impact avoidance and mitigation.

5.5.3 Stewardship

Under the stewardship policies 1408-1411 of the London Plan, protection is encouraged for natural heritage systems that remain in private lands. These protection efforts can include stewardship agreements, Conservation easements, education, land trusts, tax incentives, signage and other suitable techniques. Such efforts will be discussed in conjunction with the post development setting in context of mitigation measures and their contribution to the refinement of setbacks and buffers.

6.0 Description of the Development

2425293 Ontario Inc. (the proponent) is proposing a high-density residential development at 735 Southdale Road West in the City of London [Figures 9 and 10]. The Legal Parcel is described as Concession ETR, Part Lot 78.

The 3.8 ha Subject Lands are currently comprised of an active rural residence, a horse pasture, and several cultural and natural vegetation communities. The Subject Lands are proposed to be developed into a residential area that includes four apartment buildings (between 9 and 12 storeys) with associated landscaping, walkways, roads, and parking. Access to the residential area is proposed via Southdale Road West. A total of 560 residential units are provided by the four buildings. A total of 656 parking spaces are proposed to be provided through a combination of both above and below-ground parking areas. Walking trails are proposed throughout the development footprint, and a potential connection to the south adjacent lands is proposed to the east of the PSW. A landscape plan for the park space will be provided at a later stage.

The development is proposed to be completed in conjunction with the City of London Southdale Road widening project and is the location of the previously approved municipal road connection to Southdale Road from the North Talbot Community. The City of London has expressed a preference for the road connection to be directly across from the entrance to the Southwest Optimist Park across Southdale Road West and through the SAS1 pond.

Water and Sanitary Servicing

An existing 400mm diameter watermain on the north side of Southdale Road West will provide adequate domestic and fire flows for the development. The development is tributary to the existing sanitary system to the south within the Talbot Village Subdivision Phases 5 and 6. The proposed development will be connected to the future Talbot Village subdivision sanitary outlet to the south. Further details are provided in the Initial Proposal Report (Zelinka Priamo Ltd. et al, 2020).

Storm Servicing

The west Subject Lands currently drain to the North Talbot PSW to the south. The east Subject Lands outlet to an existing 600mm diameter culvert which drains north under Southdale Road West. The culvert inlet is located in the south boulevard of Southdale Road West across from Old Grove Place. This culvert outlets to an existing Stormwater Management Facility (SWMF) on the north side of Southdale Road. The SWMF and 600mm diameter inlet sewer have been previously designed to account for a portion of the subject property (Zelinka Priamo Ltd. et al, 2020).

Stormwater management within the proposed development will include catch basins that direct flow from impervious surfaces (parking lots, rooftops, walkways, patios) offsite to an existing stormwater management (SWM) pond. Infiltration will be maintained in open space and green space areas (EXP, 2022).

7.0 Impacts and Mitigation

This section reviews the development proposal and identifies potential direct and indirect impacts to the significant natural heritage features within and adjacent to the development footprint. Appropriate avoidance, protection and mitigation measures for the impacts are also presented.

Based on the analysis in Section 5.0, the significant features identified are summarized in Table 4. Significant natural heritage features identified on the Subject Lands are:

- Provincially Significant Wetlands and Wetlands
- Significant Wildlife Habitat
- Habitat of Threatened and Endangered Species
- UTRCA Regulated Areas

The potential direct impacts of the proposed development on these natural heritage features will be discussed in the following Section 7.1, and indirect impacts are discussed in Section 7.2. UTRCA Regulated Areas will be discussed in conjunction with the wetland features they are associated with. At the conclusion of the section, a net effects table is provided for the proposed development application summarizing potential impacts as well as proposed mitigation, compensation or enhancement measures [Table 6].

7.1 Direct Impacts

7.1.1 North Talbot PSW

As discussed in Section 5.5.2, a 30 metre buffer is suggested for the North Talbot PSW based on the City of London EMG (2021b) and the significant functions of the PSW. The proposed development plan provides an approximately 26 m to 30 m wide buffer between residential buildings and the North Talbot PSW [Figure 11]. The residential buildings encroach approximately 0.02 ha into the 30 m EMG-recommended buffer. In combination with other mitigation measures, this buffer is appropriate to protect the adjacent PSW. The buffer will be considered Park – Open Space and should be landscaped using native species, as per EMG (2021b) recommendations. The border of Silver Maple trees around the north section of the North Talbot PSW should be retained and the PSW buffer should be naturalized. An additional area of at least 0.02 ha outside the 30 m buffer should be included in the naturalization plan to help compensate for the encroachment of the residential buildings into the 30 m buffer [Figure 12]. These additional naturalized areas may be provided in the area of the proposed LID measures west of the PSW. Details will be provided at detailed design.

The buffer area is proposed to include pedestrian pathways located approximately 20-30 metres from the wetland boundary. One pathway will lead to a potential connection to the south adjacent property. Pathways will have recreational value and formalized pathways can direct pedestrians along acceptable routes away from more sensitive features (McWilliam et al., 2011; Matlack, 1993). The Southwest Area Secondary Plan (SWAP, 2019a) encourages development patterns that provide visual public access to natural heritage features, and the pathways will create recreational linkages for walking and encourage nature appreciation.

The proposed development will likely result in increased run-off and decreased infiltration due to the construction of impermeable surfaces. The use of Low Impact Development (LID) strategies and secondary infiltration opportunities are recommended by EXP (2022) to maintain pre-development infiltration volumes and sustain the adjacent PSW. It is proposed that runoff from impermeable surfaces (ex: rooftops) and infiltration in landscaped areas will contribute to the North Talbot PSW to maintain appropriate surface water levels post-development (EXP, 2022).

Protection of this PSW may also help maintain downstream hydrological features via an ephemeral flowpath from the PSW to the woodland and a small wetland to the south. This feature is outside the property boundary and was not investigated in detail.

Recommendation 1:

Incorporate mitigation measures (ex: Low Impact Development strategies and secondary infiltration opportunities) as recommended in the Hydrogeological Assessment (EXP, 2022).

Recommendation 2:

Provide a landscape plan for the North Talbot PSW buffer as part of the Site Plan approval process. The buffer should be landscaped using plant species appropriate for the soil conditions and native to Middlesex County. Native Hawthorn species and other similar native shrubs can be incorporated into the buffer planting design to discourage the public from entering the adjacent PSW. Use of species considered to be regionally rare species (Oldham, 2017) that are currently present in the Subject Lands (Cockspur Hawthorn and Larger Straw Sedge) is encouraged where possible.

Recommendation 3:

Invasive plant species that are identified within the proposed buffer area should be removed and best management practices for limiting the spread of floral invasive species, such as those provided by the Ontario Invasive Plant Council (2020), should be followed during development.

Recommendation 4:

The pathways within the buffer area should be constructed using permeable materials to maintain infiltration rates within the area of the PSW.

Recommendation 5:

Install permanent boundary demarcations along the edge of the trail next to the adjacent North Talbot PSW [Figure 11]. This could include open boundary demarcation (ex: posts, page wire fencing) and/or strategic landscaping with species that discourage trespassing (ex: Hawthorns, Raspberries). A barrier may help deter encroachment (ex: litter, trampling of plants, wildlife disruption) while still allowing the passage of wildlife species. Chain link can restrict the movement of wildlife and will not be more effective in reducing encroachment unless the entire wetland is fenced and fencing is frequently monitored.

Recommendation 6:

Confirm the requirements to protect the PSW from development with the UTRCA. Requirements for Section 28 approval established by the UTRCA during discussions, if any, must be fulfilled.

Recommendation 7:

Confirm the PSW boundary revision with MNRF. A wetland boundary revision request has been submitted.

7.1.2 Unevaluated Wetlands

Three Unevaluated Wetlands were identified within the Subject Lands. The northeast pond (SAS1) and wetland inclusion 1a (MAM2) were identified on Map 5 of the London Plan (2021), and the A2a inclusion (SWT1) was delineated during ELC investigations.

The London Plan Policy 1334 states that for non-provincially significant wetlands there shall be no net loss of the wetlands' features or functions. In some instances, and in consultation with the conservation authority having jurisdiction, the City may consider the replacement of wetlands rather than in situ protection where the features and functions of the wetland may be provided elsewhere and would enhance or restore the Natural Heritage System. Where a wetland is less than 0.1 ha, the City may consider replacement on a less than one-to-one land area basis and/or additional measures to achieve no net loss of function.

The two wetland inclusions (1a and A2a) are both less than 0.1 ha. These features can therefore be removed on the condition that no loss of function occurs. No Special Concern or Protected Species

were observed in these communities, although one Terrestrial Crayfish chimney was identified in the 1a inclusion. The value of these inclusions is considered to be largely limited to hydrological function. LID measures are proposed by EXP in the southwest near the current location of inclusion 1a to maintain the hydrologic functions of the removed wetlands post-construction. The Terrestrial Crayfish burrow in 1a can be retained in this inclusion, with additional wet habitat possibly extending from this retained wet area. Further details will be determined in the detail design phase.

The northeast pond (SAS1) is separated from the proposed residential development by Park-Open Space, but will need to be removed as part of the Southdale Road widening and construction of the City-approved Southdale Road access. Although the road construction does not pass through the entire wetland, the entire community should be relocated to avoid creating a small isolated pond fragment next to the road that has limited wildlife function. Approximately 0.11 ha of the 0.25 ha SAS1 pond to be removed is within the Subject Lands and is recommended to be recreated at a ratio of 2:1 along with the remainder of the wetland that is on the adjacent property. The relocated wetland should be given a 10 m naturalized buffer to protect it from adjacent development based on discussions with the City. This compensation recommendation is consistent with the approach for the property to the south as agreed upon with the City of London.

Recommendation 8:

Implement Low Impact Development (LID) measures and secondary infiltration strategies as recommended by EXP (2022) to ensure no net loss of hydrological function from the removal of the two wetland inclusions and the SAS1 pond. Details will be determined at detailed design.

Recommendation 9:

Retain the Terrestrial Crayfish habitat currently in inclusion 1a.

Recommendation 10:

Prior to dewatering the pond at the approved Southdale Road access location, fish and wildlife must be salvaged and relocated as guided by the Southdale Road EA. The logical and most accessible release location is the Southwest Optimist Stormwater Management Pond, immediately north across Southdale Road. Alternatively, the salvaged wildlife could be moved to the North Talbot PSW to the southwest, although this is not a suitable location for species requiring permanent water bodies. Non-native species will be destroyed.

Recommendation 11:

The removal of the northeast pond (SAS1) is recommended to be compensated for (2:1 by area with a 10 metre buffer) through wetland creation off-site. The relocated wetland should be naturalized with native wetland species and include wildlife habitat features (variable water depths, logs, brush/rock piles, emergent vegetation, bird nesting boxes). Wetland relocation will need to be coordinated with the City of London and the south adjacent landowner.

7.1.3 Significant Wildlife Habitat

Confirmed and candidate SWH in the North Talbot PSW includes confirmed woodland breeding amphibian habitat, confirmed Terrestrial Crayfish habitat, and candidate SOCC habitat. All habitat present within the North Talbot PSW will be retained and protected by the approximately 26 m buffer of Park - Open Space. No development is proposed within the dripline of the Maple Mineral Deciduous Swamp.

The only SWH present in the Subject Lands is confirmed terrestrial crayfish habitat in the 1a inclusion (MAM2) where a single crayfish chimney was observed. Terrestrial crayfish habitat in the PSW will not be impacted by the proposed development, and therefore the loss of terrestrial crayfish SWH is considered minimal.

Recommendation 12:

Retain confirmed and candidate SWH in the adjacent North Talbot PSW and protect the function of this wetland habitat with a naturalized buffer (26-30 m) from development.

7.1.4 Habitat of Endangered and Threatened Species

Five candidate bat maternity roost trees in Community 1 (CUM1-1) of the Subject Lands may provide suitable habitat for Little Brown Myotis or Northern Long-eared Myotis [END]. It should be noted that Little Brown Myotis prefer buildings or building-associated features for maternity roosting rather than natural features (Gerson, 1984; Humphrey & Fotherby, 2019). Three of the candidate roost trees are proposed for removal and two will be retained [Figure 11]. Appropriate compensation and mitigation measures will prevent direct impacts to potential bat maternity roost habitat.

Recommendation 13:

Removal of potential bat maternity roost trees should occur between October 1 and April 30, outside of the active bat season.

Recommendation 14:

One rocket-style bat box should be installed near the north edge of the North Talbot PSW, adjacent to the wooded feature and open park land where habitat is suitable for foraging. One rocket-style bat box can provide the habitat equivalence of five trees. The location of the bat box should be incorporated into the landscape plan and installation should be supervised by a qualified biologist.

7.2 Indirect Impacts

7.2.1 Sediment and Erosion Control Measures

A critical time for the protection of natural heritage features is during the construction phase. For all works and especially those within 30 m of adjacent natural heritage features, substantial sediment and erosion control measures will be required to ensure that indirect impacts to the adjacent natural heritage features identified in this report are avoided or mitigated.

Recommendation 15:

A detailed interim stormwater management plan is needed to guide the construction phase and protect the wetland features. Stormwater must be discharged away from the adjacent wetland feature. This will be provided at detail design.

Recommendation 16:

A multi-barrier approach for sediment and erosion control will be used for this development. Prior to works on site, robust sediment and erosion control fencing should be installed along the limits of the development adjacent to the wetlands [Figure 9]. The fence will act as a barrier to keep construction equipment and spoil away from the slope and vegetation to remain, and prevent erosion and sedimentation of the adjacent wetland features.

Recommendation 17:

Sediment and erosion control fencing will be installed according to the City of London Design Specifications and Requirements Manual specifications (2019b) and The Erosion and Sediment Control Guide for Urban Construction (TRCA, 2019).

Recommendation 18:

During construction, the lands between the sediment and erosion control fencing should be maintained. The fence at the southern and northeastern boundaries should remain in place until construction is complete and the remainder of the natural areas to remain are sodded or seeded and naturalized.

Recommendation 19:

Soil stockpiles should be established on the tableland in locations where natural drainage is away from the PSW. No soil should be stockpiled in the area of close proximity to the PSW. If this is not possible and there is a possibility of any stock pile slumping and moving toward the PSW edge,

these stockpiles should be protected with robust sediment and erosion control. Access to the stockpile should be confined to the up-gradient side. The stockpile locations should be determined at detailed design.

Recommendation 20:

Sediment and erosion control fencing should be inspected prior to construction to ensure it was installed correctly and during construction to ensure that the fencing is being maintained and functioning properly. Any issues that are identified are resolved in the same day.

Recommendation 21:

Sediment control measures should be provided at the discharge point of the dewatering system (EXP, 2021).

Recommendation 22:

Sediment and erosion control fencing should not be removed until adequate re-vegetation and site stabilization has occurred. Additional re-vegetation plantings and/or more time for vegetation to establish may be required; however, two growing seasons are typically sufficient to stabilize most sites.

Recommendation 23:

All disturbed areas should be re-seeded as soon as possible to maximize erosion protection and to minimize volunteer populations of invasive species which may spread to the adjacent feature.

Recommendation 24:

Roof runoff to bare ground can generate considerable sediment movement beyond the construction limits. Until the grounds have been vegetated and stable for housing and development adjacent to vegetation, roof leaders should be directed to the streets or nearby stabilized vegetated areas.

7.2.2 Construction Site Management

Recommendation 25:

Regular cleanup of the Subject Lands must be completed during construction and post-construction to ensure the adjacent natural heritage features are not degraded.

Recommendation 26:

Equipment should be cleaned prior to arrival on site including tires, undercarriage, and any part of the equipment that may transport invasive seeds to the site. Clean equipment protocols are provided by London's Invasive Plant Management Strategy (2017) and should be followed where appropriate.

Recommendation 27:

A tree preservation report should be completed in conjunction with the grading plan for the trees to remain within and outside the development footprint.

7.2.3 Protection of Water Resources

Recommendation 28:

If imported materials are required to restore onsite excavations, or to raise grades within the Subject Lands, analytical testing of the imported material may be considered to ensure that any material brought to the site meets the applicable standards under Ontario Regulation 153 for residential lands.

Recommendation 29:

A Best Management Practice (BMP) and spill contingency plan (including a spill action response plan) should be in place for fuel handling, storage and onsite equipment maintenance activities to minimize the risk of contaminant releases as a result of the proposed construction activities. Contractors working at the Site should ensure that construction equipment is in good working order and equipment operators should have spill-prevention kits, where appropriate (EXP, 2022).

Recommendation 30:

The use of chemical applications (such as commercial fertilizers) in landscaped and grassed areas should be limited. Consider using heartier grass varieties that require less extensive watering or fertilizers (EXP, 2022).

Recommendation 31:

Limit the use of salts or other additives for ice and snow control on the roadways and parking areas (EXP, 2022).

Recommendation 32:

As per recommendations by EXP Services, additional water testing during or post-development should be considered to ensure the quality of surface water features (such as the south PSW) is maintained (EXP, 2021).

7.2.4 Disturbance to Wildlife

Nesting migratory birds are protected under the *Migratory Birds Convention Act (MBCA)*, 1994. No work is permitted to proceed that would result in the destruction of active nests (nests with eggs or young birds), or the wounding or killing of birds, of species protected under the *Migratory Birds Convention Act*, 1994 and/or Regulations under that Act. Some MBCA-protected species, such as Killdeer, may make use of un-maintained areas as they frequently make nests on the ground in construction sites and other disturbed areas.

Recommendation 33:

Avoid vegetation clearing and site disturbance during migratory bird breeding season (April 1 to August 31) to ensure that no active nests are removed or disturbed, in accordance with the *Migratory Birds Convention Act* and/or Regulations under that Act. If works are proposed within the breeding season, the area should be checked for nesting birds prior to any vegetation removal or ground disturbance. If nesting birds are present, works in the area should not proceed until after August 31.

Recommendation 34:

No Bank Swallow [THR] were observed within or adjacent to the Subject Lands, however creation of suitable habitat during construction should be avoided. Best management practices for deterring nesting during construction activities should be implemented (OMNRF, 2017). These measures should include slope management (i.e., grading stockpiles, eliminating vertical extraction faces, reducing slopes to 70 degrees or less) until at least July 15.

Recommendation 35:

Make workers aware of potential incidental encounters with wildlife and the necessary protections. If an animal enters the work site, work at that location will stop and the animal should be permitted to leave without being harassed. If there are repeat observations of wildlife in the work area, barrier fencing may be used to direct wildlife away from active construction and toward natural areas.

7.2.5 Landowner(s) Education**Recommendation 36:**

Develop an information package (brochure and/or web-based resources) to educate future residents on ways to protect the natural heritage components beyond the property boundaries. This should include information on the impact of pets on wildlife and natural areas, how to limit attraction of nuisance urban wildlife, and potential impacts of recreational activities in natural features.

Recommendation 37:

The installation of educational signage along the pathways adjacent to the PSW is recommended to inform residents of the significance of the adjacent PSW. Signage discussing the natural heritage features present may be effective as some studies show people are more likely to avoid damaging activities if they are aware of the link between their actions and the subsequent negative impacts, if

they feel they are responsible for the stewardship of a natural area (Gamman et al., 1995; Johnson and Van de Kamp, 1996), and if they understand the reason for a barrier (Johnson, 1989).

Recommendation 38:

Information material (i.e. posters or brochures) should be posted in the lobbies or main foyers of the proposed residential area to inform residents of the natural heritage significance of the adjacent PSW and the species present within.

7.3 Monitoring Plan

Avoidance of direct impacts to the significant natural heritage features is achieved with the proposed Draft Plan. Mitigation and compensation measures recommended in this EIS aim to minimize the indirect impacts to the significant natural heritage features and functions. The monitoring plan is recommended to document the implementation of the mitigation and compensation measures during construction and post-construction.

The monitoring plan will be two-phase and will consist of a construction monitoring plan and a long-term post-construction plan. The construction monitoring plan will monitor for construction-related impacts, document successes or deficiencies of the implemented mitigation measures and provide guidance on remedial actions for circumstances when mitigation is not successful [e.g. Erosion and Sedimentation Control (ESC) measures]. This plan should continue from clearing and grubbing through to building construction until rear yards and grounds adjacent to natural features are vegetated and stabilized. This plan will be developed during the detailed design stage. Reports should be made available to the UTRCA and City design services staff.

Long-term post-construction monitoring shall evaluate the success of the proposed active naturalization efforts of the setback area. This plan should include remedial actions that are triggered if effects exceed pre-determined thresholds (e.g. supplemental plantings if survival rates are low). Monitoring requirements should be determined at the detailed design stage in consultation with agency staff. Recommendations for monitoring include, but are not limited to:

- Survival success of the plantings in the Park-Open Space in the 30 metre buffer adjacent to the PSW and the wet meadow naturalization areas
- Success of the relocated wetland (compensation for the removal of the SAS1 pond)
- Encroachment activities and correction – once the development is at 80% build-out, annual reporting to the City of London should be completed for two years

7.4 Net Effects

Table 6, below, summarizes potential impacts to natural heritage features and functions as well as proposed mitigation, compensation or enhancement measures.

Table 6: Net Effects

Source of Impact	Affected Feature	Predictions of Impact	Mitigation Strategy	Net Effects	Recommendations for Management and Monitoring
Artificial Lighting	North Talbot PSW	Low impacts expected - residential lights	Buffer retained between PSW and dwellings; edge of Silver Maple tree retained	No net effect	None
Litter and Garbage	North Talbot PSW	Low impacts expected - garbage litter from residential area	Garbage bins along pathways; public education (brochures, signage, web-based resources) to educate about the importance about the adjacent PSW	No net effect	Public garbage bins should be readily available and emptied regularly. On-going education.
Yard Waste	North Talbot PSW	Medium impacts expected - residents transporting yard waste from dwellings to PSW	Educational brochure and signage; web-based resources	No net effect	Monitoring and on-going education is recommended to ensure the impacts of yard waste disposal is understood by residents.
Increased access to sensitive area	North Talbot PSW	Medium impacts expected - vegetation could get trampled	Educational brochure and signage to discourage off-path wandering; web-based resources; permanent fence between residential area and PSW	No net effect	Monitoring and ongoing education is recommended to ensure that access to PSW is avoided.
Creation of new trails	North Talbot PSW	Medium impacts expected - ad-hoc trails may trample ground cover, transport invasive species	Educational brochure and signage to discourage off-path wandering; web-based resources; established path in outer area of buffer to direct recreational traffic; permanent fence between residential area and PSW	No net effect	Monitoring and ongoing education is recommended to ensure that access to PSW is avoided.
Tree damage	North Talbot PSW	Low impacts expected - limb removal	Educational brochure, web-based resources; Buffer retained between PSW and residential area; permanent fence between residential area and PSW	No net effect	Monitor for non-permitted tree removal
Increased noise	North Talbot PSW	Low impacts expected - common wildlife species found	Buffer between PSW and dwellings; low level noise from adjacent residential homes will not impact common species	No net effect	Residential by-laws restrict excessive noise.
Disturbance to wildlife during construction	North Talbot PSW	Low impacts expected - disruption to activities of nearby wildlife	Restrict timing of habitat and vegetation removal to outside breeding and sensitive periods for birds, bats, and other wildlife; make workers aware of potential incidental encounters and necessary protections; if an animal enters the work site, work at that location will stop and the animal should be permitted to leave unharassed; if there are repeat observations of wildlife in the work area, barrier fencing may be used to direct wildlife away from active construction and toward natural areas	No net effect	Disturbance is temporary and minimal for species within the PSW and surrounding lands. Monitoring and reporting protocols for incidental wildlife encounters should be followed.
Decreased infiltration and increased run-off	North Talbot PSW, northeast pond (SAS1)	Low to medium impacts expected - impervious surfaces adjacent to PSW produce levels of infiltration that are acceptable	Mitigation measures will be provided by EXP Services once hydrogeological investigations are complete; sediment and erosion control fencing at edge of development; fencing should remain until the area is serviced by storm sewers and disturbed areas are seeded; all issues with sediment and erosion control measures should be resolved the same day	TBD	Refer to the Hydrogeological Assessment (EXP, 2022).

Source of Impact	Affected Feature	Predictions of Impact	Mitigation Strategy	Net Effects	Recommendations for Management and Monitoring
Increased erosion	North Talbot PSW, northeast pond (SAS1)	Low impacts expected	Sediment and erosion control fencing installed at development limit; fencing should remain until the area is serviced by storm sewers and disturbed areas are seeded; all issues with sediment and erosion control measures should be resolved the same day	No net effect	Monitor sediment and erosion control fencing.
Increased nutrient, pesticide and sediment	North Talbot PSW, northeast pond (SAS1)	Low impacts expected - wetlands may receive regular seasonal nutrient and sediment loads	Stormwater management system; sediment and erosion control plan during construction; ban on cosmetic pesticides	No net effect	
Visual intrusion	North Talbot PSW	Low impacts expected - houses and parkland are not visually intrusive	Buffer landscaped with native species between PSW and dwellings	No net effect	
Domestic animals	North Talbot PSW	Medium impacts expected - cats that roam and catch small animals - off leash dogs can trample plants	Educational brochure - including information on the impacts of cats on wildlife; dogs on leashes; signage provided adjacent to the PSW	No net effect	Ongoing education.
Introduced invasive plants	North Talbot PSW	Medium impacts expected - disposed yard waste can have invasive species that can spread if disposed of in the PSW - invasive plants can spread if planted near wetland edge	Educational brochure and web-based resources including a list of recommended native plant species for residential landscaping; buffer with native species between PSW and dwellings to limit spread; active invasive species management; permanent fence between residential area and PSW to restrict access of residents and discourage dumping of yard waste	No net effect	Ongoing education.
Increase in urban wildlife species	North Talbot PSW	Medium impacts expected - garbage can attract nuisance wildlife	Educational brochure and web-based resources including information on what attracts nuisance wildlife	No net effect	Ongoing education.
Air pollution	North Talbot PSW	No impacts expected	Residential homes will not generate substantial air pollution	No net effect	
Fire Hazards	North Talbot PSW	Low impacts expected - potential for recreational gatherings in the PSW or Silver Maple edge	Educational brochure and web-based resources including information on potential impacts of recreational bonfires	No net effect	Ongoing education.
Use of heavy machinery – tree damage	North Talbot PSW, adjacent retained trees	High impacts expected - machinery too close to swamp edge or retained trees can break off branches or wound trunks	Complete a tree preservation report for the Subject Lands; install construction fence to restrict access to the PSW and surrounding trees during construction; tree protection fencing/sediment and erosion control fencing should be inspected frequently; all issues with fencing should be resolved the same day	No net effect	Monitor sediment and erosion control fencing.

Source of Impact	Affected Feature	Predictions of Impact	Mitigation Strategy	Net Effects	Recommendations for Management and Monitoring
Use of heavy machinery – soil compaction	North Talbot PSW, adjacent retained trees	High impacts expected - machinery too close to retained trees can compact soils over vital tree roots	Complete a tree preservation report for the Subject Lands; install construction fence to restrict access to retained wooded areas	No net effect	Regular monitoring during construction to ensure tree protection fencing and sediment and erosion control fencing is functioning, and tree roots are protected
Use of heavy machinery – oil, gasoline, grease spill	North Talbot PSW, northeast pond (SAS1)	Medium impacts expected - machinery can leak or refueling can generate spills	Establish storage/refueling area away from wetland edges and seasonal flow paths	No net effect	Containment of spills should be included in plan.
Changes in soil grade	North Talbot PSW	Medium impacts expected - raising the grades may result in root suffocation - lowering grade may result in removal of tree roots - grade changes can alter water table or drainage patterns	Complete a tree preservation report for the Subject Lands; install construction fence along development limit to protect roots from soil compaction	No net effect	Regular monitoring by an ecological consultant during construction to ensure trees are protected

8.0 Summary and Conclusions

2425293 Ontario Inc. (the proponent) is proposing a high-density residential development at 735 Southdale Road West in the City of London.

The proposed development avoids direct biological impacts to the features and functions of the PSW at the south edge of the Subject Lands. A suitable buffer (26-30 m wide) is provided from the PSW to help mitigate indirect impacts to the PSW and protect the adjacent significant wildlife habitat (confirmed and candidate). The buffer area should be landscaped with native species to establish an enhanced buffer between the proposed development and the adjacent significant natural heritage features and functions. The PSW and the buffer area should be protected as Open Space.

Two small (<0.1 ha) Unevaluated Wetlands within the Subject Lands are proposed to be removed. Net loss of function will be prevented by retention of Terrestrial Crayfish SWH and implementation of LID measures to maintain hydrological function. Relocation of the northeast SAS1 pond feature due to road-widening along Southdale Road West and the City-preferred road connection will need to be coordinated with the City of London and the south adjacent landowner.

This EIS has set out recommendations to protect the adjacent significant natural heritage features from indirect impacts. Provided these are met, it is our opinion that the proposed development can proceed.

MTE seeks comments from the City of London and the UTRCA with respect to the contents of the EIS. Formal comments can be submitted in writing to MTE of behalf of the client. Should you wish to clarify any questions or require additional information as part of the review of this EIS, do not hesitate to contact us.

All of which is respectfully submitted,

MTE CONSULTANTS INC.



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519-204-6510 ext. 2243
aleadbetter@mte85.com



Reviewed By: Dave Hayman, M.Sc.
Manager, Natural Environments
519-204-6510 ext. 2241
dhayman@mte85.com

ACL:dh
Encl: References
cc:

9.0 References

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Figures

Figure 1 – Site Location

Figure 2 – Land Use (The London Plan Map 1, 2021)

Figure 3 – Natural Heritage (The London Plan Map 5, 2021)

Figure 4 – Southwest Area Secondary Plan Mapping (2019)

Figure 5 – Zoning (City of London Zoning By-Law)

Figure 6 – Vegetation Communities

Figure 7 – Wildlife Investigations

Figure 8 – Recommended Buffers

Figure 9 – Development Plan (Zedd Architecture, April 2022)

Figure 10 – Development Overlay

Figure 11 – Mitigation Measures

Figure 12 – Compensation and Naturalization Measures

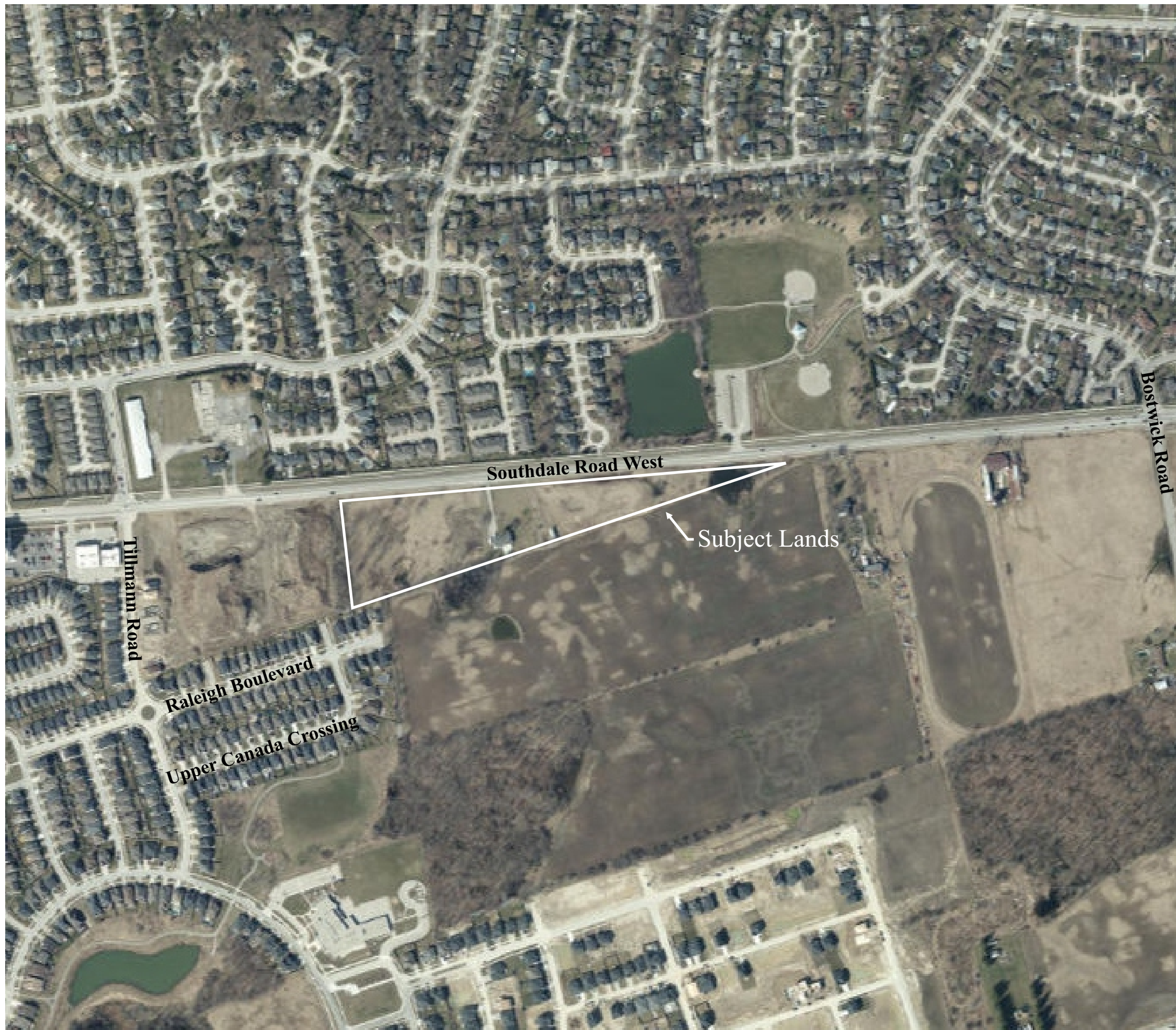
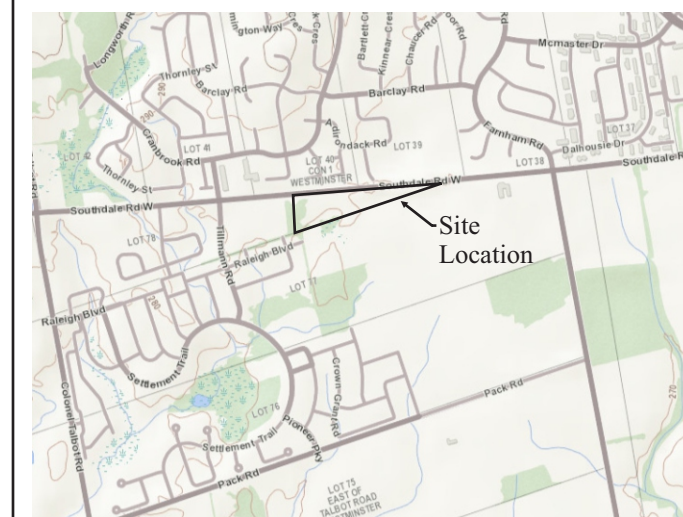


Figure 1: Site Location
(City of London Air Photo, 2020)



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Scale 1:50,000
Key Plan

* Locations are approximate and should be verified by survey where necessary.

Print on 11X17, Landscape Orientation

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August 2021

MTE Project#: 42128-200



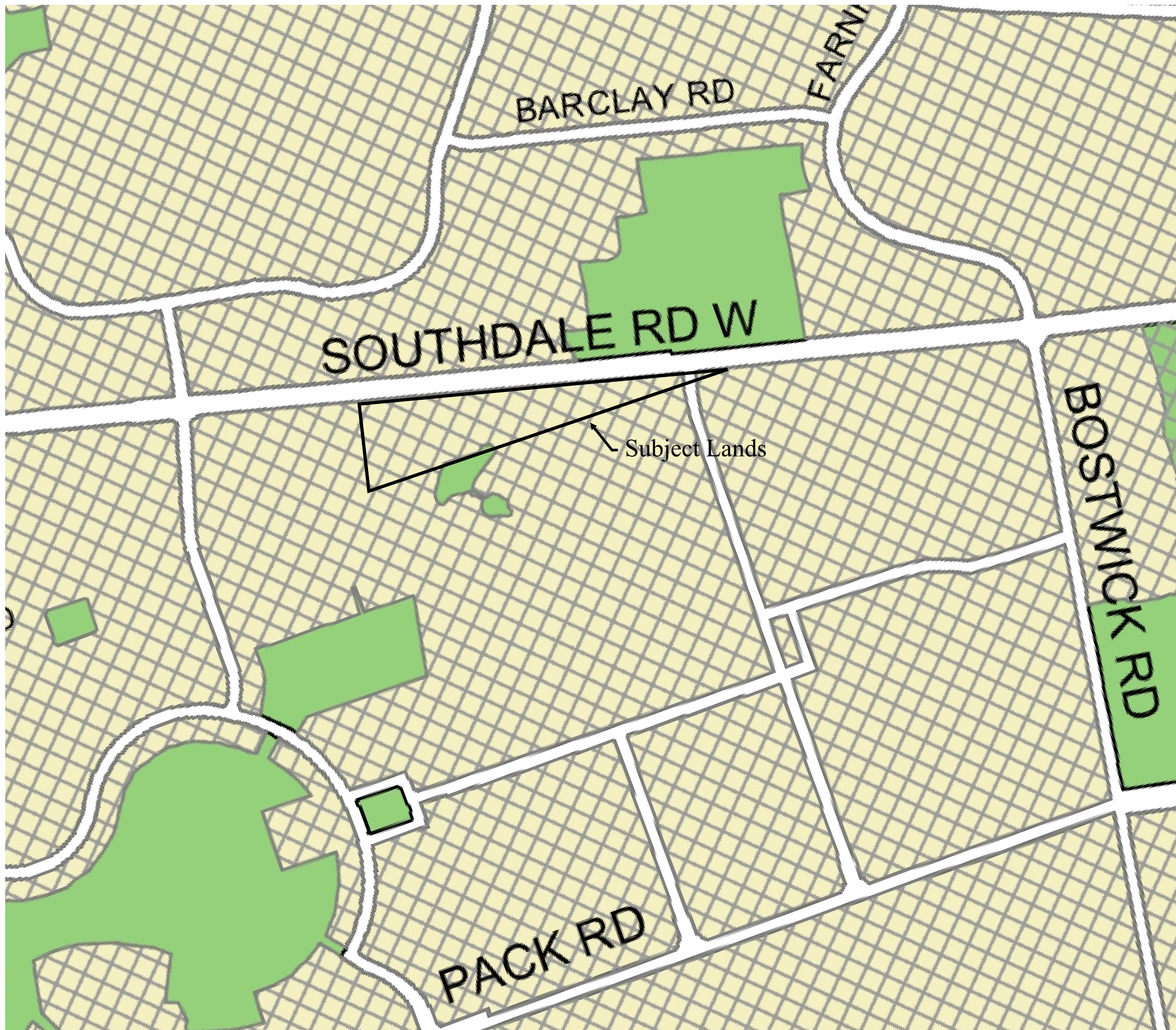


Figure 2: Land Use
(The London Plan Map 1, May 2021)



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Key Plan

Legend

- Green Space
- Environmental Review
- Farmland
- Neighbourhoods
- Urban Growth Boundary
- Watercourses/Ponds
- Railways
- Areas Withheld from LPAT Approval

* Locations are approximate and should be verified by survey where necessary.

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MTE Project#: 42128-200





Figure 3: Natural Heritage
(The London Plan Map 5, May 2021)



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Key Plan

Legend

- Provincially Significant Wetlands
- Wetlands
- Unevaluated Wetlands
- Significant Woodlands
- Woodlands
- Significant Valleylands
- Valleylands
- Areas of Natural and Scientific Interest (ANSI)
- Environmentally Significant Areas (ESA)
- Potential ESAs
- Upland Corridors
- Unevaluated Vegetation Patches
- Potential Naturalization Areas
- Water Bodies
- Conservation Authority Boundary
- Subwatershed Boundary
- Watercourses/Ponds
- Urban Growth Boundary

* Locations are approximate and should be verified by survey where necessary.

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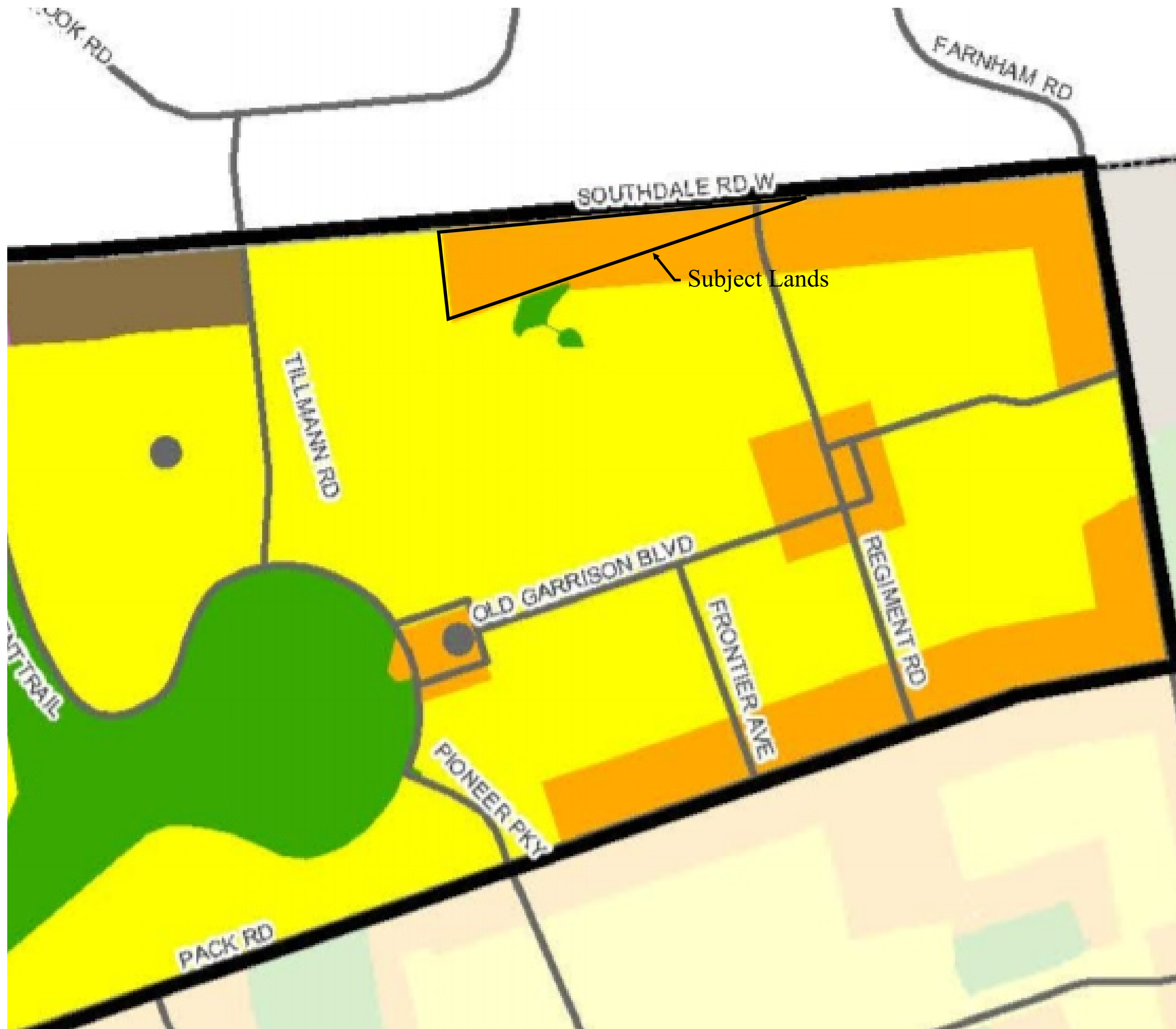


Figure 4: Southwest Area Secondary Plan
Land Use Designations
(Southwest Area Secondary Plan, Updated December 2019)



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Key Plan

- Legend**
- High Density Residential
 - Medium Density Residential
 - Low Density Residential
 - Open Space and Environmental Review
 - Parks (Existing and Proposed)
 - Urban Growth Boundary
 - Neighbourhood Boundary

* Locations are approximate and should be verified by survey where necessary.
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February 2022 MTE Project#: 42128-200



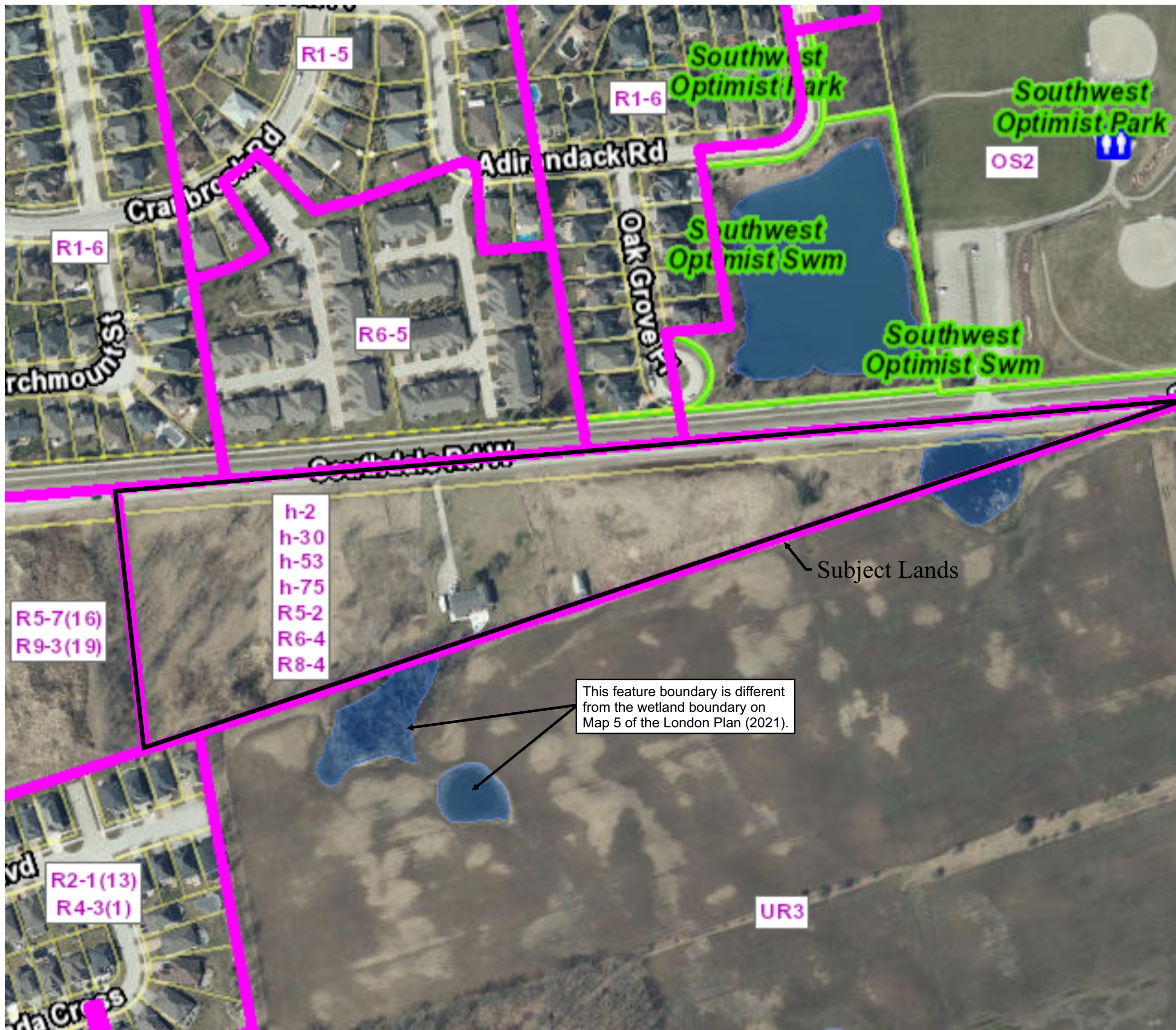



Figure 5: City of London Zoning
(City of London Zoning By-Law, July 2021)



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Key Plan

Legend

 Zoning Boundaries

* Locations are approximate and should be verified by survey where necessary.

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August 2021

MTE Project#: 42128-200





Figure 6: Vegetation Communities
(City of London Air Photo, 2020)



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Scale 1:50,000
Key Plan

Legend

- 1 CUM1-1 Dry-Moist Old Field Meadow Type (1.9 ha) with 1a MAM2 Mineral Meadow Marsh Ecosite inclusion (0.08ha)
- A1 Residential Home and Yard (0.50ha)
- 2 CUM1-1 Dry-Moist Old Field Meadow Type (0.83 ha)
- A2 Active Horse Pasture (0.23 ha) with A2a SWT1 Mineral Swamp Thicket Ecosite (0.03 ha)
- 3 SAS1 Submerged Shallow Aquatic Ecosite (0.1 ha on site)
- 4 MAS2 Mineral Shallow Marsh Ecosite (0.1 ha)
- 5 SWD3 Maple Mineral Deciduous Swamp Ecosite (0.3 ha)
- North Talbot PSW Boundary (London Plan Map 5, 2021)
- Proposed Wetland Boundary (MTE Consultants)
- Vegetation Community
- - - Vegetation inclusion

* Locations are approximate and should be verified by survey where necessary.

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Scale 1:2250
May 2022

MTE Project#: 42128-200





Figure 7: Key Field Findings
(City of London Air Photo, 2020)



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Scale 1:50,000
Key Plan

Legend

- 1 CUM1-1 Dry-Moist Old Field Meadow Type (1.9ha) with
1a MAM2 Mineral Meadow Marsh Ecosite inclusion (0.08ha)
- A1 Residential Home and Yard (0.50ha)
- 2 CUM1-1 Dry-Moist Old Field Meadow Type (0.83ha)
- A2 Active Horse Pasture (0.23ha) with
A2a SWT1 Mineral Swamp Thicket Ecosite (0.03ha)
- 3 SAS1 Submerged Shallow Aquatic Ecosite (0.10ha on site)
- 4 MAS2 Mineral Shallow Marsh Ecosite (0.10ha)
- 5 SWD3 Maple Mineral Deciduous Swamp Ecosite (0.30ha)

— Proposed Wetland Boundary (MTE)

- Amphibian Call Count Station (100 m radius)
- Candidate Bat Maternity Roost Tree
- Terrestrial Crayfish Evidence (Chimney or Individual)
- Animal Burrow (>10 cm diameter)
- Confirmed Significant Wildlife Habitat (SWH)
- Candidate Significant Wildlife Habitat (SWH)

* Locations are approximate and should be verified by survey where necessary.
Print on 11X17, Landscape Orientation

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Scale 1:1250

May 2022

MTE Project#: 42128-200



Figure 8: Wetland Management Strategy
(City of London Air Photo, 2020)



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Scale 1:50,000
Key Plan

Legend

- 1 CUM1-1 Dry-Moist Old Field Meadow Type (1.9ha) with 1a MAM2 Mineral Meadow Marsh Ecosite inclusion (0.08ha)
- A1 Residential Home and Yard (0.50ha)
- 2 CUM1-1 Dry-Moist Old Field Meadow Type (0.83ha)
- A2 Active Horse Pasture (0.23ha) with A2a SWT1 Mineral Swamp Thicket Ecosite (0.03ha)
- 3 SAS1 Submerged Shallow Aquatic Ecosite (0.10ha on site)
- 4 MAS2 Mineral Shallow Marsh Ecosite (0.10ha)
- 5 SWD3 Maple Mineral Deciduous Swamp Ecosite (0.30ha)

- Proposed PSW Boundary (MTE Consultants)
- - - Recommended Wetland Buffer

* Locations are approximate and should be verified by survey where necessary.

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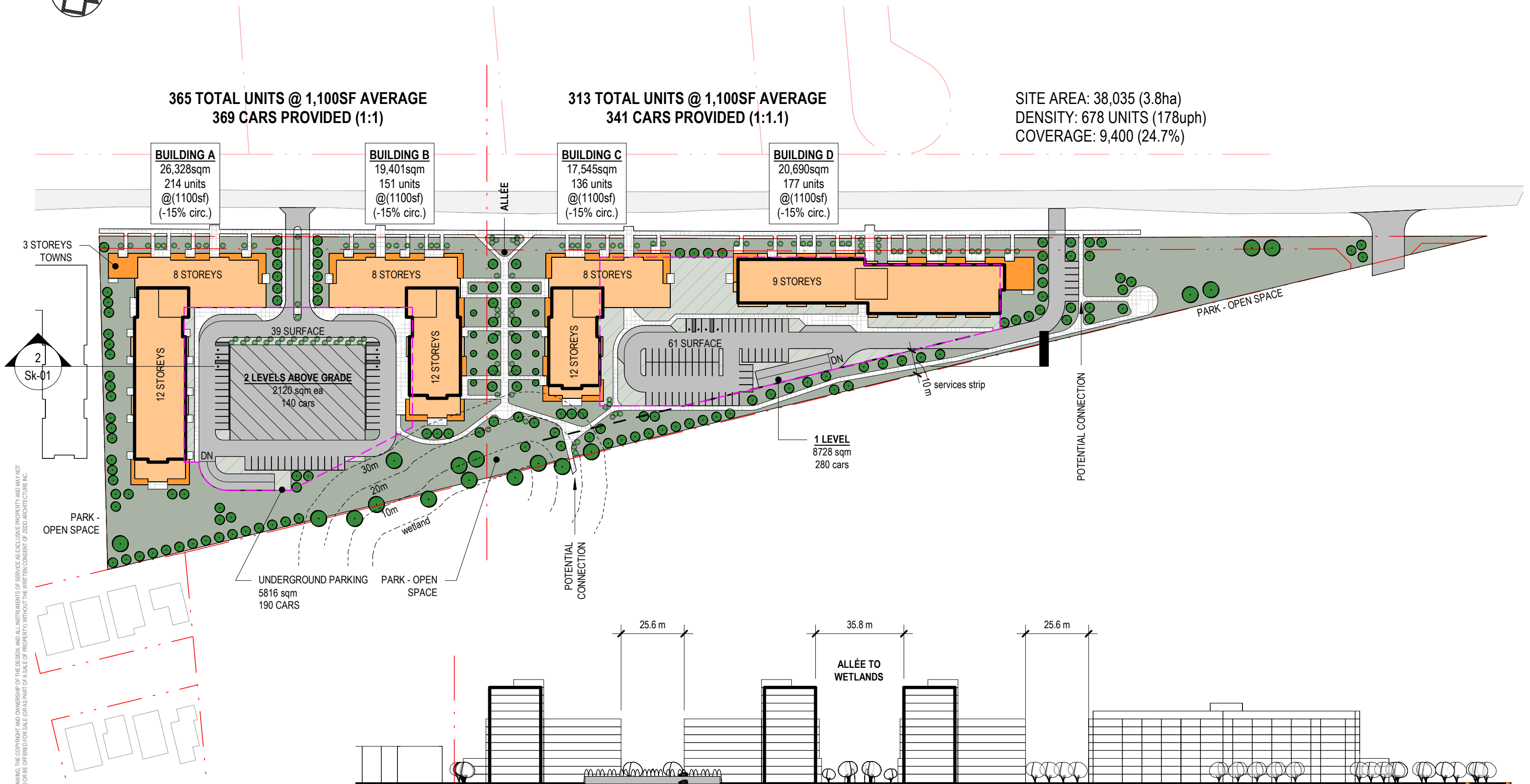
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May 2022

MTE Project#: 42128-200



Figure 9: Development Plan (Zedd Architecture, April 2022)



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Figure 10: Development Overlay
(City of London Air Photo, 2020)



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Scale 1:50,000
Key Plan

Legend

- 1 CUM1-1 Dry-Moist Old Field Meadow Type (2.2ha) with 1a MAM2 Mineral Meadow Marsh Ecosite inclusion (0.1ha)
- A1 Residential Home and Yard
- 2 CUM1-1 Dry-Moist Old Field Meadow Type (0.9ha)
- A2 Active Horse Pasture with A2a SWT1 Mineral Swamp Thicket Ecosite (0.03ha)
- 3 SAS1 Submerged Shallow Aquatic Ecosite (0.1ha on site)
- 4 MAS2 Mineral Shallow Marsh Ecosite (0.10ha)
- 5 SWD3 Maple Mineral Deciduous Swamp Ecosite (0.30ha)
- Proposed PSW Boundary (MTE)
- Southdale Road Widening Allowance (City of London)

* Locations are approximate and should be verified by survey where necessary.

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May 2022

MTE Project#: 42128-200



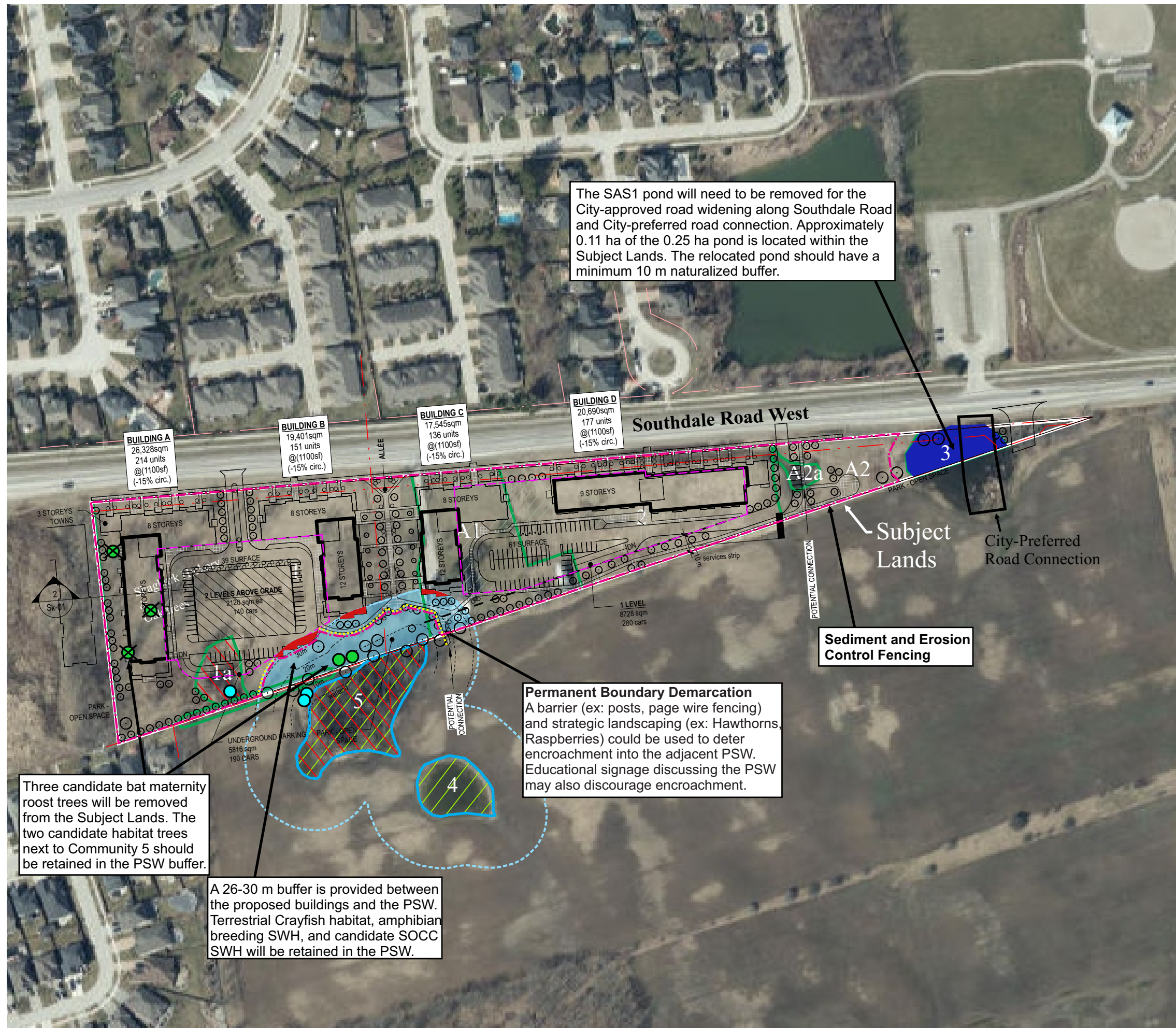
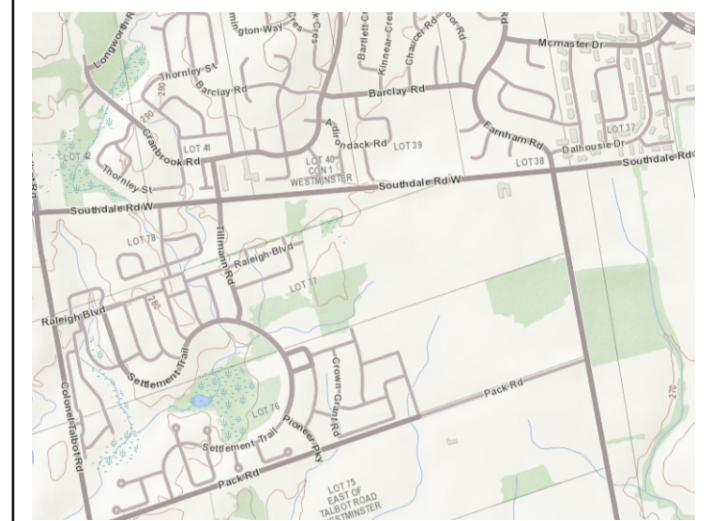


Figure 11: Mitigation Measures
(City of London Air Photo, 2020)



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Key Plan

Legend

- 1 CUM1-1 Dry-Moist Old Field Meadow Type (2.2ha) with
 - 1a MAM2 Mineral Meadow Marsh Ecosite inclusion (0.1ha)
- A1 Residential Home and Yard
- 2 CUM1-1 Dry-Moist Old Field Meadow Type (0.9ha)
- A2 Active Horse Pasture with
 - A2a SWT1 Mineral Swamp Thicket Ecosite (0.03ha)
- 3 SAS1 Submerged Shallow Aquatic Ecosite (0.1ha on site)
- 4 MAS2 Mineral Shallow Marsh Ecosite (0.10ha)
- 5 SWD3 Maple Mineral Deciduous Swamp Ecosite (0.30ha)

- PSW Boundary (MTE)
- - - Approximate Location of Sediment and Erosion Fencing
- Proposed Boundary Demarcation
- 30m Buffer From PSW
- Encroachment of Development Into the 30 m Buffer
- Approximate Area of SAS1 Pond to be Removed From the Subject Lands and Relocated
- Candidate Bat Maternity Roost Tree to be Retained
- ⊗ Candidate Bat Maternity Roost Tree to be Removed
- Terrestrial Crayfish Burrow
- Confirmed SWH
- Candidate SWH

* Locations are approximate and should be verified by survey where necessary.

Print on 11X17, Landscape Orientation

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Scale 1:2250
May 2022

MTE Project#: 42128-200



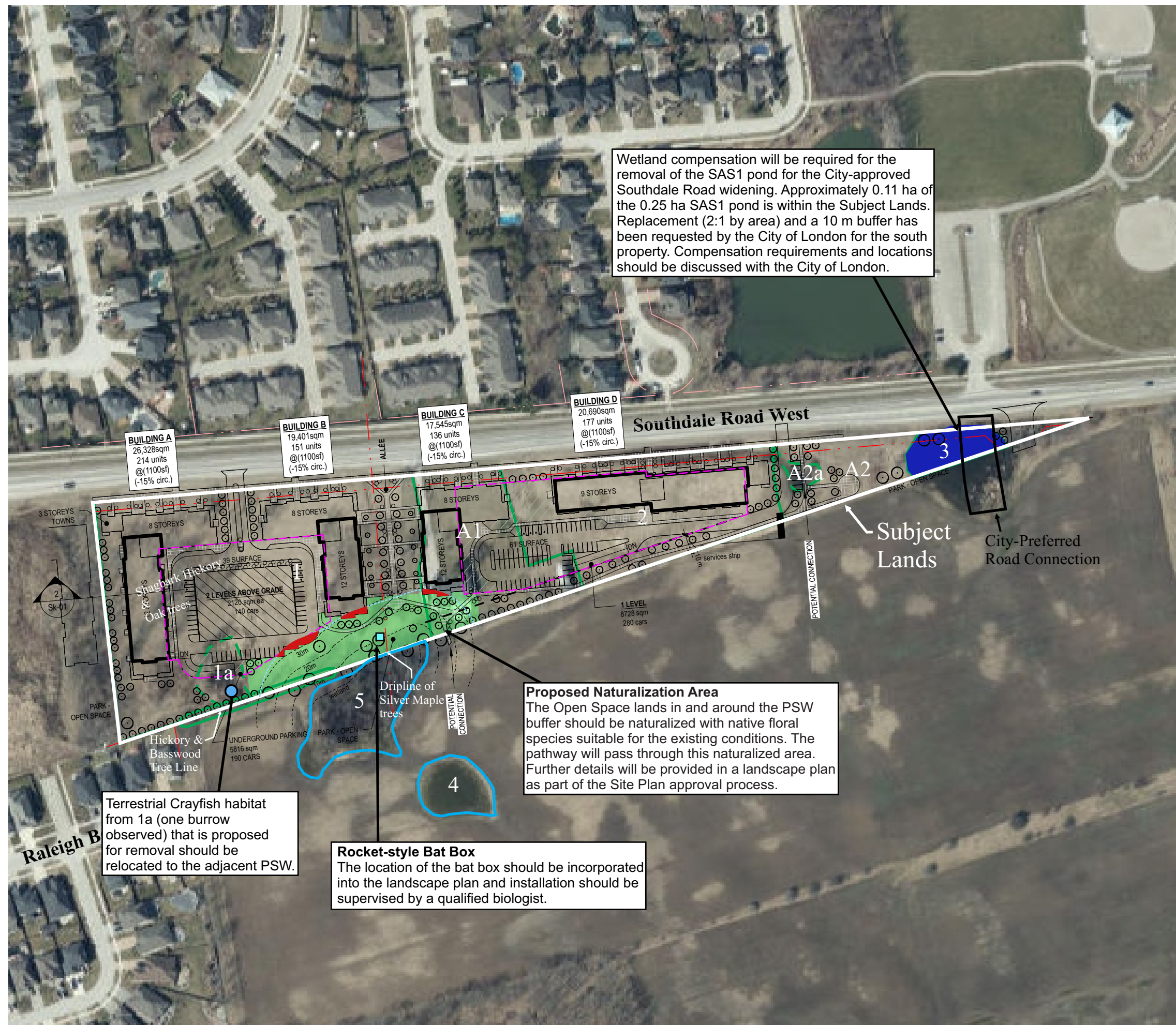


Figure 12: Compensation and Naturalization Measures
(City of London Air Photo, 2020)



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Key Plan

Legend

- 1 CUM1-1 Dry-Moist Old Field Meadow Type (2.2ha) with
 - 1a MAM2 Mineral Meadow Marsh Ecosite inclusion (0.1ha)
 - A1 Residential Home and Yard
- 2 CUM1-1 Dry-Moist Old Field Meadow Type (0.9ha)
- A2 Active Horse Pasture with
 - A2a SWT1 Mineral Swamp Thicket Ecosite (0.03ha)
- 3 SAS1 Submerged Shallow Aquatic Ecosite (0.1ha on site)
- 4 MAS2 Mineral Shallow Marsh Ecosite (0.10ha)
- 5 SWD3 Maple Mineral Deciduous Swamp Ecosite (0.30ha)

- PSW Boundary (MTE)
- Approximate Location of Sediment and Erosion Fencing
- Proposed Boundary Demarcation
- Conceptual Rocket-style Bat Box Location
- Proposed Naturalization Area
- Conceptual 30 m PSW Buffer
- Encroachment of the Development Into the 30 m Buffer
- Terrestrial Crayfish Burrow to be Relocated to PSW

* Locations are approximate and should be verified by survey where necessary.

Print on 11X17, Landscape Orientation

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May 2022

MTE Project#: 42128-200



Appendix A

Record of Pre-Consultation

APPENDIX A

Environmental Impact Study ISSUES SUMMARY CHECKLIST REPORT

Application Title: 735 Southdale Rd

Date Submitted: January 20, 2020

Proponent: Royal Premiere Homes - Farhad Noory

Qualifications

Primary Consultant:

Key Contact Person:

Other Consultants/ field personnel:

Hydrogeology/ Hydrology: Exp

Biological – Flora: MTE

Biological – Fauna: MTE

Other:

Context for Background Information

Subwatershed: Dingman Creek

Tributary Fact Sheet Number:

Planning / Policy Area: Talbot/SWAP

Technical Advisory Review Team

Ecologist Planner James MacKay

Planner for File

EEPAC

Conservation Authority Tara Tchir

Ministry of Natural Resources

Ministry of Municipal Affairs and Housing

Ministry of Agriculture and Food

Other Review Groups (e.g., Community Associations, Field Naturalists)

1.0 DESCRIPTION OF THE ENVIRONMENT (Features)

Purpose: To have a clear understanding of the current status of the land, and the proposed “development” or land use change.

1.1 Mapping (Location and Context)

Current aerial photography

- Land Use – Excerpts of the Official Plan for the City of London Ontario Schedules A, B, showing a 5-10 km radius of subject site
- Terrain setting @ 1:10,000 – 1:15,000 scale showing landscape features, subwatershed divides
- Existing Environmental Resources showing @1:2,000 – 1:5,000 showing Vegetation, Hydrology, contours, linages.
- Environmental Plan or Strategy from Subwatershed reports (tributary fact sheet), Community (Area) Plans, or other

1.2 Description of Site, Adjacent lands, Linage with Natural Heritage System

List all supporting studies and reports available to provide background summary (e.g. subwatershed, hydrological, geo-technical, natural heritage etc.).

SWAP, Southdale Road Widening EA

Check the first box if the information is relevant and required as part of this study. Check the second box if sufficient data is available.

1.2.1 Terrain Setting

- | | | |
|-------------------------------------|-------------------------------------|---------------------------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Soils (surface and subsurface) |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Glacial geomorphology – landform type |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Subwatershed |

- Topographic features
- Ground water discharge
- Shallow ground water/baseflow
- Ground water discharge/aquifer
- Aggregate resources

1.2.2 **Hydrology**

- Hydrological catchment boundary
- Surface drainage pattern
- Watercourses (Permanent, Intermittent)
- Stream order (Headwater, 1st, 2nd, 3rd or higher)
- Agricultural Drains
- Downstream receiving watercourse
- Agricultural Drains
- Hazard Line (Map 6)

1.2.3 **Natural Hazards**

- 100 year Erosion Line
- Floodline mapping
- Fill line mapping

1.2.4 **Vegetation**

- Vegetation Patch Number
- System (Terrestrial, Wetland, Aquatic)
- Cover (Open, Shrub, Treed)
- Community Type(s)
- ELC Community Class (Bluff, Forest, Swamp, Tallgrass Prairie, Savannah & Woodland, Fen, Bog, Marsh, Open Water, Shallow Water)
- ELC Community Series
- Rare Vegetation Communities

1.2.5

Flora

Flora (inventory dates, source)

3-season

Rare flora (National, Provincial, Regional)

1.2.6

Fauna

Fauna (Inventory dates; sources)

Breeding Birds

Standard 2 June visits

Migratory Birds

Amphibians

Reptiles

incidental

Mammals

incidental

Butterflies

incidental

Odonata

incidental

Other

Bird Species of Conservation Priority

Rare Fauna

1.2.7

Wildlife Habitat

- Species-At-Risk Regulated Habitat critical habitat mapping
- Winter habitat for deer, wild turkey
- Waterfowl Habitat (wetlands, poorly drained landscape – bottomlands, beaver ponds, seasonally flooded areas, staging areas, feeding areas)
- Colonial Birds Habitat
- Hibernacula
- Habitat for Raptors
- Forests with springs or seeps
- Ephemeral ponds
- Wildlife trees (snags, cavities, x-large trees > 65 cm DBH)
- Forest Interior Birds
- Area-sensitive birds

1.2.8

Aquatic Habitat

(SWS Aquatic Resources Management Reports)

- Fish communities
- Fish spawning areas
- Fish migration routes
- Thermal refuge for fish

- Benthic inventory
- Substrate
- Riparian habitat (extent and type)

1.2.9

Linkages and Corridors

(The diversity of natural features in an area, and the natural connections between them should be maintained, and improved where possible. PPS 2.3.3)

- Valleylands
- Significant Watercourses (Thames River, Stoney Creek, Medway Creek, Dingman Creek, Pottersburg Creek, Wabuno Creek, Mud Creek, Stanton Creek (Drain), Kelly Creek (Drain))
- Upland Corridors / species migration routes
- Big Picture Cores and Corridors
- Linkages between aquatic and terrestrial areas (riparian habitat, runoff)
- Groundwater connections
- Patch clusters (mosaic of patches in the landscape)

1.3 Social Values

1.3.1

Human Use Values

- Recreational linkages for hiking, walking
- Nature appreciation, aesthetics
- Education, research
- Cultural / traditional heritage
- Social (parks and open space)
- Resources Products (e.g. timber, fish, furbearers, peat)
- Aggregate Resources

1.3.2

Land Use - Cultural

- Archaeological (pre 1500)
- Historical (post 1500 – present)
- Adjacent historical and archeological
- Future

1.3.3

Land Use - Active

- Archaeological (pre 1500)
- Historical (post 1500 – present)
- Adjacent historical and archeological
- Future

1.3.4

Other

2.0 EVALUATION OF SIGNIFICANCE

Components of the Natural Heritage System

The policies in Section 15.4 apply to recognized and potential components of the natural heritage system as delineated on Schedule 'B' or features that may be considered for inclusion on Schedule 'B'. They also address the protection of environmental quality and ecological function with respect to water quality, fish habitat, groundwater recharge, headwaters and aquifers.

2.1 Environmentally Significant Areas

- Identified Environmentally Significant Areas (ESA)

Name

- Potential ESAs – Expansion of an Existing ESA

Name

- Potential ESA – Area not associated with an existing ESA

Name

2.2 Wetlands

- Provincially Significant Wetlands

Name

- Wetlands

Name

- Unevaluated Wetlands

2.3 Areas of Natural and Scientific Interest

- Provincial Life Science ANSI
- Regional Life Science ANSI
- Earth Science ANSI

2.4 Habitat of Species-At-Risk (SAR)

- Endangered
- Threatened
- Vulnerable

2.5 Woodlands

- Significant Woodlands
- ~~Unevaluated Vegetation Patches~~ – patches >0.5ha

2.6 Corridors and Linkages

- River, Stream and Ravine Corridors
- Upland Corridors
- Naturalization and Anti-fragmentation Areas

3.0 IDENTIFICATION AND DESCRIPTION OF FUNCTIONS

Ecological Functions the natural processes, products or services that species and non-living environments provide or perform within or between ecosystems and landscapes. Check those functions that will be required to assess for the study (key and supporting functions).

3.1 Biological Functions

- Habitat (provision of food, shelter for species)
- Limiting habitat
- Species life histories (reproduction and dispersal)
- Habitat guilds
- Indicator species
- Keystone species
- Introduced species
- Predation / parasitism
- Population dynamics
- Vegetation structure, density and diversity
- Food chain support

- Productivity
- Diversity
- Carbon cycle
- Energy cycling
- Succession and disturbance processes (natural and man-made)
- Relationships between species and communities

3.2 Hydrological and Wetland Functions

- Groundwater recharge and discharge (hydrogeology)
- Water storage and release (fluvial geomorphology)
- Maintaining water cycles (water balance)
- Water quality improvement
- Flood damage reduction
- Shoreline stabilization / erosion control
- Sediment trapping
- Nutrient retention and removal / biochemical cycling
- Aquatic habitat (fish, macroinvertebrates)

3.3 Landscape Features and Functions

- Size
- Connections, corridors and linkages
- Proximity to other areas / natural heritage features (e.g. woodlands, wetlands, valleylands, water, etc.)
- Fragmentation

3.4 Functions, Benefits and Values of Importance to Humans

- Contributing to healthy and productive landscapes
- Improving air quality by supplying oxygen and absorbing carbon dioxide
- Converting and storing atmospheric carbon
- Providing natural resources for economic benefit
- Providing green space for human activities
- Aesthetic and quality-of-life benefit
- Environmental targets and/or environmental management strategies

PROPOSAL REVIEW MEETING SUMMARY & RECORD OF CONSULTATION

Date: August 6, 2020

Subject: Proposal Review Meeting
735 Southdale Road West

Meeting Date: July 15, 2020 (Online Zoom meeting)

Meeting Participants:

R. Carnegie (Coordinator)	Development Services
M. Feldberg	Development Services
L. Pompilii (Chair)	Development Services – Planning
L. Mottram	Development Services – Planning
T. Koza	Development Services – Engineering
M. Harrison	Development Services – Engineering
B. Williams	Development Services – Engineering
J. MacKay	Development Services – Ecologist
B. Page	Parks & Recreation Services
G. LaForge	Development Finance
A. Giesen	E.E.S. – Transportation
S. Chambers	E.E.S. – Stormwater Management
A. Sones	E.E.S. – Stormwater Management
J. Chaves	E.E.S. – Stormwater Management
M. Schaum	E.E.S. – Wastewater & Drainage Engineering
K. Graham	E.E.S. – Wastewater & Drainage Engineering
P. Lupton	E.E.S. – Water Engineering
J. Robinson	E.E.S. – Water Engineering
J. Smolarek	Urban Design
L. Dent	Heritage Planning
S. Pratt	Upper Thames River Conservation Authority

Owner/Applicant: Royal Premier Homes
Authorized Agent: Zelinka Priamo c/o Harry Froussios
File Reference: File #TS2020-005
Type of Application: Proposed Draft Plan of Subdivision
Location: 735 Southdale Road West
File Manager: Lou Pompilii
Planner: Larry Mottram

DEPARTMENT & AGENCY COMMENTS

The following is a summary of the comments as reported by the respective service areas/agencies in response to the proposal. It is noted that these comments do not necessarily reflect the final planning recommendation on the proposal.

DEVELOPMENT PLANNING:

Lou Pompilii *Manager, Development Services Planning*
Larry Mottram *Senior Planner*

- As indicated in the IPR under Section 6.0 - Area Studies, a site-specific amendment to the SWAP is required to permit the proposed density of 147 UPH. Please include in the FPR a brief overview of the criteria outlined in Section 20.5.4.1 iv) e) of the SWAP in support of the proposed increase in density.
- Justification for the increased density should give consideration to density bonusing in return for facilities, services, and matters that result in a public benefit (ie. affordable housing).
- Noise impact assessment study for development adjacent Southdale Road West may be required as a condition of draft plan approval and/or a holding provision in the zoning by-law.
- It's our expectation that applications for Official Plan and Zoning By-law Amendment will be brought forward together with the Plan of Subdivision application, as stated on Page 19 of the IPR. During the Proposal Review meeting the proponent's agent indicated a preference for submitting the subdivision application followed by applications for OPA and

ZBA at a future date. Development Services is prepared to review the request with the applicant at the time of submission prior to acceptance for processing.

DEVELOPMENT SERVICES - URBAN DESIGN:

Jerzy Smolarek

Urban Designer

General Comments:

- Overall urban design staff are supportive of the general block layout of the subdivision, which provides for two blocks and two roads. The inclusion of Street 'A' will be an important element as this will provide for a much needed connection between Southdale Road and the future neighbourhood to the south in keeping with Policies in SWAP with regards to connectivity and street network. The ultimate location of this connection should take into account the natural heritage constraints and keep the road outside of any required features and their buffers.

Zoning Comments:

- An analysis should be provided to show how any proposed built form does not negatively impact the surrounding low-rise residential developments, both existing and planned. This includes any proposed multi-level parking structures.
- The following comments are specifically related to the design of the building and site, if this proposal requires a bonus these features should be included in a detailed set of drawings forming part of the re-zoning application. Otherwise some of the comments below may form part of the zoning envelope to ensure that policies of the Southwest Area Plan (SWAP), the current Official Plan, and The London Plan are implemented in terms of the general placement, massing, and design of the building.
 - Design buildings to respond to their locations. If a building is located next to a street corner location, the lower portion of the building(s) should provide interest to the intersection they are adjacent to. If a building is mid-block its massing should generally be located along the street frontage, and where the building extends towards the rear of the site, provide for appropriate yard (interior and rear) setbacks and/or step-backs;
 - Ensure the residential entrance (lobby) of the building is easily distinguished from the individual ground floor unit entrances and provide for architectural features to pronounce this entrance.
 - For any ground floor street facing residential, include individual ground floor unit entrances with related courtyards or "front porches" with access directly to the City sidewalk along the street frontage they face in order to active the street edge.
 - Articulate the facades to provide depth and variation in the built form to enhance the pedestrian environment;
 - Include an appropriate step-back above the 3rd or 4th floor adjacent to any street frontage in order to provide for a human scale along the street;
 - Incorporate a variety of materials and textures to highlight different architectural elements and provide interest and rhythm along the building (i.e. trim, framing, decorative masonry details, fenestration rhythm);
 - Include a high proportion of glazing in order to break up the massing of the building
- This application is to be reviewed by the Urban Design Peer Review Panel (UDPRP), and as such, an Urban Design Brief will be required. UDPRP meetings take place on the third Wednesday of every month, once an Urban Design Brief is submitted as part of a complete application the application will be scheduled for an upcoming meeting and the assigned planner as well as the applicant's agent will be notified. If you have any questions relating to the UDPRP or the Urban Design Briefs please contact Wyatt Rotteau at 519.661.2500 x7545 or by email at wrotteau@london.ca.

DEVELOPMENT SERVICES - HERITAGE PLANNING:

Laura Dent

Heritage Planner

- Archaeological Potential at the above property is identified on the City's 2018 archaeological mapping and includes both indigenous and historic potential on the property. Soil disturbance is reasonably anticipated due to proposed future construction on the property.
- Section 7.3 in the Internal Proposal Report (June 2020) identifies archaeological and built heritage concerns and indicates that "an archaeological study will be completed and submitted with the application."(p9)
- Specific conditions of a complete application should include the following:
 - The proponent shall retain a consultant archaeologist, licensed by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) under the provisions of the Ontario Heritage Act (R.S.O. 1990 as amended) to carry out a Stage 1-2 archaeological assessment on the entire property and follow through on recommendations to mitigate, through preservation or resource removal and

documentation, adverse impacts to any significant archaeological resources found (Stages 3-4).

- The archaeological assessment must be completed in accordance with the most current Standards and Guidelines for Consulting Archaeologists, Ministry of Tourism, Culture and Sport.
- All archaeological assessment reports will to be submitted to the City of London once the Ministry of Tourism, Culture and Sport has accepted them into the Public Registry; both a hard copy and PDF format of archaeological reports should be submitted to Development Services.
- No soil disturbance arising from demolition, construction, or any other activity shall take place on the subject property prior to Development Services receiving the Ministry of Tourism, Culture and Sport compliance letter indicating that all archaeological licensing and technical review requirements have been satisfied.
- Additional notes include the following:
 - If an archaeological assessment has already been completed and received a compliance letter from the Ministry, the compliance letter along with the assessment report may be submitted for review to ensure they meet municipal requirements.
 - The subject property is in an area identified as being of archaeological potential in the City of London Archaeological Management Plan. It is an offence under Section 48 and 69 of the Ontario Heritage Act for any party other than a consultant archaeologist to make alterations to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from an archaeological site.
 - Should previously undocumented (i.e. unknown or deeply buried) archaeological resources be discovered, they may be a new archaeological site and therefore be subject to Section 48(1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the Ontario Heritage Act. Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48(1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.
 - If human remains/or a grave site is discovered, the proponent or person discovering the human remains and/or grave site must cease alteration of the site immediately. The Funerals, Burials and Cremation Services Act requires that any person discovering human remains must immediately notify the police or coroner and the Registrar of Burial Sites, War Graves, Abandoned Cemeteries and Cemetery Closures, Ontario Ministry of Government and Consumer Services.

DEVELOPMENT SERVICES - NATURAL HERITAGE:

James MacKay *Ecologist*

- Significant concerns over the buffers shown on the draft plan. Minimum buffers to Provincially Significant Wetlands have not been adhered to (30m).
- The development appears to come as close as 10m to the wetland feature (part of road network), this is not supportable.
- The draft plan shows the potential for 13 additional parking spaces, these are fully within the 30m buffer and as close as 10m from the Provincially Significant Wetland.
- The scoping meeting identified an additional wetland feature within the adjacent lands to the Provincially Significant Wetland on the subject site (to the northwest), this has not been shown on the draft plan and appears to indicate it is being removed or potentially relocated (offsite?).
- The scoping meeting identified another wetland feature located in the far northeast corner of the subject site. While the proponent indicated that the entire feature would be removed by a City constructed road requirement, this is not entirely clear and will require further review. As the proponent shows a local road connecting at the point where the wetland appears to be located. It may be a joint issue still requiring resolution. The scoping document indicated the City is willing to work with the proponent to resolve this issue, if indeed it is a joint issue.
- The City recognizes the desire for high density at the subject site and trying to work with an odd shaped parcel, however this also must be reflected in the protection of the Natural Heritage Features and the increased impacts expected from high density use as identified in the EMG. Revisions to address buffers and potential compensation issues as per City Policies and EMG documents need to be reflected in an updated draft plan, what is currently shown is not supportable as previously identified. The City is willing to work with the proponent to address buffer and other related issues.
- The scoping documents identifies the requirement for a combined SLSR/EIS (this will need to be in conformity with all in-force London Plan policies including 1429 and 1430).
- The scoping document identifies the requirement for a full Hydrogeological study and water balance, to be scoped with the UTRCA.

PARKS AND RECREATION:

Bruce Page *Senior Planner*

- Parkland dedication is required for the subdivision. This dedication may be in the form of land or cash-in-lieu pending the result of the approved EIS

WASTEWATER & DRAINAGE ENGINEERING:

Marcus Schaum *Senior Technologist*

- Based on the South West Area Master Servicing Plan the North Talbot Community Plan the subject lands are ultimately tributary to the future Colonel Talbot PS currently under construction. The subject lands are within Oxford/Greenway WTP sanitary sewersheds
- The intended municipal sanitary sewer outlet based on accepted sanitary drainage area plans is the municipal 450mm diameter sanitary sewer at Pack Road that has since been extended to the north by way of residential developments such as Talbot Village Ph 5 and 6. Furthermore an IPR was recently submitted for TV Ph 7 and 8 which could further extend sanitary sewers and roads to the limits of these lands.
- As mentioned in the 735 Southdale Rd IPR a Phase 1 for a planned Block 1 is being proposed that would move ahead once the TVPS and Westfield Village pumping stations are decommissioned by way of an interim sanitary connection for Block 1 to the existing unassumed sanitary sewer on Tillman Road.
- SED is not supportive of temporary interim servicing and it is not the preferred solution. It is further recognized it has been a few years since there were offline discussions with senior staff about a possible interim sanitary connection. The cost, timing and social impacts and noting these lands were never included in the sanitary drainage area plan to the Tillman Road sewer, at this point in time may not make it as feasible. In addition a proposed interim solution would result in temporary non-standard private servicing in the municipal ROW and result in connections to unassumed sewers, unassumed works and services and pumping station in the adjacent Westfield Village Subdivision. Written permission from the adjacent subdivider is also required prior to any proposed connections to unassumed works and services, as well as, all specific details and co-ordination will need to be provided and all expectations clarified.
- To this end SED is open to having further dialogue and will require more clarity and more detail on the Owner's expected timing for this development proposal moving forward and expectations and timing for when TVPS and Westfield PS can be decommissioned and what, if any, arrangements and co-ordination are in place that would extend and route sewers and align with the adjacent lands to the south; and what has been negotiated to date that will provide the ultimate sanitary routing and connection and road connections. Sewer routing and maximum density should be clarified.
- A municipal sanitary outlet for the subject lands will need to be demonstrated and align with sewer connection locations, and sewer routings under ultimate conditions with the adjacent lands to the south and will need to be included as part of a complete application and included as part of the IPR and will need to also align with maximum density and population.

WATER ENGINEERING:

Josh Robinson *Technologist II*

Water Engineering have reviewed the proposal summary and has the following comments.

- Water is available for the subject site via the municipal 400mm concrete high level watermain on Southdale Road East.
- This watermain is part of the Springbank/Westmount/Pond Mills/Wickerson high level system which has a hydraulic grade line of 335.0m.
- City records indicate the current site is not connected to a municipal watermain. Any existing wells on site are to be abandoned to MOECP standards and guidelines.
- The proposal identifies the tallest building to be 18 storeys. Please note that if a building over 84m in height will require a second water service connection in accordance with the OBC.
- As indicated in the report each building will require its own independent water service to prevent the creation of any regulated drinking water systems.
- A water servicing report addressing domestic demands, fire flows, and water quality will be required.

STORMWATER MANAGEMENT:

Adrienne Sones *Environmental Services Engineer*

General Comments/Information – Stormwater Management (SWM)

- The site is located within the Dingman Creek Subwatershed. The subject lands are within the stormwater drainage areas of the existing Southwest Optimist SWM Facility. Portions of the site to be accommodated by water quality and quantity controls of the existing SWM Facility

will not be required to meet additional requirements of the Dingman EA. Any new stormwater controls required in addition to the existing SWM Facilities shall be designed in accordance with the requirements of the Dingman EA.

- A detailed hydrogeological investigation carried out by a qualified consultant will be required, which will be prepared in accordance with the guidance contained in the most recent City of London Design Specifications & Requirements Manual. It is recommended that the proponent and their consultant undertake pre-consultation with City of London and UTRCA staff to confirm the scope of the required technical study. The hydrogeological study shall be submitted as part of the complete application.
- The SWM report shall:
 - Address how the proposed development will meet City of London water quality and quantity SWM design criteria (as per the Dingman EA and Stormwater Management Design Specifications and Requirements Manual, section 6.2.3) and the functional design of the Southwest Optimist SWM Facility (formerly referred to as Cranbrook South SWM Facility).
 - Verify any existing storm infrastructure proposed to accommodate flows from the site has sufficient capacity to meet current design standards and conditions and is also in adequate condition to receive flow from the proposed development.
 - Support and reflect the findings of an accepted Hydrogeology Report and Environmental Impact Study.
 - Verify and demonstrate water balance or stormwater conveyance requirements of adjacent natural features. Conveyance of stormwater to natural features shall consider the hydrological impacts such as, but not limited to peak flows, total runoff volumes and annual water balance conditions. The stormwater requirements and justification for maintenance to natural features should be supported by the findings and requirements of the EIS and hydrogeological investigation as scoped with City and UTRCA staff and clearly detailed in the Stormwater Management Report.
 - Include a representative lot level runoff coefficient value including all anticipated impervious surfaces including buildings and hardscaping to verify the proposed development meets approved “c” runoff coefficients.
 - Be submitted as part of the complete application. A functional SWM report may be included as part of the complete application. This report may be required to be updated, revised and resubmitted to support the detailed design submission.
- Once the final Draft Plan is established further evaluation will be required, likely at the detailed design stage, which may include but may not necessarily be limited to the following:
 - Details and discussion regarding LID considerations proposed for the development.
 - Discussions related to the water taking requirements to facilitate construction (i.e., PTTW or EASR be required to facilitate construction), including sediment and erosion control measure and dewatering discharge locations.
 - Evaluation of construction related impacts, and their potential effects on the shallow groundwater system.
 - Discussion regarding mitigation measures associated with construction activities specific to the development (e.g., specific construction activities related to dewatering).
 - Development of appropriate short-term and long-term monitoring plans (if applicable).
 - Development of appropriate contingency plans (if applicable), in the event of groundwater interference related to construction.

TRANSPORTATION PLANNING & DESIGN:

Andrew Giesen *Senior Transportation Technologist*

The Transportation Planning & Design Division has reviewed the proposal summary and has the following comments.

- The applicant is to have regard for and implement through this plan of subdivision Complete Streets (which includes such things as barrier curb, sidewalk on both sides, asphalt width, and ROW width)
- The applicant is also to have regard for the Council approved Southdale Road West Environmental Assessment (EA):
<http://www.london.ca/residents/Environment/EAs/Pages/Southdale-Road-West--Bostwick-Road-Improvements-.aspx>
- The applicant is to coordinate with the land owner to the south the location of Street “A” & Street “B”
 - Right of way widening of 18.0m from centre line required along Southdale Road West
 - 6.0m x 6.0m daylight triangles required at Street “A” and Southdale Road West and at Street “B” at Southdale Road West.
 - As part of a complete application an updated plan showing all bends, tapers, & centre line radii complying with City Standards including 10m straight tangents between horizontal curves, and centre line radii complying with the Design Specifications and

Requirement Manual (DSRM) will be required. (150m centre line radii required for Neighbourhood connectors)

- As part of a complete application a Transportation Impact Assessment (TIA) is required to determine the impact the proposed development may have on the surrounding transportation network, the TIA is to be scoped with City staff prior to undertaking and be carried out in conformance with the City's TIA Guidelines
- Barrier curb will be required through the subdivision in accordance with the (DSRM)
- The centre line of Street "A" and Street "B" is to align perpendicular to Southdale Road West
- Right and left turn lanes will be required on Southdale Road West at Street "A"
- Street "A" at Southdale road West is to be restricted to Right in/Right out in accordance with City standards and as envisioned in the Southdale Road West EA
- Gateway widening required on Street "B" at Southdale Road West with a ROW width of 24.0m for 45.0m tapered back over 30m to a ROW width of 23.0m
- Street "B" to be constructed with an asphalt width of 13.0m and include buffered bike lanes in accordance with the Cycling Master Plan and DSRM
- Street "B" to include a yellow centre line in accordance with the DSRM
- Gateway widening required on Street "A" at Southdale Road West with a ROW width of 21.5m for 30.0m tapered back over 30m to a ROW width of 20.0m
- TMP required for any work in the City ROW

DEVELOPMENT FINANCE:

Greg LaForge *Manager I*

- The below comments are based on the 2019 DC Background Study and By-law. Development Finance has reviewed the documents provided regarding the above noted IPR and based on this information have the following comments:

Water

- There are no anticipated claims for subsidy on oversized watermains (watermains 300mm or greater). All local and private watermains and connections will be installed at the Owner's cost.

Wastewater

- There are no anticipated claims for subsidy on oversized sanitary sewers (sanitary sewers 300mm or greater). All local, temporary or private sanitary sewer works and connections will be installed at the Owner's cost.

Stormwater

- There are no anticipated claims for subsidy on oversized storm sewers (storm sewers 1200mm or greater). All local and private sewers and connections will be installed at the Owner's cost.

Stormwater Management

- If LIDs are accepted through the subdivision design process that improve water quality or water balance in conjunction with local stormwater servicing on City-owned lands or within a dedicated Municipal easement, these would be eligible for subsidy. LIDs constructed within a site plan are not eligible for subsidy.

Transportation

- A related City led DC project to upgrade Southdale Road West between Bostwick Road and Colonel Talbot Road from 2 to 4 lanes fronting this property is currently scheduled for construction in 2031 (est. \$11.7 M). Construction of any external roadworks will be dependent upon the coordination and timing of these works.
- If Owner led DC eligible Minor Road Works are identified through the subdivision design process, these works would be subject to Work Plan approval. The Work Plan submission would be required in conjunction with the first submission of engineering drawings and may include the following works:
 - Internal road widenings would be claimable for the difference in construction costs between the standard road width up to a Neighbourhood Connector and the oversized road width under the Road Oversizing program.
 - Construction costs related to on-road cycling lanes would be eligible for a claim under the Active Transportation program.
- All other internal roadworks up to and including Neighbourhood Connectors, temporary external road works and connections are to be constructed at the Owner's cost.

Parks

- There are no Owner anticipated claims for parks related infrastructure.

DEVELOPMENT ENGINEERING:

Ted Koza *Manager, Development Engineering*
Mike Harrison *Senior Engineering Technologist*
Bryn Williams *Engineering Technologist*

STANDARD COMMENTS:

- All the usual standard conditions of draft plan will be imposed;
- Cost sharing for any eligible services or facilities will be based on the most financially economical solution for the claim, unless agreed to otherwise by the City; and
- External land needs are to be addressed as necessary (e.g. utility corridors, public roads, construction roads, emergency access etc.).

INITIAL PROPOSAL REPORT COMMENTS:

- General Comments in regards to the report i.e. the report signed, identify if any existing draft plan of subdivision will need to be amended based on the proposed draft plan of subdivision, etc.

9.0 Water Servicing:

- It should be noted that the existing watermain on Southdale Rd runs through the north side of the Road. A detailed traffic management plan will be required for making the two road cuts on Southdale Rd.

DRAFT PLAN OF SUBDIVISION DRAWING COMMENTS:

- The draft plan of subdivision drawing is to comply with all City standards with regard to the above comments and the following:
 - Draft plan of subdivision is to include various existing features;
 - Topographical information (e.g. contours, elevations, vegetation areas, water courses, wells, utility corridors, and flood plain limits)
 - Legal info of this plan and adjoined lands (e.g. easements, lot and plan numbers, addresses, and adjacent streets)
 - Proposed road curvature and radii to comply with City standards
 - Tapers / transitions
 - Road widening's
 - Dimension all right of way's including window streets
 - Daylighting triangles where applicable
 - 0.3m reserves and road dedications as necessary
 - Drawing to scale
 - North arrow, etc.

REQUIREMENTS FOR A COMPLETE DRAFT PLAN OF SUBDIVISION SUBMISSION:

- For a complete Draft Plan of Subdivision Application, the Owner is to provide the following:
- The Final Proposal Report addressing all Development Services comments with respect to the IPR.
- Revised proposed Draft Plan of Subdivision drawing as per Development Services comments.
- The Owner shall provide to the City for review and acceptance a geotechnical report to address all geotechnical issues with respect to the development of this plan, including, but not limited to, the following:
 - Servicing, grading and drainage of this subdivision;
 - Road pavement structure;
 - Dewatering;
 - Foundation design;
 - Removal of existing fill (including but not limited to organic and deleterious materials);
 - The placement of new engineering fill;
 - Any necessary setbacks related to slope stability for lands within this plan;
 - Identifying all required mitigation measures including Low Impact Development (LIDs) solutions; and any other requirements as needed by the City, all to the satisfaction of the City.
- Provide an opinion letter certified by a Professional Engineer confirming if an EA is required.

These notes highlight the Development Services (Engineering) comments at the Internal Proposal Review Meeting based on the circulated plan accompanying the Initial Proposal Report, and are to be used to aid in preparing the minutes. The comments themselves are preliminary in nature and do not preclude the possibility that further issues may be identified as the review proceeds. Development Services formal comments on the draft plan of subdivision application will be provided when the application is circulated for review under the standard File Manager review process.

EXTERNAL COMMENTING AGENCIES

Ministry of Natural Resources and Forestry (MNR)

Karina Černiavskaja District Planner – Aylmer District
(No comments Rec'd)

UNION GAS LTD.

Justin Cook *Senior Pipeline Engineer*
(No comments Rec'd)

LONDON TRANSIT COMMISSION (L.T.C.)

Transportation Planning Technician
(No comments Rec'd)

THAMES VALLEY DISTRICT SCHOOL BOARD

Christie Kent *Planner*
(No comments Rec'd)

LONDON DISTRICT CATHOLIC SCHOOL BOARD

Rebecca McLean *Planning Specialist*
(No comments Rec'd)

LONDON-MIDDLESEX HEALTH UNIT

Bernadette McCall *Public Health Nurse*
(No comments Rec'd)

UPPER THAMES RIVER CONSERVATION AUTHORITY (U.T.R.C.A.)

Stefanie Pratt *Land Use Planner*
Comments received via email and attached below

REQUIREMENTS TO PROCEED WITH CURRENT APPLICATION

New City of London Complete Application Requirements for Planning Act Applications

All new applications submitted on or after January 22, 2018 will be required to meet the new requirements for the relevant application type. These applications must be submitted using the updated application forms dated January 2018 which will appear on the City's website in early January.

The new requirements are in addition to any technical submission requirements you are currently required to meet, and are as follows:

Draft Plan of Subdivision

A simplified draft plan of subdivision is required for the production of the on-site sign. The graphic must be sized to the dimensions of 46”(W) x 46”(H), provided in PDF and JPEG format at a DPI of 300.

The subdivision must be centred and scaled within the 46” bounding box to allow for maximum readability. The area outside of the draft plan of subdivision must be populated with Ontario Base Map data to provide context for the surrounding land. This additional contextual information should be displayed at a lighter transparency and contain information such as, but not limited to: streets, parcel fabric, building outlines, and watercourses. The images should be full bleed with no borders. The image must not be distorted or skewed in any way and is subject to cropping.

The simplified image of the proposed subdivision must include the following elements:

- Outline the extent of the subdivision boundary
- Road, lot, and block fabric and descriptions
- Proposed street name labels
- Proposed block numbers & area calculations
- Colour application to all lots and blocks per The London Plan colours (see Map I for relevant place types and colour standards)
- Light grey colour application to all street and walkway blocks
- Basic map elements: (north arrow, scale, etc.)

Official Plan and/or Zoning By-Law Amendment (applicable only where Renderings are required as part of a complete application)

Proposed Development best represented using a landscape image format Graphic renderings are required which represent the conceptual design of the proposal for the production of the on-site sign.

A minimum of 2 renderings must be provided, oriented in landscape format and sized to the dimensions of 48”(W) x 26”(H), provided in PDF and JPEG format at a DPI of 300.

These renderings should be an accurate visual representation of the proposal and highlight features of the conceptual design. The images should be full bleed with no borders. The image must not be distorted or skewed in any way and is subject to cropping.

OR

Proposed Development best represented using a portrait image format
Graphic renderings are required which represent the conceptual design of the proposal for the production of the on-site sign.

A minimum of 2 renderings must be provided, oriented in portrait format and sized to the dimensions of 14”(W) x 26”(H), provided in PDF and JPEG format at a DPI of 300.
AND

A minimum of 3 renderings must be provided, oriented in landscape format and sized to the dimensions of 34”(W) x 13”(H), provided in PDF and JPEG format at a DPI of 300.
The landscape images are typically, but not always, of the pedestrian level of a tall building.

These renderings should be an accurate visual representation of the proposal and highlight features of the conceptual design. The images should be full bleed with no borders. The image must not be distorted or skewed in any way and is subject to cropping.

The following documentation is required for a Complete Application Submission:

- **Draft Plan of Subdivision Application:**
 - 2 copies of the City of London Subdivision Application Form.
 - 24 rolled copies of the Draft Plan, completed as required under Section 51(17) of the Planning Act (the Draft Plan must include the Approval Authority signature block)
 - A digital file of the Draft Plan tied to the City’s geographic horizontal control network (NAD 1983 UTM Zone 17N) must be submitted as well (refer to the City’s Plans Submission Standards available on-line).
 - 1 legal sized copy of the Draft Plan.
 - Associated application fees
 - Updated as per comments from various groups detailed above i.e. **Transportation**, Parks, Development Engineering, etc.

Draft plan of Subdivision is to include various features listed on the Draft Plan of Subdivision Application Form
- **Official Plan and Zoning By-law Amendment Application:**
 - 2 copies of completed City of London Official Plan and Zoning By-law Amendment application form and supporting documentation
 - Hard copy and digital file of proposed zoning map
 - Associated application fees
- **Final Proposal Report (FPR):**
 - Updated to reflect the comments that have been identified in this Record of Consultation, in accordance with the requirements prescribed in the File Manager Reference Manual;
 - FPR is to include updated information on water, sanitary, stormwater, transportation and development finance components, parks and open space, natural heritage, urban design, heritage planning, and development planning and addressing all comments identified in the Record of Consultation (*Note: applicant/consultant should undertake off-line discussions with contacts prior to completing the FPR, to ensure all servicing requirements are suitably addressed*);
 - Final Proposal Report which fully addresses the policies of the Provincial Policy Statement, the Planning Act, the 1989 Official Plan, the London Plan and the Southwest Area Secondary Plan.
- **Reports/Studies and Plans Required:**
 - Road layout and concept plan showing all bends, tapers, 10m straight tangents between horizontal curves, and centre line radii complying with the DSRM will be required. (150m centre line radii required for Neighbourhood connectors)
 - Transportation Impact Assessment (TIA)
 - Confirmation the proponents have demonstrated a municipal sanitary outlet for the subject lands acceptable to City of London – Sewer Engineering Division
 - Water Servicing Report
 - Stormwater Management (SWM) Report
 - Hydrogeological Investigation Report (scoped with City of London and UTRCA staff)
 - Water Balance Analysis
 - Geotechnical Report

- Stage 1 – 2 Archaeological Assessment
- EA opinion letter
- Urban Design Brief
- Environmental Impact Study (EIS)

Prepared By:

Rob Carnegie *Proposal Review Meeting Coordinator, Development Planning*
(519) 661-CITY (2489) ext. 2787 RCarnegie@london.ca

Reviewed By:

Larry Mottram *Senior Planner, Development Planning*
(519) 661- CITY (2489) ext. 4866 LMottram@london.ca

Approved By:

Lou Pompilii *Manager, Development Planning*
(519) 661- CITY (2489) ext. 5488 LPompilii@london.ca

"Inspiring a Healthy Environment"

July 21, 2020

City of London - Development Services
P.O. Box 5035
London, Ontario N6A 4L9

Attention: Rob Carnegie (sent via e-mail)

Dear Mr. Carnegie:

Re: UTRCA Comments – Proposal Review Meeting July 15, 2020
Owner/Applicant: Royal Premier Homes c/o Farhad Noory
Agent: Zelinka Priamo Ltd. c/o Harry Frousios
735 Southdale Road West, London, ON

The Upper Thames River Conservation Authority (UTRCA) has reviewed the proposed draft plan and associated Initial Proposal Report with regard for the policies in the *Environmental Planning Policy Manual for the Upper Thames River Conservation Authority (June 2006)*. These policies include regulations made pursuant to Section 28 of the *Conservation Authorities Act*, and are consistent with the natural hazard and natural heritage policies contained in the *Provincial Policy Statement (2020, PPS)*. The *Upper Thames River Source Protection Area Assessment Report* has also been reviewed in order to confirm whether the subject lands are located in a vulnerable area. The Drinking Water Source Protection information is being disclosed to the Municipality to assist them in fulfilling their decision making responsibilities under the *Planning Act*.

PROPOSAL

The subject lands are a triangular lot, approximately 3.8 ha (9.4 ac) in size and currently contain an existing dwelling and shed; there is also an existing wetland/ponding area located at the eastern extent of these lands, along with other small pockets of wetlands.

The applicant is proposing to development a residential apartment complex consisting of four (4), nine (9) storey buildings containing a total of 500 units. Parking will be accommodated with at-grade centralized parking and two (2), three (3) storey above grade parking structures. The present design of the lands includes two (2) municipal road connections to Southdale Road West and tying into the Talbot Village subdivision to the south (Phase 7 and 8). These roads will act as separations for the phases of development, initiating in the west. The eastern-most portion of the lands will be a small open space block.

The subject lands are currently:

- Zoned “*Holding Residential h-h-2-h-30-h-53-h-75-R5-2/R6-4/R8-4*”;
- Designated “*Multi-Family Medium Density Residential*” in the Official Plan (1989); and,
- Within the “*Neighbourhoods*” Place Types in the London Plan (2016).

In addition, the subject lands are located within the Southwest Area Plan and North Talbot Residential Neighbourhood, identifying the property as medium density residential. It should also be noted that all policy documents identify the adjacent natural heritage features as open space or environmental review, which slightly encroach onto the subject lands.

The Initial Proposal Report, prepared by Zelinka Priamo Ltd. and dated June 2020, states that an Official Plan Amendment and a Zoning By-law Amendment application will be required and submitted at a later time.

CONSERVATION AUTHORITIES ACT

The UTRCA has the provincially delegated responsibility for the natural hazard policies of the PPS, as established under the “Provincial One Window Planning System for Natural Hazards” Memorandum of Understanding between Conservation Ontario, the Ministry of Natural Resources and Forestry (MNR) and the Ministry of Municipal Affairs and Housing. This means that the Conservation Authority represents the provincial interest in commenting on *Planning Act* applications with respect to natural hazards and ensures that the proposal is consistent with the PPS.

The UTRCA’s role in the development process is comprehensive and coordinates our planning and permitting interests. Through the plan review process, we ensure that development proposals meet the tests of the *Planning Act*, are consistent with the PPS, conform to municipal planning documents as well as the policies in the UTRCA’s Environmental Planning Policy Manual (2006). Permit applications must meet the requirements of Section 28 of the *Conservation Authorities Act* and our policies as set out in our Environmental Planning Policy Manual. This approach ensures that the principle of development is established through the *Planning Act* approval process and that subsequently, the necessary approvals can be issued under Section 28 of the *Conservation Authorities Act* once all of the planning matters have been addressed.

Section 28 Regulations - Ontario Regulation 157/06

The subject lands are regulated by the UTRCA in accordance with Ontario Regulation 157/06, made pursuant to Section 28 of the *Conservation Authorities Act*. The regulation limit is comprised of:

- Provincially Significant Wetland (PSW), known as the North Talbot Wetlands, and surrounding area of interference; and,
- Unevaluated wetlands and their surrounding areas of interference.

Please refer to the attached mapping for the location of the PSW. It should be noted that where a discrepancy in the mapping occurs, the text of the regulation prevails and a feature determined to be present on the landscape is regulated by the UTRCA. For this particular site, preliminary ecological studies have identified a small unevaluated wetland pocket to the west of the PSW, and an unevaluated wetland at the eastern-most extent of these lands.

The UTRCA has jurisdiction over lands within the regulated area and requires that landowners obtain written approval from the Authority prior to undertaking any site alteration or development within this area including filling, grading, construction, alteration to a watercourse and/or interference with a wetland.

UTRCA ENVIRONMENTAL PLANNING POLICY MANUAL (2006)

The UTRCA’s Environmental Planning Policy Manual is available online at:
<http://thamesriver.on.ca/planning-permits-maps/utrca-environmental-policy-manual/>

NATURAL HAZARDS

As indicated, the UTRCA represents the provincial interest in commenting on *Planning Act* applications with respect to natural hazards. The PPS directs new development to locate and avoid natural hazards. In Ontario, prevention is the preferred approach for managing hazards in order to reduce or minimize the risk to life and property. This is achieved through land use planning and the Conservation Authority’s regulations with respect to site alteration and development activities.

The UTRCA's natural hazard policies are consistent with the PPS and those which are applicable to the subject lands include:

3.2.2 General Natural Hazard Policies

These policies direct new development and site alteration away from hazard lands. No new hazards are to be created and existing hazards should not be aggravated. The Authority also does not support the fragmentation of hazard lands through lot creation which is consistent with the PPS.

3.2.6 Wetland Policies

New development and site alteration is not permitted in wetlands. Furthermore, new development and site alteration may only be permitted in the area of interference surrounding a wetland if it can be demonstrated through the preparation of an Environmental Impact Study (EIS) that there will be no impact on the hydrological function of the wetland feature and no potential hazard impact on the development.

The subject lands and adjacent lands contain a Provincially Significant Wetland and the surrounding area of interference, forming part of the North Talbot Wetlands. These lands also contain additional unevaluated wetlands and areas of interference. The UTRCA does not support development within Provincially Significant Wetlands or wetland hazards, and requires an appropriate buffer to be established through the completion of technical studies.

An EIS and Hydrogeological Investigation are required to establish the extent and ecological functions of the existing features which shall in turn guide an appropriately buffered area for development that can maintain these features and functions. These reports have already been scoped with UTRCA and City of London staff earlier this year. We continue to recommend that the applicant work with the adjacent landowner to obtain information on the connections to the adjacent features.

The proposed concept plan only identifies the PSW and a limited buffer. Additional information will be required as to how the development will interact with the PSW and other unevaluated wetlands. Should the relocation of these features be proposed to accommodate development, the overall site design shall result in a net environmental benefit. The technical reports shall speak to any relocation and compensation efforts to achieve the overall benefit. Proposals of this nature are subject to the requirements of the Section 28 permit process and approval from the UTRCA Hearings Committee.

NATURAL HERITAGE

The UTRCA provides technical advice on natural heritage to ensure an integrated approach for the protection of the natural environment consistent with the PPS. The linkages and functions of water resource systems consisting of groundwater and surface water features, hydrologic functions and the natural heritage system are necessary to maintain the ecological and hydrological integrity of the watershed. The PPS also recognizes the watershed as the ecologically meaningful scale for integrated and long-term planning which provides the foundation for considering the cumulative impacts of development.

The UTRCA's natural heritage policies are consistent with the PPS and those which are applicable to the subject lands include:

3.3.2 Wetland Policies

New development and site alteration is not permitted in wetlands. Furthermore, new development and site alteration may only be permitted in the adjacent lands of a wetland if it can be demonstrated through the preparation of an Environmental Impact Study (EIS) that there will be no negative impact on the feature or its ecological function.

DRINKING WATER SOURCE PROTECTION: Clean Water Act

The subject lands have been reviewed to determine whether or not they fall within a vulnerable area (Wellhead Protection Area, Highly Vulnerable Aquifer, and Significant Groundwater Recharge Areas). Upon review, we can advise that the subject lands **are not** within a vulnerable area. For policies, mapping and further information pertaining to drinking water source protection, please refer to the approved Source Protection Plan at: <https://www.sourcewaterprotection.on.ca/approved-source-protection-plan/>

COMMENTS AND REQUIREMENTS

As indicated, the subject lands and adjacent lands are regulated by the UTRCA. A summary of our comments/requirements are as follows:

1. The Initial Proposal Report (IPR) and proposed conceptual plan have identified the PSW and a limited buffer (in some cases 10 metres). Additional information will be required relating to how the development will interact with the PSW and other unevaluated wetlands. Should the relocation of these features be proposed to accommodate development, the overall site design shall result in a net environmental benefit. The technical reports shall speak to any relocation and compensation efforts to achieve the overall benefit. Proposals of this nature are subject to the requirements of the Section 28 permit process and approval from the UTRCA Hearings Committee.
2. The proposed conceptual plan identifies two (2) access points from Southdale Road West.
 - a) Through discussions at the Proposal Review Meeting (PRM), it was identified that compensation for the east unevaluated wetland would be a shared responsibility of the applicant and the City, due to proposed future road widening of Southdale Road West. Please coordinate and provide any additional information once available.
 - b) The PRM also included discussions regarding the west roadway requirements. It was identified that consideration will need to be given to the PSW prior to determining if, and where a potential access road will connect to the southern development.
3. Section 7.1 of the IPR states “*Any Conservation Authority interests will be addressed prior to final approval*”. Please ensure the UTRCA is involved throughout the entirety of the planning process to ensure the lands are appropriately reviewed and planned with UTRCA’s/Provincial interest considered. This will help ensure that approval is not granted through the *Planning Act* process that cannot be approved under Section 28 of the *Conservation Authorities Act*.
4. The UTRCA will require the preparation of a full EIS and Hydrogeological Assessment to be submitted alongside future applications for review. These documents have already been scoped with City of London and UTRCA staff. We continue to recommend that the applicant work with the adjacent landowner to obtain information on the connections to the adjacent features.
5. The IPR provides an overview the Stormwater Management (SWM) proposal. Once an appropriate development limit has been established from the natural hazard and natural heritage features on site, a detailed SWM report will be required to ensure the existing SWM facilities have sufficient capacity to accommodate this proposal. The implementation of Low Impact Development measures is strongly encouraged where feasible.
6. A water balance analysis will also be required to ensure flows to all wetlands features are maintained from pre to post development.

7. As this application is still in the pre-consultation stage, the UTRCA requirements are subject to change pending further consultation and revisions to the proposed development.

MUNICIPAL PLAN REVIEW FEES

Consistent with UTRCA Board of Directors approved policy, Authority Staff are authorized to collect fees for the review of *Planning Act* applications. Upon submission of formal applications, the applicant may be invoiced as follows:

- Pre-Consultation: No Fee
- Draft Plan of Subdivision: \$150.00 per lot, to a maximum of \$10,000
- Official Plan Amendment Application: \$750.00
- Zoning By-law Amendment Application: \$750.00
- Site Plan Consultation: No Fee
- Site Plan Application: \$500.00
- Technical Review of EIS: \$1,075.00
- Technical Review of Hydrogeological Investigation: \$1,075.00
- Technical Review of Stormwater Management Report: \$1,075.00
- Section 28 Permit Fee: To be determined upon future submission

Please note these fees are subject to change dependent upon the timing of the submission(s).

Thank you for the opportunity to provide comments on the Initial Proposal Report and attend the Proposal Review Meeting. Please circulate a copy of the meeting minutes to our office.

If you have any questions, please contact the undersigned at extension 430.

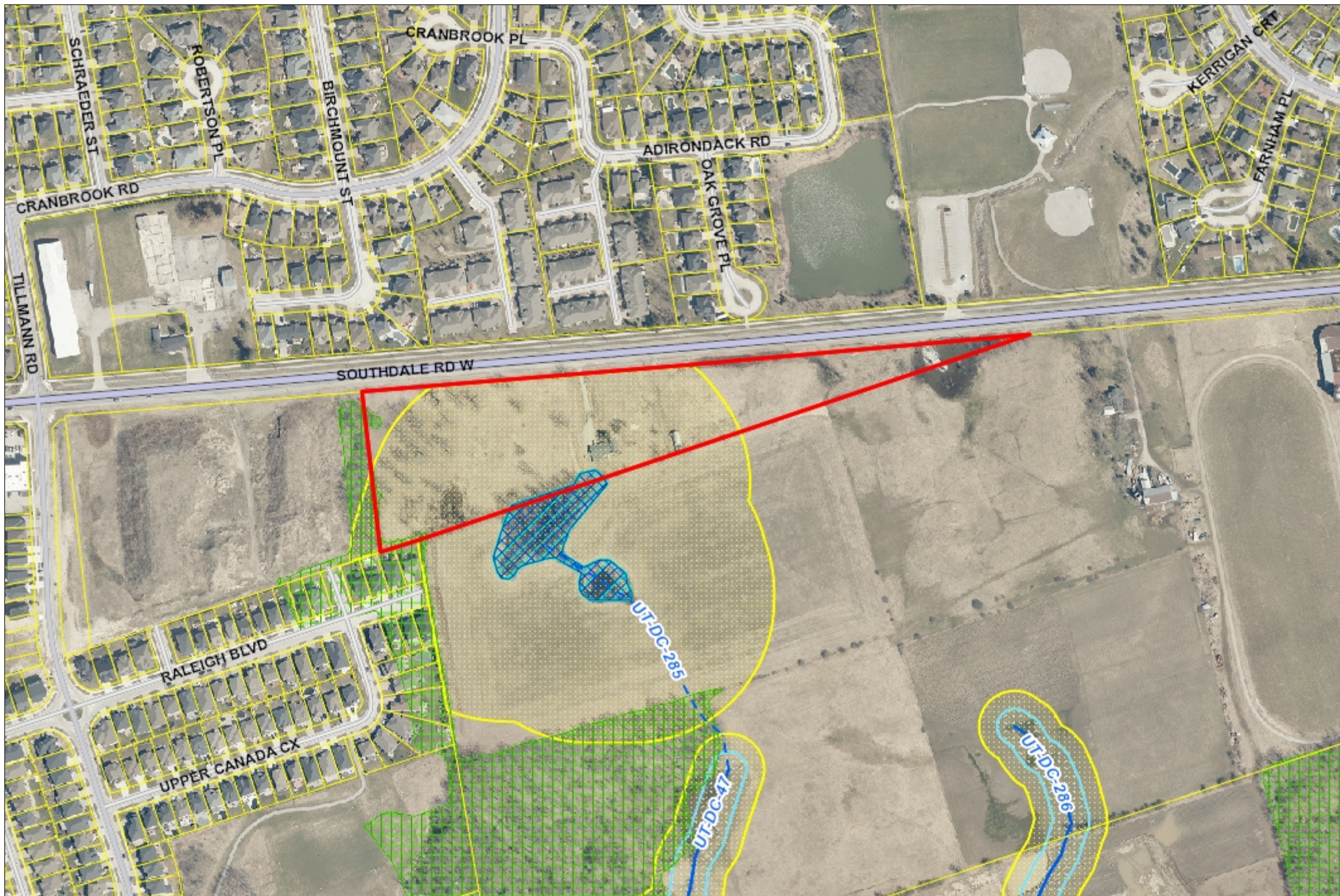
Yours truly,
UPPER THAMES RIVER CONSERVATION AUTHORITY



Stefanie Pratt
Land Use Planner

Enclosure: UTRCA Regulation Limit Mapping (please print on legal size paper for accurate scales)

c.c.: Harry Frousios, Zelinka Priamo Ltd.
Farhad Noorry, Royal Premier Homes
Larry Mottram, City of London Development Services (Subdivisions) Senior Planner
Lou Pompilii, City of London Development Services (Subdivisions) Manager
James MacKay, City of London Development Services (Subdivisions) Ecologist
Brent Verscheure, UTRCA Land Use Regulations Officer



Regulation Limit

Regulation under s.28 of the *Conservation Authorities Act*
 Development, interference with wetlands, and alterations to shorelines and watercourses. O.Reg 157/06, 97/04.

Legend

- Assessment Parcel (MPAC)
- Watercourse (UTRCA, 2015)
 - Open
 - Tiled
- Middlesex NHSS Woodland (2014)
 - Candidate for Ecologically Important
 - Ecologically Important
 - Significant Ecologically Important
- Wetlands (MNRF)
 - Evaluated-Provincial
 - Evaluated-Other
 - Not Evaluated
- Wetland Hazard
- Flooding Hazard
- Erosion Hazard (Detail)
- Regulation Limit 2018

The Regulation Limit depicted on this map schedule is a representation of O.Reg 157/06 under O.Reg 97/04.

The Regulation Limit is a conservative estimation of the hazard lands within the UTRCA watershed. In the case of discrepancies between the mapping and the actual features on a property, the text of Ontario Regulation 157/06 prevails and the jurisdiction of the UTRCA may extend beyond areas shown on the maps.

The UTRCA disclaims explicitly any warranty, representation or guarantee as to the content, sequence, accuracy, timeliness, fitness for a particular purpose, merchantability or completeness of any of the data depicted and provided herein.

The UTRCA assumes no liability for any errors, omissions or inaccuracies in the information provided herein and further assumes no liability for any decisions made or actions taken or not taken by any person in reliance upon the information and data furnished hereunder.

This map is not a substitute for professional advice. Please contact UTRCA staff for any changes, updates and amendments to the information provided.

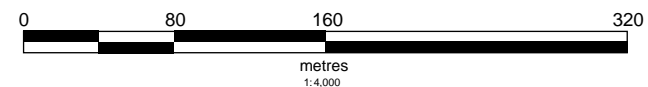
This document is not a Plan of Survey.

Sources: Base data, 2015 Aerial Photography used under licence with the Ontario Ministry of Natural Resources Copyright © Queen's Printer for Ontario; City of London.

Notes:
735 Southdale Road West, London

Created By: SP July 20, 2020

* Please note: Any reference to scale on this map is only appropriate when it is printed landscape on legal-sized (8.5" x 14") paper.



Laura McLennan

From: Tara Tchir <TchirT@thamesriver.on.ca>
Sent: Monday, May 11, 2020 2:53 PM
To: James MacKay; Laura McLennan; s.levin s.levin; Stefanie Pratt; Brent Verscheure
Cc: Linda Nicks; Tara Tchir
Subject: 735 Southdale Road
Attachments: 735 Southdale Road_Scoping Document_draft.pdf

I am good with the checklist, provided that they realize that a scoped hydrogeological study will need to be done using UTRCA checklist. It is mentioned in your checklist, I just want to make sure it is emphasized and I have cc'd Linda on this email. They also need to make sure all flora and fauna are identified per ELC community and that SWH is evaluated. Also, at this point I am not 100% UTRCA can support wetland compensation / relocation (until some additional biological info is put forward about the quality / history of wetland features in NE corner).

Tara Tchir
Ecologist
1424 Clarke Road London, Ontario, N5V 5B9
519.451.2800 Ext. 261
tchirt@thamesriver.on.ca | www.thamesriver.on.ca

>>> "MacKay, James" <jmackay@london.ca> 5/10/2020 12:42 PM >>>
Hi All, please see the attached scope for 735 Southdale Road. There are issues with the electronic version of this document that required me to come into the office and make written additions. Please provide your feedback/ comments on the document that I might have missed and I will make the updates and provide a final document for the completed report.

Regards,



James MacKay, M.Sc.

Ecologist Planner
ISA Certified Arborist
City of London
Development Services

T: (519) 661-CITY (2489) ext. 4865 | F: (519) 963-1483 | E: jmackay@london.ca

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Appendix B

MNRF Information Request

Allie Leadbetter

From: ESA-Aylmer (MNRF) <ESA.Aylmer@ontario.ca>
Sent: Friday, February 1, 2019 3:57 PM
To: Erin Boynton
Cc: Dave Hayman
Subject: RE: Stage 1: Emara Southdale Road

Hello,

The Ministry of Natural Resources and Forestry (MNRF) understands that Biologic is conducting an information request for the proposed Hany Emara project located at 735 Southdale Road West in the City of London identified in the information provided.

MNRF provides the following natural heritage information in response to your request.

Species at Risk (SAR)

The Species at Risk in Ontario (SARO) List (<https://www.ontario.ca/laws/regulation/080230>) is Ontario Regulation 230/08 issued under the Endangered Species Act, 2007 (ESA). The ESA came into force on June 30, 2008, and provides both species protection (under section 9) and habitat protection (under section 10) to species listed as endangered or threatened on the SARO List.

An initial Species at Risk (SAR) (Endangered and Threatened species) screening has been completed for the above-noted property.

There are no known occurrences of SAR on the subject property; However there are known occurrences of SAR in the general project area, including:

- Barn Swallow
- Butternut

Please note that this is an initial screening for SAR and the absence of an element occurrence does not indicate the absence of species. The province has not been surveyed comprehensively for the presence or absence of SAR and MNRF data relies on observers to report sightings of SAR. Field assessments by a qualified professional may be necessary if there is a high likelihood for SAR species and/or habitat to occur within the project footprint and potentially be impacted.

It is important to note the following:

- The Committee on the Status of Species at Risk in Ontario (COSSARO) meets regularly to evaluate new species for listing and/or re-evaluate species already on the SARO List.
- As a result, species designations may change and changes may occur in both species and habitat protection which could affect the level of protection they receive under the ESA 2007 and whether proposed projects may have adverse effects on SAR.
- Habitat protection provisions for a species may change if a species-specific habitat regulation comes into effect.

If an activity or project will result in adverse effects to endangered or threatened species and/or their habitat, additional action would need to be taken in order to remain in compliance with the ESA. Additional action could be applying for an authorization under section 17(2)(c) of the ESA, or completing an online registry for an ESA regulation and following the rules in regulation if the project is eligible (<http://www.ontario.ca/environment-and-energy/natural-resources-approvals>).

Questions about the registry process should be directed to MNRF's Registry and Approval Services Centre at 1-855-613-4256 or at mnr.rasc@ontario.ca. Please be advised that applying for an authorization does not guarantee approval and the process can take several months.

Significant Wildlife Habitat (SWH)

Significant wildlife habitat (SWH) may be present on or adjacent to the above-noted subject lands (within 120 m). Please consult the Significant Wildlife Habitat Technical Guide (SWHTG, OMNR 2000), the Natural Heritage Reference Manual (NHRM) and the Ecoregion Criteria Schedules for criteria on identifying and determining significance of wildlife habitat. SWH is identified by planning authorities using the criteria and processes recommended in the SWHTG and Ecoregion Criteria Schedules.

Link to the SWHTG: <https://www.ontario.ca/environment-and-energy/guide-significant-wildlife-habitat>

Link to Ecoregion 7E criteria schedule:

http://publicdocs.mnr.gov.on.ca/View.asp?Document_ID=21843&Attachment_ID=45645

MNRF completed a screening for S1-S3, SH and special concern species and the following have known occurrences in the general project area:

- Snapping Turtle (SC, S3)

The habitat of provincially rare (S1-S3, SH) and Special Concern species is considered SWH under the category of 'Special Concern and Rare Wildlife Species' in the SWHTG Ecoregion Criteria Schedules. Therefore, consideration should be given to these species and whether their habitat occurs on or within 120 m of the subject lands.

Areas of Natural and Scientific Interest (ANSIs)

There are no Provincially or Regionally Significant Earth or Life Science ANSI's within or 120m adjacent to the proposed subject lands.

Significant Woodlands

We recommend you refer to applicable Official Plans for criteria to determine the significance of woodlands near the project locations. The NHRM also contains information and criteria for determining significant woodlands.

Significant Wetlands

As you are aware, a portion of the Provincially Significant North Talbot Wetland exists along the southern boundary of the property. Site-specific investigation within the study area may find additional wetlands within such ELC communities that have not yet been evaluated or designated.

Consideration and delineation of wetland areas should be determined using criteria and methodology as outlined in the Ontario Wetland Evaluation System (OWES) and submitted to MNRF for review.

Significant Valleylands

MNRF does not possess significant valleylands mapping. The NHRM provides guidance and evaluation criteria for determining significant valleylands. Conservation authorities should be contacted to inquire about information pertaining to significant valleylands if they have not been identified in the applicable Official Plan.

Fish and Fish Habitat

There are no watercourses on or adjacent the project area.

Natural Heritage Systems

Policy 2.1.2 of the PPS states that the diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems (NHS), should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.

Applicable natural heritage studies (e.g. in an EIS) should identify and recognize natural heritage systems and the linkages between and among natural heritage features and areas associated with the proposed development and site alteration. Based on the local NHS/linkages identified, or those specifically identified in an Official Plan, an EIS should outline potential impacts to the NHS and consider ways of maintaining, restoring, and/or improving linkages between and among natural heritage features and areas.

Conservation Authorities and Official Plans may provide additional natural heritage information for this study.

Please be advised that it is your responsibility to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws or other agency approvals.

If you have any questions or require additional information, please feel free to contact me.

Thanks,

Jason Webb

Management Biologist
Ministry of Natural Resources and Forestry
Aylmer District
(519) 773-4744
Jason.webb@ontario.ca

From: Erin Boynton [mailto:eboynton@biologic.ca]
Sent: December-18-18 10:49 AM
To: ESA-Aylmer (MNRF) <ESA.Aylmer@ontario.ca>
Cc: Dave Hayman <dhayman@biologic.ca>
Subject: Stage 1: Emara Southdale Road

To Whom It May Concern:

Please find attached a Stage 1 Information Request for the proposed building of medium density housing units at Part Lot 78, Concession ETR, Middlesex County, London ON.

A confirmation of receipt would be appreciated to confirm that the document is in the queue for review.

The attached documents are submitted as part of our discussions with MNRF with respect to the Endangered Species Act. Until a final decision has been rendered with respect to this application, it is our expectation these documents will be treated as Personal and Confidential. Thank you for your time.

Erin Boynton

BioLogic

201-110 Riverside Dr.

London, ON N6H 4S5

P-519-434-1516 xt 103

F-519-434-0575

E- eboynton@biologic.ca

Appendix C

Ecological Land Classification Information

-200

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: 92128 - Southdale	POLYGON: 1	
	SURVEYOR(S): WH	DATE: 04/17/2018	TIME: start finish
	UTMZ: 17	UTME:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
<input checked="" type="checkbox"/> TERRESTRIAL <input type="checkbox"/> WETLAND <input type="checkbox"/> AQUATIC	<input type="checkbox"/> ORGANIC <input checked="" type="checkbox"/> MINERAL SOIL <input type="checkbox"/> PARENT MIN. <input type="checkbox"/> ACIDIC BEDRK. <input type="checkbox"/> BASIC BEDRK. <input type="checkbox"/> CARB. BEDRK.	<input type="checkbox"/> LACUSTRINE <input type="checkbox"/> RIVERINE <input type="checkbox"/> BOTTOMLAND <input type="checkbox"/> TERRACE <input type="checkbox"/> VALLEY SLOPE <input checked="" type="checkbox"/> TABLELAND <input type="checkbox"/> ROLL UPLAND <input type="checkbox"/> CLIFF <input type="checkbox"/> TALUS <input type="checkbox"/> CREVICE / CAVE <input type="checkbox"/> ALVAR <input type="checkbox"/> ROCKLAND <input type="checkbox"/> BEACH / BAR <input type="checkbox"/> SAND DUNE <input type="checkbox"/> BLUFF	<input type="checkbox"/> NATURAL <input checked="" type="checkbox"/> CULTURAL	<input type="checkbox"/> PLANKTON <input type="checkbox"/> SUBMERGED <input type="checkbox"/> FLOATING-LVD. <input checked="" type="checkbox"/> GRAMINOID <input type="checkbox"/> FORB <input type="checkbox"/> LICHEN <input type="checkbox"/> BRYOPHYTE <input type="checkbox"/> DECIDUOUS <input type="checkbox"/> CONIFEROUS <input type="checkbox"/> MIXED	<input type="checkbox"/> LAKE <input type="checkbox"/> POND <input type="checkbox"/> RIVER <input type="checkbox"/> STREAM <input type="checkbox"/> MARSH <input type="checkbox"/> SWAMP <input type="checkbox"/> FEN <input type="checkbox"/> BOG <input type="checkbox"/> BARREN <input checked="" type="checkbox"/> MEADOW <input type="checkbox"/> PRAIRIE <input type="checkbox"/> THICKET <input type="checkbox"/> SAVANNAH <input type="checkbox"/> WOODLAND <input type="checkbox"/> FOREST <input type="checkbox"/> PLANTATION
SITE		COVER			
<input type="checkbox"/> OPEN WATER <input type="checkbox"/> SHALLOW WATER <input type="checkbox"/> SURFICIAL DEP. <input type="checkbox"/> BEDROCK		<input checked="" type="checkbox"/> OPEN <input type="checkbox"/> SHRUB <input type="checkbox"/> TREED			

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1 CANOPY	2	2	JUGnigr >> CARovat = POPdeH
2 SUB-CANOPY			
3 UNDERSTOREY	3	2	SALalba
4 GRD. LAYER	6	4	CIRarve = BRDiner = F25sp > SOLcanal

HT CODES: 1=>25 m 2=10<HT 25 m 3=2<HT 10 m 4=1<HT 2 m 5=0.5<HT 1 m 6=0.2<HT 0.5 m 7=HT<0.2 m

CVR CODES 0= NONE 1=0% < CVR 10% 2=10 < CVR 25% 3=25 < CVR 60% 4= CVR > 60%

STAND COMPOSITION:	BA:
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SIZE CLASS ANALYSIS:	< 10	10 - 24	25 - 50	> 50
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STANDING SNAGS:	< 10	10 - 24	25 - 50	> 50
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DEADFALL / LOGS:	< 10	10 - 24	25 - 50	> 50
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ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE:	<input checked="" type="checkbox"/> PIONEER	<input type="checkbox"/> YOUNG	<input type="checkbox"/> MID-AGE	<input type="checkbox"/> MATURE	<input type="checkbox"/> OLD GROWTH
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SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G =
MOISTURE:	DEPTH OF ORGANICS:	(cm)	
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:	(cm)	

COMMUNITY CLASSIFICATION:

ELC CODE

COMMUNITY CLASS:	CULTURAL	Cu
COMMUNITY SERIES:	MEADOW	CUM
ECOSITE:	MINERAL	CUM1
VEGETATION TYPE:		
INCLUSION	Mineral Meadow Marsh	MAN2
COMPLEX		

Notes:

ELC MANAGEMENT / DISTURBANCE	SITE: Southdale-42128-200
	POLYGON: 1
	DATE:
	SURVEYOR(S):

DISTURBANCE EXTENT	0	1	2	3	SCORE †
TIME SINCE LOGGING	> 30 YRS	15 - 30 YRS	5 - 15 YRS	0 - 5 YEARS	
INTENSITY OF LOGGING	NONE	FUEL WOOD	SELECTIVE	DIAMETER LIMIT	
EXTENT OF LOGGING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
SUGAR BUSH OPERATIONS	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF OPERATIONS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
GAPS IN FOREST CANOPY	NONE	SMALL	INTERMEDIATE	LARGE	
EXTENT OF GAPS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
LIVESTOCK (GRAZING)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF LIVESTOCK	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ALIEN SPECIES	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF ALIEN SPECIES	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
PLANTING (PLANTATION)	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF PLANTING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
TRACKS AND TRAILS	NONE	FAINT TRAILS	WELL MARKED	TRACKS OR	
EXTENT OF TRACKS/TRAILS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DUMPING (RUBBISH)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DUMPING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
EARTH DISPLACEMENT	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISPLACEMENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
RECREATIONAL USE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF RECR. USE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
NOISE	NONE	SLIGHT	MODERATE	INTENSE	
EXTENT OF NOISE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DISEASE/DEATH OF TREES	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISEASE / DEATH	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
WIND THROW (BLOW DOWN)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF WIND THROW	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BROWSE (e.g. DEER)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BROWSE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BEAVER ACTIVITY	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BEAVER	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FLOODING (pools & puddling)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FLOODING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FIRE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FIRE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ICE DAMAGE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF ICE DAMAGE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
OTHER	NONE	LIGHT	MODERATE	HEAVY	
EXTENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	

† INTENSITY x EXTENT = SCORE

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: <i>Shady 42128-200</i>	POLYGON: <i>2</i>	
	SURVEYOR(S): <i>WH</i>	DATE: <i>OCT 17, 2018</i>	TIME: start finish
	UTMZ: <i>19</i>	UTME:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
<input checked="" type="checkbox"/> TERRESTRIAL <input type="checkbox"/> WETLAND <input type="checkbox"/> AQUATIC	<input type="checkbox"/> ORGANIC <input checked="" type="checkbox"/> MINERAL SOIL <input type="checkbox"/> PARENT MIN. <input type="checkbox"/> ACIDIC BEDRK. <input type="checkbox"/> BASIC BEDRK. <input type="checkbox"/> CARB. BEDRK.	<input type="checkbox"/> LACUSTRINE <input type="checkbox"/> RIVERINE <input type="checkbox"/> BOTTOMLAND <input type="checkbox"/> TERRACE <input type="checkbox"/> VALLEY SLOPE <input checked="" type="checkbox"/> TABLELAND <input type="checkbox"/> ROLL. UPLAND <input type="checkbox"/> CLIFF <input type="checkbox"/> TALUS <input type="checkbox"/> CREVICE / CAVE <input type="checkbox"/> ALVAR <input type="checkbox"/> ROCKLAND <input type="checkbox"/> BEACH / BAR <input type="checkbox"/> SAND DUNE <input type="checkbox"/> BLUFF	<input type="checkbox"/> NATURAL <input checked="" type="checkbox"/> CULTURAL	<input type="checkbox"/> PLANKTON <input type="checkbox"/> SUBMERGED <input type="checkbox"/> FLOATING-LVD. <input checked="" type="checkbox"/> GRAMINOID <input type="checkbox"/> FORB <input type="checkbox"/> LICHEN <input type="checkbox"/> BRYOPHYTE <input type="checkbox"/> DECIDUOUS <input type="checkbox"/> CONIFEROUS <input type="checkbox"/> MIXED	<input type="checkbox"/> LAKE <input type="checkbox"/> POND <input type="checkbox"/> RIVER <input type="checkbox"/> STREAM <input type="checkbox"/> MARSH <input type="checkbox"/> SWAMP <input type="checkbox"/> FEN <input type="checkbox"/> BOG <input type="checkbox"/> BARREN <input checked="" type="checkbox"/> MEADOW <input type="checkbox"/> PRAIRIE <input type="checkbox"/> THICKET <input type="checkbox"/> SAVANNAH <input type="checkbox"/> WOODLAND <input type="checkbox"/> FOREST <input type="checkbox"/> PLANTATION
SITE			COVER		
<input type="checkbox"/> OPEN WATER <input type="checkbox"/> SHALLOW WATER <input checked="" type="checkbox"/> SURFICIAL DEP. <input type="checkbox"/> BEDROCK			<input checked="" type="checkbox"/> OPEN <input type="checkbox"/> SHRUB <input type="checkbox"/> TREED		

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1 CANOPY			
2 SUB-CANOPY			
3 UNDERSTOREY			
4 GRD. LAYER	<i>5</i>	<i>4</i>	<i>BPOwixer > SLYrepe > SOLcann = LATlati</i>

HT CODES: 1 =>25m 2 = 10<HT 25m 3 = 2<HT 10m 4 = 1<HT 2m 5 = 0.5<HT 1m 6 = 0.2<HT 0.5m 7 = HT<0.2m
CVR CODES 0 = NONE 1 = 0% < CVR 10% 2 = 10 < CVR 25% 3 = 25 < CVR 60% 4 = CVR > 60%

STAND COMPOSITION: BA:

SIZE CLASS ANALYSIS:	< 10	10 - 24	25 - 50	> 50
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STANDING SNAGS:	< 10	10 - 24	25 - 50	> 50
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DEADFALL / LOGS:	< 10	10 - 24	25 - 50	> 50
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ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE:	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH
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SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G =
MOISTURE:	DEPTH OF ORGANICS:	(cm)	
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK:	(cm)	

COMMUNITY CLASSIFICATION:

COMMUNITY CLASS:	ELC CODE
<i>CULTURAL</i>	<i>CU</i>
<i>MEADOW</i>	<i>CHM</i>
<i>MINERAL</i>	<i>CHM1</i>
<i>DRY/MOIST OLD FIELD MEADOW TYPE</i>	<i>CHM1-1</i>
INCLUSION	
COMPLEX	

Notes:

ELC MANAGEMENT / DISTURBANCE	SITE: <i>Shady 42128-200</i>				
	POLYGON: <i>2</i>				
	DATE:				
	SURVEYOR(S): <i>WH</i>				
DISTURBANCE EXTENT	0	1	2	3	SCORE †
TIME SINCE LOGGING	> 30 YRS	15 - 30 YRS	5 - 15 YRS	0 - 5 YEARS	
INTENSITY OF LOGGING	NONE	FUEL WOOD	SELECTIVE	DIAMETER LIMIT	
EXTENT OF LOGGING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
SUGAR BUSH OPERATIONS	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF OPERATIONS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
GAPS IN FOREST CANOPY	NONE	SMALL	INTERMEDIATE	LARGE	
EXTENT OF GAPS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
LIVESTOCK (GRAZING)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF LIVESTOCK	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ALIEN SPECIES	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF ALIEN SPECIES	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
PLANTING (PLANTATION)	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF PLANTING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
TRACKS AND TRAILS	NONE	FAINT TRAILS	WELL MARKED	TRACKS OR	
EXTENT OF TRACKS/TRAILS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DUMPING (RUBBISH)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DUMPING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
EARTH DISPLACEMENT	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISPLACEMENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
RECREATIONAL USE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF RECR. USE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
NOISE	NONE	SLIGHT	MODERATE	INTENSE	
EXTENT OF NOISE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DISEASE/DEATH OF TREES	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISEASE / DEATH	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
WIND THROW (BLOW DOWN)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF WIND THROW	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BROWSE (e.g. DEER)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BROWSE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BEAVER ACTIVITY	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BEAVER	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FLOODING (pools & puddling)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FLOODING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FIRE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FIRE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ICE DAMAGE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF ICE DAMAGE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
OTHER	NONE	LIGHT	MODERATE	HEAVY	
EXTENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	

† INTENSITY x EXTENT = SCORE

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: <u>Sumner 42128200</u>	POLYGON: <u>3</u>	
	SURVEYOR(S): <u>WH</u>	DATE:	TIME: start finish
	UTMZ:	UTME:	UTMN:

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
<input type="checkbox"/> TERRESTRIAL <input type="checkbox"/> WETLAND <input checked="" type="checkbox"/> AQUATIC	<input type="checkbox"/> ORGANIC <input type="checkbox"/> MINERAL SOIL <input type="checkbox"/> PARENT MIN. <input type="checkbox"/> ACIDIC BEDRK. <input type="checkbox"/> BASIC BEDRK. <input type="checkbox"/> CARB. BEDRK.	<input checked="" type="checkbox"/> LACUSTRINE <input type="checkbox"/> RIVERINE <input type="checkbox"/> BOTTOMLAND <input type="checkbox"/> TERRACE <input type="checkbox"/> VALLEY SLOPE <input checked="" type="checkbox"/> TABLELAND <input type="checkbox"/> ROLL UPLAND <input type="checkbox"/> CLIFF <input type="checkbox"/> TALUS <input type="checkbox"/> CREVICE / CAVE <input type="checkbox"/> ALVAR <input type="checkbox"/> ROCKLAND <input type="checkbox"/> BEACH / BAR <input type="checkbox"/> SAND DUNE <input type="checkbox"/> BLUFF	<input type="checkbox"/> NATURAL <input type="checkbox"/> CULTURAL	<input type="checkbox"/> PLANKTON <input checked="" type="checkbox"/> SUBMERGED <input type="checkbox"/> FLOATING-LVD. <input type="checkbox"/> GRAMINOID <input type="checkbox"/> FORB <input type="checkbox"/> LICHEN <input type="checkbox"/> BRYOPHYTE <input type="checkbox"/> DECIDUOUS <input type="checkbox"/> CONIFEROUS <input type="checkbox"/> MIXED	<input type="checkbox"/> LAKE <input type="checkbox"/> POND <input type="checkbox"/> RIVER <input type="checkbox"/> STREAM <input type="checkbox"/> MARSH <input type="checkbox"/> SWAMP <input type="checkbox"/> FEN <input type="checkbox"/> BOG <input type="checkbox"/> BARREN <input type="checkbox"/> MEADOW <input type="checkbox"/> PRAIRIE <input type="checkbox"/> THICKET <input type="checkbox"/> SAVANNAH <input type="checkbox"/> WOODLAND <input type="checkbox"/> FOREST <input type="checkbox"/> PLANTATION
SITE		COVER			
<input type="checkbox"/> OPEN WATER <input checked="" type="checkbox"/> SHALLOW WATER <input type="checkbox"/> SURFICIAL DEP. <input type="checkbox"/> BEDROCK		<input checked="" type="checkbox"/> OPEN <input type="checkbox"/> SHRUB <input type="checkbox"/> TREED			

STAND DESCRIPTION:

LAYER	HT	CVR	SPECIES IN ORDER OF DECREASING DOMINANCE (up to 4 sp) (>> MUCH GREATER THAN; > GREATER THAN; = ABOUT EQUAL TO)
1 CANOPY	3	1	SALALB
2 SUB-CANOPY			
3 UNDERSTOREY			
4 GRD. LAYER	6	1	AGRstol = BIDFron

HT CODES: 1 = >25 m 2 = 10<HT 25 m 3 = 2<HT 10 m 4 = 1<HT 2 m 5 = 0.5<HT 1 m 6 = 0.2<HT 0.5 m 7 = HT<0.2 m
 CVR CODES 0 = NONE 1 = 0% < CVR 10% 2 = 10 < CVR 25% 3 = 25 < CVR 60% 4 = CVR > 60%

STAND COMPOSITION:	BA:
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SIZE CLASS ANALYSIS:	< 10	10 - 24	25 - 50	> 50
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STANDING SNAGS:	< 10	10 - 24	25 - 50	> 50
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DEADFALL / LOGS:	< 10	10 - 24	25 - 50	> 50
------------------	------	---------	---------	------

ABUNDANCE CODES: N = NONE R = RARE O = OCCASIONAL A = ABUNDANT

COMM. AGE :	PIONEER	YOUNG	MID-AGE	MATURE	OLD GROWTH
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SOIL ANALYSIS:

TEXTURE:	DEPTH TO MOTTLES / GLEY	g =	G =
MOISTURE:	DEPTH OF ORGANICS: (cm)		
HOMOGENEOUS / VARIABLE	DEPTH TO BEDROCK: (cm)		

COMMUNITY CLASSIFICATION:

ELC CODE

COMMUNITY CLASS:	SHALLOW WATER	SA
COMMUNITY SERIES:	SUBMERGED	SAS
ECOSITE:	SUBMERGED SHALLOW WATER AQUA	SASI
VEGETATION TYPE:		
INCLUSION		
COMPLEX		

Notes:

ELC MANAGEMENT / DISTURBANCE	SITE: <u>Sumner 42128</u>
	POLYGON: <u>3</u>
	DATE:
	SURVEYOR(S):

DISTURBANCE EXTENT	0	1	2	3	SCORE †
TIME SINCE LOGGING	> 30 YRS	15 - 30 YRS	5 - 15 YRS	0 - 5 YEARS	
INTENSITY OF LOGGING	NONE	FUEL WOOD	SELECTIVE	DIAMETER LIMIT	
EXTENT OF LOGGING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
SUGAR BUSH OPERATIONS	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF OPERATIONS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
GAPS IN FOREST CANOPY	NONE	SMALL	INTERMEDIATE	LARGE	
EXTENT OF GAPS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
LIVESTOCK (GRAZING)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF LIVESTOCK	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ALIEN SPECIES	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF ALIEN SPECIES	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
PLANTING (PLANTATION)	NONE	OCCASIONAL	ABUNDANT	DOMINANT	
EXTENT OF PLANTING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
TRACKS AND TRAILS	NONE	FAINT TRAILS	WELL MARKED	TRACKS OR	
EXTENT OF TRACKS/TRAILS	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DUMPING (RUBBISH)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DUMPING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
EARTH DISPLACEMENT	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISPLACEMENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
RECREATIONAL USE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF RECR. USE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
NOISE	NONE	SLIGHT	MODERATE	INTENSE	
EXTENT OF NOISE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
DISEASE/DEATH OF TREES	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF DISEASE / DEATH	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
WIND THROW (BLOW DOWN)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF WIND THROW	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BROWSE (e.g. DEER)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BROWSE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
BEAVER ACTIVITY	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF BEAVER	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FLOODING (pools & puddling)	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FLOODING	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
FIRE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF FIRE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
ICE DAMAGE	NONE	LIGHT	MODERATE	HEAVY	
EXTENT OF ICE DAMAGE	NONE	LOCAL	WIDESPREAD	EXTENSIVE	
OTHER	NONE	LIGHT	MODERATE	HEAVY	
EXTENT	NONE	LOCAL	WIDESPREAD	EXTENSIVE	

† INTENSITY x EXTENT = SCORE

Appendix D

Floral Inventory Data

Floral Inventory (2018-10-17, 2019-05-13, 2019-06-04, 2019-06-19, 2019-08-01)													
1	1a	2	3	Scientific Name	Common Name	CW	GRank	COSEWIC	Nrank	SARO	SRank	MD	Invasive
	X			<i>Acer saccharinum</i>	Silver Maple	-3.0	G5		N5		S5	C	
X				<i>Acer saccharum</i>	Sugar Maple	3.0	G5		N5		S5	C	
		X		<i>Achillea millefolium</i>	Common Yarrow	3.0	G5		N5		SE		
X	X	X		<i>Agrimonia gryposepala</i>	Hooked Agrimony	3.0	G5		N5		S5	C	
		X		<i>Agrostis gigantea</i>	Redtop	-3.0	G4G5		NNA		SE5	IC	Y
	X	X	X	<i>Agrostis stolonifera</i>	Creeping Bentgrass	-3.0	G5		N5		SE5	IC	
X	X			<i>Ambrosia artemisiifolia</i>	Common Ragweed	3.0	G5		N5		S5	C	
		X		<i>Anthoxanthum odoratum</i>	Sweet Vernalgrass	3.0	GNR		NNA		SE4	IR	
X	X			<i>Apocynum cannabinum</i>	Hemp Dogbane	0.0	G5		N5		S5		
	X			<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	-3.0	G5		N5		S5	C	
	X	X	X	<i>Asclepias incarnata</i>	Swamp Milkweed	-5.0	G5		N5		S5	C	
X	X	X	X	<i>Asclepias syriaca</i>	Common Milkweed	5.0	G5		N5		S5	C	
X	X	X	X	<i>Barbarea vulgaris</i>	Bitter Wintercress	0.0	GNR		NNA		SE5	IC	
	X	X		<i>Bidens frondosa</i>	Devil's Beggarticks	-3.0	G5		N5		S5	X	
	X			<i>Boehmeria cylindrica</i>	False Nettle	-5.0	G5		N5		S5	X	
X				<i>Brassica nigra</i>	Black Mustard	5.0	GNR		NNA		SE5	IX	
X		X	X	<i>Bromus inermis</i>	Smooth Brome	5.0	G5		NNA		SE5	IC	Y
X				<i>Cardamine diphylla</i>	Two-leaved Toothwort	3.0	G5		N5		S5	X	
X	X	X		<i>Carex blanda</i>	Woodland Sedge	0.0	G5		N5		S5	C	
	X			<i>Carex crinita</i>	Fringed Sedge	-5.0	G5		N5		S5	C	
X	X	X		<i>Carex gracillima</i>	Graceful Sedge	3.0	G5		N5		S5	C	
	X	X		<i>Carex normalis</i>	Larger Straw Sedge	-3.0	G5		NNR		S4	R	
		X		<i>Carex scoparia</i>	Pointed Broom Sedge	-3.0	G5		N5		S5		
X	X			<i>Carex sparganioides</i>	Burreed Sedge	3.0	G5		N5		S4S5	U	
	X	X		<i>Carex vulpinoidea</i>	Fox Sedge	-5.0	G5		N5		S5	C	
X				<i>Carya cordiformis</i>	Bitternut Hickory	0.0	G5		N5		S5	X	
X				<i>Carya ovata</i>	Shagbark Hickory	3.0	G5		N5		S5	X	
		X		<i>Cichorium intybus</i>	Chicory	3.0	GNR		NNA		SE5	IC	
X	X			<i>Circaea canadensis</i>	Broad-leaved Enchanter's Nightshade	3.0	G5		N5		S5	X	
X	X	X	X	<i>Cirsium arvense</i>	Canada Thistle	3.0	G5		NNA		SE5	IC	Y
	X			<i>Cirsium muticum</i>	Swamp Thistle	-5.0	G5		N5?		S5	X	
X				<i>Claytonia virginica</i>	Narrow-leaved Spring Beauty	3.0	G5		NNR		S5	C	
X				<i>Clinopodium vulgare</i>	Field Basil	5.0	G5		N5		S5	X	
X	X			<i>Cornus racemosa</i>	Gray Dogwood	0.0	G5		N5		S5	X	
		X		<i>Cornus sericea</i>	Red-osier Dogwood	-3.0	G5		N5		S5	C	
X	X			<i>Crataegus crus-galli</i>	Cockspur Hawthorn	0.0	G5		N5		S4	R	
X				<i>Crataegus punctata</i>	Dotted Hawthorn	5.0	G5		N5		S5	C	
X				<i>Dactylis glomerata</i>	Orchard Grass	3.0	GNR		NNA		SE5	IC	
X		X	X	<i>Daucus carota</i>	Wild Carrot	5.0	GNR		NNA		SE5	IC	
X	X	X		<i>Dipsacus fullonum</i>	Common Teasel	3.0	GNR		NNA		SE5	IC	Y
	X			<i>Eleocharis obtusa</i>	Blunt Spikerush	-5.0	G5		N5		S5	C	
		X		<i>Elymus repens</i>	Creeping Wildrye	3.0	GNR		NNA		SE5	IC	
X	X			<i>Equisetum arvense</i>	Field Horsetail	0.0	G5		N5		S5	C	
	X	X		<i>Erigeron philadelphicus</i>	Philadelphia Fleabane	-3.0	G5		N5		S5	C	
X				<i>Erythronium americanum</i>	Yellow Trout-lily	5.0	G5		N5		S5	X	
		X		<i>Eupatorium perfoliatum</i>	Common Boneset	-3.0	G5		N5		S5	C	
X	X	X		<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	0.0	G5		N5		S5	C	
X				<i>Frangula alnus</i>	Glossy Buckthorn	0.0	GNR		NNA		SE5	IU	Y
X	X			<i>Galium mollugo</i>	Smooth Bedstraw	5.0	GNR		NNA		SE5	IX	Y
X	X			<i>Geranium robertianum</i>	Herb-Robert	3.0	G5		N4		S5	C	
		X		<i>Glechoma hederacea</i>	Ground Ivy	3.0	GNR		NNA		SE5	IX	
X	X			<i>Hesperis matronalis</i>	Dame's Rocket	3.0	G4G5		NNA		SE5	IX	Y
X				<i>Hieracium vulgatum</i>	Common Hawkweed	5.0	GNR		NNA		SE2?	IR	
X				<i>Hydrophyllum virginianum</i>	Virginia Waterleaf	0.0	G5		N5		S5	C	
X	X	X		<i>Hypericum perforatum</i>	Common St. John's-wort	5.0	GNR		NNA		SE5	IC	Y
X				<i>Hypericum punctatum</i>	Spotted St. John's-wort	0.0	G5		N5		S5	X	
		X		<i>Iris pseudacorus</i>	Yellow Iris	-5.0	GNR		NNA		SE4	IR	Y
		X		<i>Iris pumila</i>	Dwarf Iris	5.0	GNR		NNA		SEH		

Floral Inventory (2018-10-17, 2019-05-13, 2019-06-04, 2019-06-19, 2019-08-01)													
1	1a	2	3	Scientific Name	Common Name	CW	GRank	COSEWIC	Nrank	SARO	SRank	MD	Invasive
X				<i>Juglans nigra</i>	Black Walnut	3.0	G5		N4		S4?	X	
			X	<i>Juncus tenuis</i>	Path Rush	0.0	G5		N5		S5	X	
		X		<i>Lamium purpureum</i>	Purple Dead-nettle	5.0	GNR		NNA		SE3	IR	
X				<i>Lapsana communis</i>	Common Nipplewort	3.0	GNR		NNA		SE5	IR	
		X	X	<i>Lathyrus latifolius</i>	Everlasting Pea	5.0	GNR		NNA		SE4	IX	
		X		<i>Leucanthemum vulgare</i>	Oxeye Daisy	5.0	GNR		NNA		SE5	IC	
X				<i>Ligustrum vulgare</i>	European Privet	3.0	GNR		NNA		SE5	IX	Y
		X		<i>Linaria vulgaris</i>	Butter-and-eggs	5.0	GNR		NNA		SE5	IC	
		X		<i>Lonicera tatarica</i>	Tartarian Honeysuckle	3.0	GNR		NNA		SE5	IX	Y
		X	X	<i>Lotus corniculatus</i>	Garden Bird's-foot Trefoil	3.0	GNR		NNA		SE5	IX	Y
			X	<i>Lycopus americanus</i>	American Water-horehound	-5.0	G5		N5		S5	C	
X				<i>Lysimachia ciliata</i>	Fringed Loosestrife	-3.0	G5		N5		S5	X	
			X	<i>Lythrum salicaria</i>	Purple Loosestrife	-5.0	G5		NNA		SE5	IC	Y
X		X	X	<i>Monarda fistulosa</i>	Wild Bergamot	3.0	G5		N5		S5		
X				<i>Ostrya virginiana</i>	Eastern Hop-hornbeam	3.0	G5		N5		S5	C	
X	X			<i>Persicaria virginiana</i>	Virginia Smartweed	0.0	G5		N4		S4	X	
	X			<i>Phalaris arundinacea</i>	Reed Canary Grass	-3.0	G5		N5		S5	X	Y
X			X	<i>Phleum pratense</i>	Common Timothy	3.0	GNR		NNA		SE5	IC	
	X	X		<i>Phragmites australis</i>	Common Reed	-3.0	G5		N5		S4?		Y
X	X	X		<i>Plantago lanceolata</i>	English Plantain	3.0	G5		NNA		SE5	IC	
			X	<i>Plantago major</i>	Common Plantain	3.0	G5		NNA		SE5	IC	
X			X	<i>Poa pratensis</i>	Kentucky Bluegrass	3.0	G5		N5		S5		
X				<i>Podophyllum peltatum</i>	May-apple	3.0	G5		N5		S5	X	
X				<i>Populus deltoides</i>	Eastern Cottonwood	0.0	G5		N5		S5		
			X	<i>Prunella vulgaris</i>	Self-heal	0.0	G5		N5		S5		
X				<i>Quercus alba</i>	White Oak	3.0	G5		N5		S5	C	
X				<i>Quercus rubra</i>	Northern Red Oak	3.0	G5		N5		S5	C	
			X	<i>Ranunculus acris</i>	Tall Buttercup	0.0	G5		NNA		SE5	IC	
			X	<i>Ranunculus pensylvanicus</i>	Pennsylvania Buttercup	-5.0	G5		NNR		S5	X	
			X	<i>Ranunculus sceleratus</i>	Cursed Buttercup	-5.0	G5		N5		S5		
X	X			<i>Rhamnus cathartica</i>	Common Buckthorn	0.0	GNR		NNA		SE5	IC	Y
X	X			<i>Rosa multiflora</i>	Multiflora Rose	3.0	GNR		NNA		SE5	IX	Y
X	X			<i>Rubus occidentalis</i>	Black Raspberry	5.0	G5		N5		S5	C	
X				<i>Rudbeckia hirta</i>	Black-eyed Susan	3.0	G5		N5		S5	C	
X	X			<i>Rumex acetosella</i>	Sheep Sorrel	3.0	GNR		NNA		SE5	IC	
		X		<i>Rumex crispus</i>	Curly Dock	0.0	GNR		NNA		SE5	IC	
	X	X	X	<i>Salix alba</i>	White Willow	-3.0	G5		NNA		SE4	IX	
	X			<i>Salix interior</i>	Sandbar Willow	-3.0	GNR		NNR		S5	C	
X				<i>Sanguinaria canadensis</i>	Bloodroot	3.0	G5		N5		S5	X	
	X		X	<i>Schoenoplectus tabernaemontani</i>	Soft-stemmed Bulrush	-5.0	G5		N5		S5	C	
			X	<i>Scirpus atrovirens</i>	Dark-green Bulrush	-5.0	G5		N5		S5	C	
	X			<i>Scirpus pendulus</i>	Rufous Bulrush	-5.0	G5		N5		S5	C	
		X		<i>Setaria faberi</i>	Giant Foxtail	3.0	GNR		NNA		SE4	IC	
X		X		<i>Solidago altissima</i>	Tall Goldenrod	3.0	G5		N5		S5		
X	X	X		<i>Solidago canadensis</i>	Canada Goldenrod	3.0	G5		N5		S5		
		X		<i>Solidago gigantea</i>	Giant Goldenrod	-3.0	G5		N5		S5	X	
X			X	<i>Solidago juncea</i>	Early Goldenrod	5.0	G5		N5		S5	X	
X	X			<i>Sonchus arvensis</i>	Field Sow-thistle	3.0	GNR		NNA		SE5	IX	
			X	<i>Stellaria graminea</i>	Grass-leaved Starwort	5.0	GNR		NNA		SE5	IX	
X		X		<i>Symphyotrichum ericoides</i>	White Heath Aster	3.0	G5		N5		S5		
	X			<i>Symphyotrichum lanceolatum</i>	Panicled Aster	-3.0	G5		N5		S5	C	
X				<i>Symphyotrichum lateriflorum</i>	Calico Aster	0.0	G5		N5		S5	C	
	X	X		<i>Symphyotrichum novae-angliae</i>	New England Aster	-3.0	G5		N5		S5	C	
X	X			<i>Symphyotrichum pilosum</i>	White Heath Aster	3.0	G5		N5		S5		
	X			<i>Symplocarpus foetidus</i>	Skunk Cabbage	-5.0	G5		N5		S5	C	
X				<i>Tragopogon pratensis</i>	Meadow Goat's-beard	5.0	GNR		NNA		SE5	IX	
	X		X	<i>Typha angustifolia</i>	Narrow-leaved Cattail	-5.0	G5		N5		SE5	IX	Y
X	X			<i>Verbena urticifolia</i>	White Vervain	0.0	G5		N5		S5	X	
X	X			<i>Viola sororia</i>	Woolly Blue Violet	0.0	G5		N5		S5	X	

Floral Inventory (2018-10-17, 2019-05-13, 2019-06-04, 2019-06-19, 2019-08-01)													
1	1a	2	3	Scientific Name	Common Name	CW	GRank	COSEWIC	Nrank	SARO	SRank	MD	Invasive
X				<i>Vitis riparia</i>	Riverbank Grape	0.0	G5		N5		S5	C	
X	X			<i>Xanthium strumarium</i>	Rough Cocklebur	0.0	G5		N5		S5	C	

Appendix E

Breeding Bird Survey Data



AVIFAUNAL SURVEY INFORMATION SUMMARY SHEET

Project Name: 735 Southdale Road West

MTE File No.: 42128-200

Collector(s): Will Huys

Species Abbr.	Species Name	Date		Start		Finish		Weather		S Rank	ESA Status	PIF Status	Notes		
		Visit 1		Visit 2		Comm. 1		Comm. 2						Comm. 3	
		Code	No.	Code	No.	Code	No.	Code	No.					Code	No.
				4-Jun-19	7:45 a.m.	9:00 a.m.		13°C clear, still							
				19-Jun-19	7:30 a.m.	9:00 a.m.		20°C clear, warm							
MALL	Mallard								YOY	2	YOY	12	S5	Pair	
KILL	Killdeer					VO	1	VO	2				S5		
MODO	Mourning Dove							FY	4	P	2		S5		
DOWO	Downy Woodpecker	VO	1										S5		
EAKI	Eastern Kingbird			FY	2						T	1	S4	RC	
WAVI	Warbling Vireo	SM	1	P	2								S5		
BLJA	Blue Jay			T	1								S5		
TRES	Tree Swallow								P	2			S4		
BCCH	Black-capped Chickadee	VO	1										S5	-	
WBNU	White-breasted Nuthatch	SM	1										S5	-	
AMRO	American Robin	P	3	FY	4				OB	1			S5		
GRCA	Gray Catbird	OB	1										S4		
SOSP	Song Sparrow	SM	3	P	2	SM	2	P	3		T	1	S5		
NOCA	Northern Cardinal	OB, SM	1	P	2								S5		
RWBL	Red-winged Blackbird	P	6	FY	6	T	3		AE	6	FY	3	S4		
COGR	Common Grackle	FS	3	P	5				P	2	FY	4	S5		
BHCO	Brown-headed Cowbird	P	2			P	2						S4		
BAOR	Baltimore Oriole	SM	1	T	1								S4	RC,RS	
HOSP	House Sparrow								OB	3	P	10	SNA		

Evidence Codes:

Breeding Bird - Possible

SH=Suitable Habitat SM=Singing Male

Breeding Bird - Probable

T=Territory A=Anxiety Behaviour D=Display N=Nest Building P=Pair V=Visiting Nest

Breeding Bird - Confirmed

DD=Distraction NE=Eggs AE=Nest Entry NU=Nest Used NY=Nest Young FY=Fledged Young FS=Food/Faecal Sack

Other Wildlife Evidence

OB=Observed DP=Distinctive Parts TK=Tracks VO=Vocalization HO=House/Den FE=Feeding Evidence CA=Carcass
 Fy=Eggs or Young SC=Scat SI=Other Signs (specify)

Appendix F

Amphibian Breeding Survey Data



AMPHIBIAN MONITORING FIELD SHEET

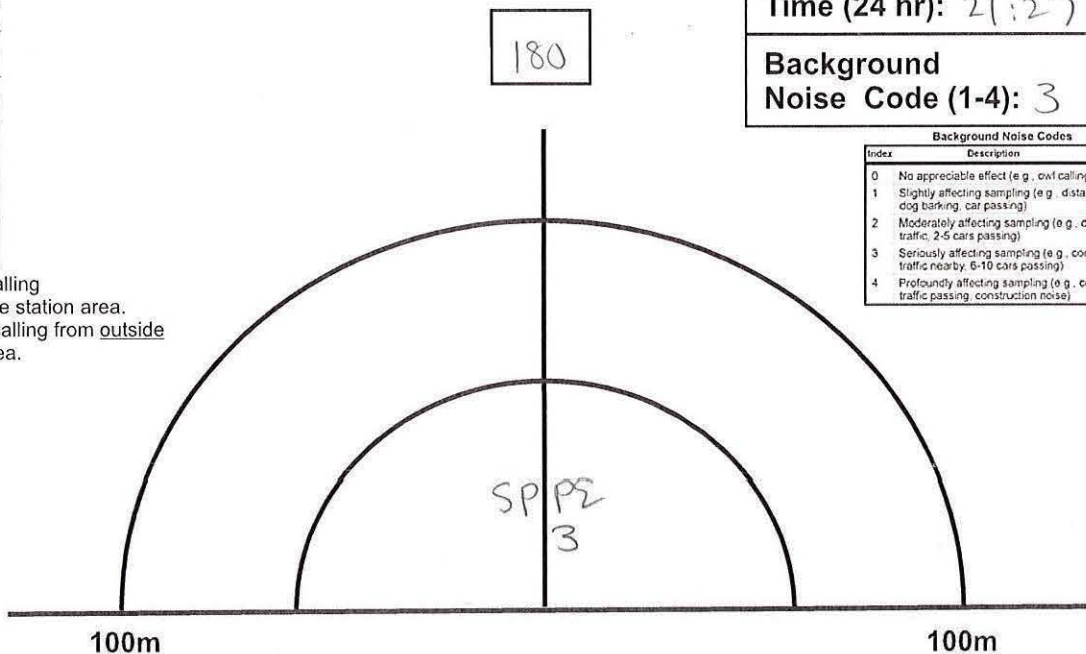
Project: Sheik - Southdale
 Date: April 8 2019 Project Manager: LM
 Collector(s): WN Visit #: 1

WEATHER CONDITIONS				WIND SCALE	
Temp:	Wind:	<u>0</u>	Cloud Cover (%)	Precipitation	0
<u>12</u>	Direction:	<u>-</u>	<u>0</u>	<input checked="" type="checkbox"/> None/Dry <input type="checkbox"/> Drizzle	1
				<input type="checkbox"/> Damp/Fog <input type="checkbox"/> Rain	2
CALL LEVEL CODES					3
Code 1: Calls not simultaneous, number of individuals can be accurately counted					4
Code 2: Some calls simultaneous, number of individuals can be reliably estimated					
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated					

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	<input checked="" type="checkbox"/>	
WOFR		

* Check if species is calling from inside 100-metre station area.
 ** Check if species is calling from outside 100-metre station area.

Station: A



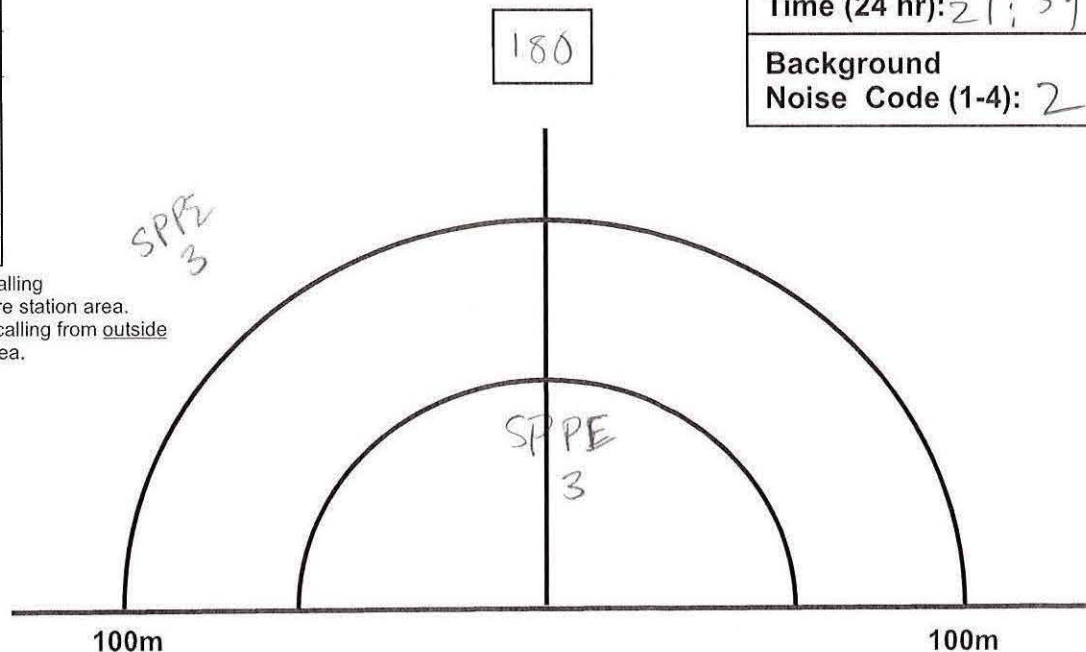
Station Start Time (24 hr): 21:27
 Background Noise Code (1-4): 3

Index	Description
0	No appreciable effect (e.g. owl calling)
1	Slightly affecting sampling (e.g. distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g. distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g. continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g. continuous traffic passing, construction noise)

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
WOFR		

* Check if species is calling from inside 100-metre station area.
 ** Check if species is calling from outside 100-metre station area.

Station: B



Station Start Time (24 hr): 21:34
 Background Noise Code (1-4): 2



AMPHIBIAN MONITORING FIELD SHEET

Project: 42128-200 Shalk
 Date: May 16, 2009 Project Manager: _____
 Collector(s): WN Visit #: 2

WEATHER CONDITIONS				WIND SCALE	
Temp. <u>15</u>	Wind: <u>2</u>	Cloud Cover (%) <u>80</u>	Precipitation	0	Calm
Direction: <u>S</u>			<input checked="" type="checkbox"/> None/Dry <input type="checkbox"/> Damp/Fog	1	Smoke Drifts
			<input type="checkbox"/> Drizzle <input type="checkbox"/> Rain	2	Wind Felt on Face
CALL LEVEL CODES				3	Leaves in constant motion
Code 1: Calls not simultaneous, number of individuals can be accurately counted				4	Wind raises dust and paper
Code 2: Some calls simultaneous, number of individuals can be reliably estimated					
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated					

Reference Site: No Yes UTM _____

Species	In*	Out**
AMTO	X	
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	X	
WOFR		

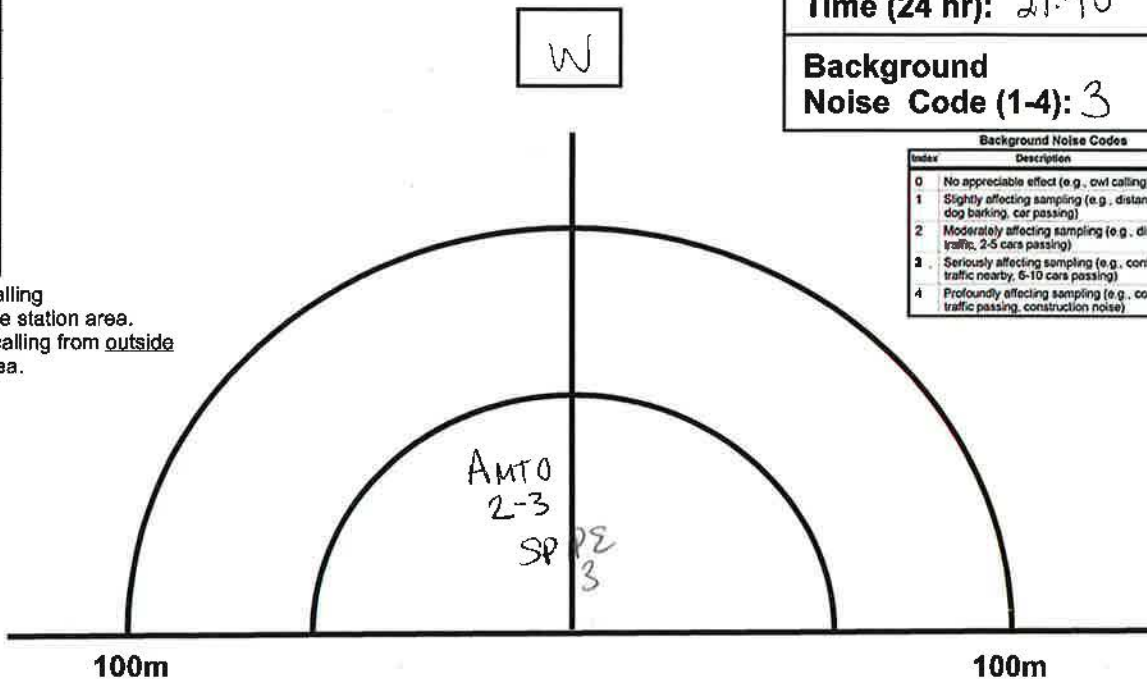
Station: 2

Station Start Time (24 hr): 21:40

Background Noise Code (1-4): 3

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-3 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)

* Check if species is calling from inside 100-metre station area.
 ** Check if species is calling from outside 100-metre station area.



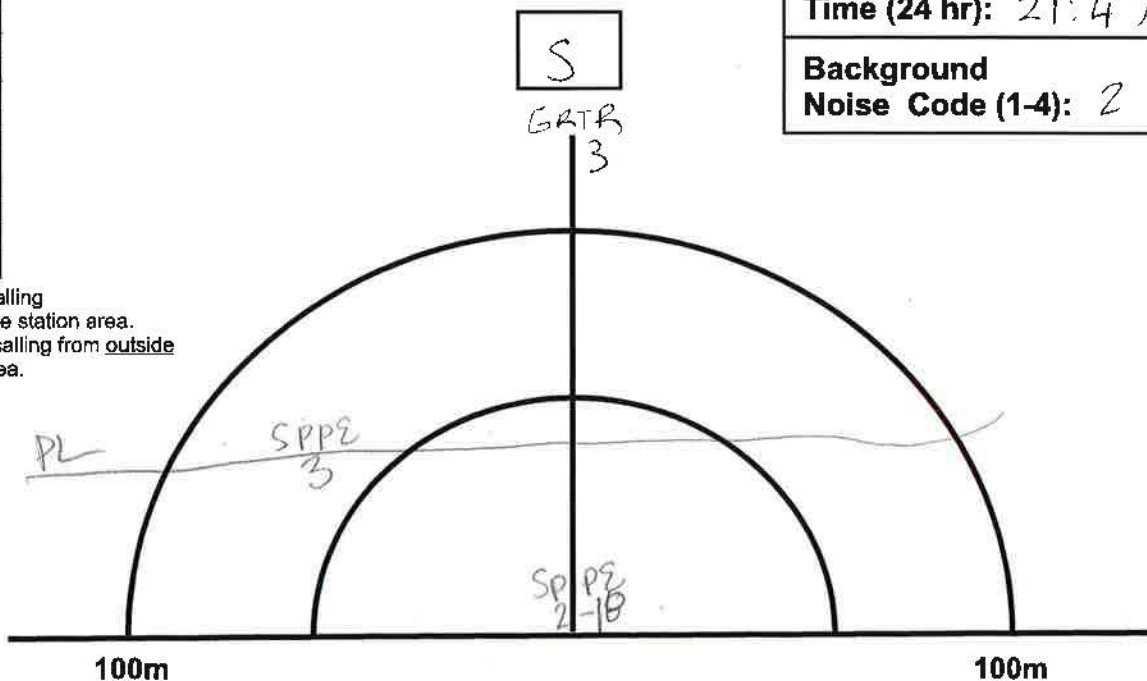
Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		X
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	X	
WOFR		

Station:

Station Start Time (24 hr): 21:47

Background Noise Code (1-4): 2

* Check if species is calling from inside 100-metre station area.
 ** Check if species is calling from outside 100-metre station area.





AMPHIBIAN MONITORING FIELD SHEET

Project: W2128-Sheik Southdale
 Date: June 12, 2014 Project Manager: LM
 Collector(s): ZA Visit #: 3

WEATHER CONDITIONS				WIND SCALE	
Temp: <u>17°C</u>	Wind: <u>1</u>	Cloud Cover (%): <u>90%</u>	Precipitation: <input checked="" type="checkbox"/> None/Dry <input type="checkbox"/> Drizzle	0	Calm
	Direction: <u>NE</u>		<input type="checkbox"/> Damp/Fog <input type="checkbox"/> Rain	1	Smoke Drifts
CALL LEVEL CODES				2	Wind Felt on Face
Code 1: Calls not simultaneous, number of individuals can be accurately counted				3	Leaves in constant motion
Code 2: Some calls simultaneous, number of individuals can be reliably estimated				4	Wind raises dust and paper
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated					

Reference Site: No Yes UTM _____

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR	✓	
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

Station: A

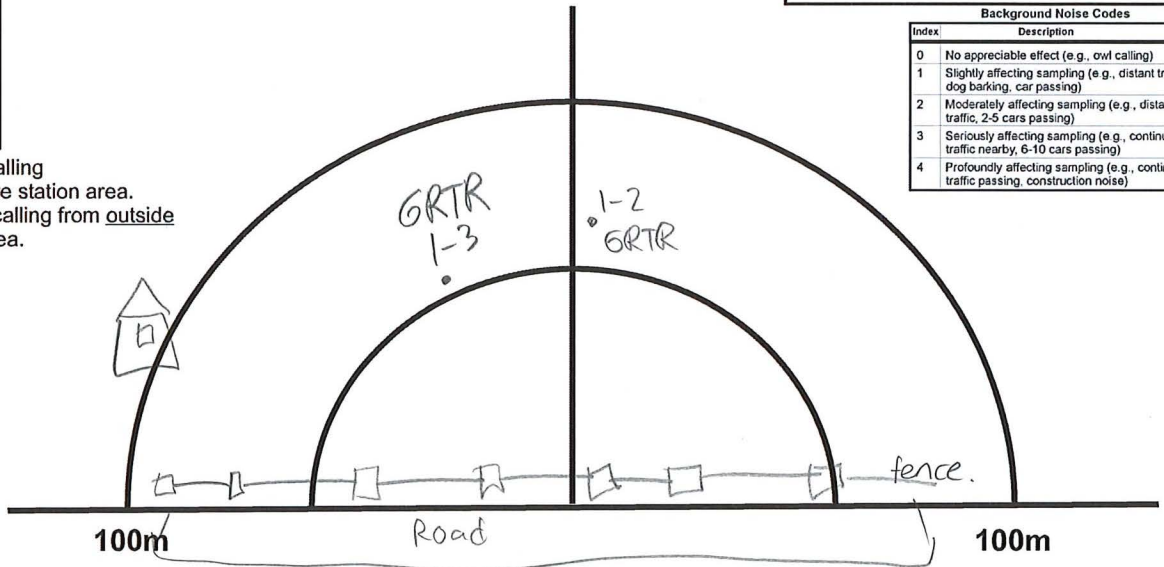
S

Station Start Time (24 hr): 23:10

Background Noise Code (1-4): 2

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)

* Check if species is calling from inside 100-metre station area.
 ** Check if species is calling from outside 100-metre station area.



Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR	✓	
GRFR	✓	
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

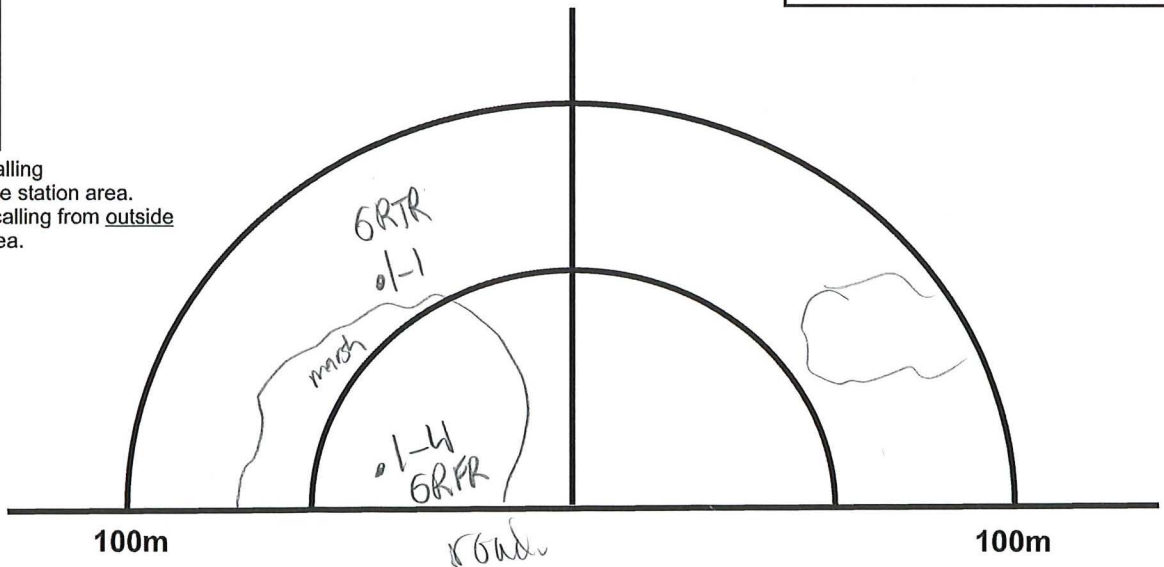
Station: B

S

Station Start Time (24 hr): 23:20

Background Noise Code (1-4): 2

* Check if species is calling from inside 100-metre station area.
 ** Check if species is calling from outside 100-metre station area.



Appendix G

Bat Maternity Roost Survey Data

Appendix B – Suitable Maternity Roost Trees for Little Brown Myotis/Northern Myotis

Include all **live and dead** standing trees $\geq 10\text{cm}$ dbh with loose or naturally exfoliating bark, cavities, hollows or cracks.

Project Name: <u>42128-200</u>	Survey Date(s): <u>May 13, 2019</u>
Site Name: <u>735 Southdale Rd.</u>	Observers(s): <u>WH</u>
ELC Ecosite: <u>CUM1-1</u>	Snag Density (snags/ha): <u> </u>

Tree #	Tree Species ID	dbh (cm)	Height Class ²	Snag attributes (check all that apply)	Easting	Northing	Notes
BT1	CARYova	45	1	<input type="checkbox"/> cavity ³ <input checked="" type="checkbox"/> loose bark <input type="checkbox"/> crack <input type="checkbox"/> knot hole <input type="checkbox"/> other snag within 10m? <input type="checkbox"/> Decay Class 1-3? <input type="checkbox"/>	475100	4753849	2 stems
BT2	CARYova	65	1	<input type="checkbox"/> cavity <input checked="" type="checkbox"/> loose bark <input type="checkbox"/> crack <input type="checkbox"/> knot hole <input type="checkbox"/> other snag within 10m? <input type="checkbox"/> Decay Class 1-3? <input type="checkbox"/>	475129	4753821	
BT3	CARYova	45	1	<input type="checkbox"/> cavity <input checked="" type="checkbox"/> loose bark <input type="checkbox"/> crack <input type="checkbox"/> knot hole <input type="checkbox"/> other snag within 10m? <input type="checkbox"/> Decay Class 1-3? <input type="checkbox"/>	475109	4753794	
BT4	CARYova	75	1	<input type="checkbox"/> cavity <input checked="" type="checkbox"/> loose bark <input type="checkbox"/> crack <input type="checkbox"/> knot hole <input type="checkbox"/> other snag within 10m? <input type="checkbox"/> Decay Class 1-3? <input type="checkbox"/>	475215	4753781	
BT5	CARYova	50	1	<input type="checkbox"/> cavity <input checked="" type="checkbox"/> loose bark <input type="checkbox"/> crack <input type="checkbox"/> knot hole <input type="checkbox"/> other snag within 10m? <input type="checkbox"/> Decay Class 1-3? <input type="checkbox"/>	475225	4753785	
				<input type="checkbox"/> cavity <input type="checkbox"/> loose bark <input type="checkbox"/> crack <input type="checkbox"/> knot hole <input type="checkbox"/> other snag within 10m? <input type="checkbox"/> Decay Class 1-3? <input type="checkbox"/>			
				<input type="checkbox"/> cavity <input type="checkbox"/> loose bark <input type="checkbox"/> crack <input type="checkbox"/> knot hole <input type="checkbox"/> other snag within 10m? <input type="checkbox"/> Decay Class 1-3? <input type="checkbox"/>			
				<input type="checkbox"/> cavity <input type="checkbox"/> loose bark <input type="checkbox"/> crack <input type="checkbox"/> knot hole <input type="checkbox"/> other snag within 10m? <input type="checkbox"/> Decay Class 1-3? <input type="checkbox"/>			
				<input type="checkbox"/> cavity <input type="checkbox"/> loose bark <input type="checkbox"/> crack <input type="checkbox"/> knot hole <input type="checkbox"/> other snag within 10m? <input type="checkbox"/> Decay Class 1-3? <input type="checkbox"/>			
				<input type="checkbox"/> cavity <input type="checkbox"/> loose bark <input type="checkbox"/> crack <input type="checkbox"/> knot hole <input type="checkbox"/> other snag within 10m? <input type="checkbox"/> Decay Class 1-3? <input type="checkbox"/>			

² **Height Class:** 1 = Dominant (above canopy); 2 = Co-dominant (canopy height); 3 = Intermediate (just below canopy); 4 = suppressed (well below canopy)

³ The approx. height of the cavity should be noted. Note that cavities with an entrance near the ground may also be used by bats if they are "chimney-like".

Decay Class: 1 = Healthy, live tree; 2 = Declining live tree, part of canopy lost; 3 = Very recently dead, bark intact, branches intact

Appendix H

Significant Wildlife Habitat Table

ELCs: CUM1-1, MAM2 (inclusion), SWT1 (inclusion), SAS1, SWD3 (adjacent PSW)

Seasonal Concentration of Animals

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	Confirmed SWH
Waterfowl Stopover and Staging Areas (Terrestrial)	CUM1-1	- Large fields with abundant sheet water in spring not available.	No	<p>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”.</p> <ul style="list-style-type: none"> • Any mixed species aggregations of 100 or more individuals required. • The flooded field ecosite habitat plus a 100-300m radius, dependent 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). 	No
Waterfowl Stopover and Staging Areas (Aquatic)	SAS1, SWD3 (adjacent)	<p>- Pond (SAS1) is present in the northeast Subject Lands, however the feature is too small to support a significant number of waterfowl.</p> <p>- No Ruddy Ducks, Canvasbacks, or Redheads were observed during the 2009 OWES evaluation of the North Talbot PSW, and no evidence of waterfowl staging was observed.</p>	No	<p>Studies carried out and verified presence of:</p> <ul style="list-style-type: none"> • 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 • The combined area of the ELC ecosites and a 100m radius area is SWH • Wetland area and shorelines associated with sites identified within the SWHTG are significant wildlife habitat. • 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). 	No
Shorebird Migratory Stopover Area	MAM2 inclusion	- No beach areas, bars, seasonally flooded, muddy and un-vegetated shoreline habitat available. MAM2 inclusion is vegetated and small (0.08 ha).	No	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of 3 or more of listed species and >1000 shorebird use days during spring or fall migration period (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period). • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. 	No
Raptor Wintering Area	CUM1-1	- No forest ELC codes present and fields are small due to surrounding row crop agriculture, so no combination of forest and fields >20 ha present.	No	<p>Studies confirm the use of these habitats by:</p> <ul style="list-style-type: none"> • One or more Short-eared Owls or; One of more Bald Eagles or; At least 10 individuals and two of the listed hawk/owl species. • To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. 	No
Bat Hibernacula	-	- No suitable features present.	No	<ul style="list-style-type: none"> • All sites with confirmed hibernating bats are SWH. • The area includes 200m radius around the entrance of the hibernaculum for 	No

735 Southdale Road West (Project #42128-200)

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	Confirmed SWH
				<p>most development types and 1000m for wind farms</p> <ul style="list-style-type: none"> • 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” 	
Bat Maternity Colonies	SWD3 (adjacent)	- The adjacent PSW does not include at least ten large diameter wildlife trees per hectare.	No	<p>Maternity Colonies with confirmed use by;</p> <ul style="list-style-type: none"> • >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” 	No
Turtle Wintering Areas	SAS1, SWD3 (adjacent)	<p>- Over-wintering sites are permanent water bodies, large wetlands, and bogs and fens with adequate dissolved oxygen.</p> <p>- Community 3 (SAS1) is likely too shallow and no turtles were observed during site investigations. This is supported by the Southdale Road West Improvements – Pine Valley to Colonel Talbot Road – EIS (AECOM, 2018).</p> <p>- The adjacent North Talbot PSW (SWD3) is dry in the winter.</p>	No	<p>Presence of 5 over-wintering Midland Painted Turtles is significant.</p> <ul style="list-style-type: none"> • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant. • The mapped ELC Ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deepwater 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). • Congregation of turtles is more common where wintering areas are limited and therefore significant. 	No
Reptile Hibernaculum	All other than really wet	- No features indicative of hibernation sites (bedrock fissures, rock piles, burrows) present within the Subject Lands.	No	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. Near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct). • Note: If there are Special Concern Species present, then site is SWH. • The feature in which the hibernacula is located plus a 30 m radius area is SWH. 	No
Colonially-Nesting Bird Breeding Habitat (Bank/Cliff)	CUM1-1	- No exposed soil banks, cliff faces, sandy hills, borrow pits, steep slopes, or other suitable habitat present.	No	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of 1 or more nesting sites with 8cxlix or 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”. 	No
Colonially-Nesting Bird Breeding	SWD3 (adjacent)	- Suitable habitat is present in the adjacent PSW, however this community was not investigated during the breeding bird study to	No	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of 2 or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with 	No

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Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	Confirmed SWH
Habitat (Trees/Shrubs)		confirm the presence of colonially-nesting birds. - An OWES evaluation in 2009 gave the North Talbot PSW a score of zero for nesting of colonial waterbirds. - No heron nesting sites/colonies present based on LIO mapping (wildlife values area map).		a colony is the SWH. • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April-August) or by evidence such as the presence of fresh guano, dead young and/or eggshells.	
Colonially-Nesting Bird Breeding Habitat (Ground)	CUM1-1, MAM2-2	- No islands, peninsulas, or low bushes close to streams/ditches are present. - No nesting sites for Ring-billed Gull or Herring Gull identified in the area by LIO wildlife values area mapping.	No	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. • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects".	No
Migratory Butterfly Stopover Areas	CUM1-1	- A butterfly stopover area will be >10 ha in size with a combination of forest (FOD) and field (CUM/CUT), and be located within 5 km of Lake Erie or Lake Ontario. Criteria not met due to the lack of forested ELC codes present, the small size of CUM1-1 communities, and the large distance from both Lake Erie and Lake Ontario.	No	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct). MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day, significant variation can occur between years and multiple years of sampling should occur. • 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.	No
Land Bird Migratory Stopover Areas	SWD3 (adjacent)	- No woodlots >5 ha in size that are within 5 km of Lake Ontario and Lake Erie. Criteria not met.	No	Studies confirm: • Use of the habitat by >200 birds/day and with >35 spp with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (Mar to May) and fall (Aug-Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"	No

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Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	Confirmed SWH
<p>Deer Winter Congregation Areas</p>	<p>SWD3 (adjacent)</p>	<p>- No woodlots >100 ha in size. Criteria not met. - No White-tailed Deer wintering areas identified in the area by LIO wildlife values area mapping.</p>	<p>No</p>	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. • Use of the woodlot by whitetailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF. • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques, ground or road surveys. or a pellet count deer density survey. 	<p>No</p>

Rare Vegetation Communities

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	Confirmed SWH
Cliffs and Talus Slopes	-	Not present.	No	<ul style="list-style-type: none"> Confirm any ELC Vegetation Type for Cliffs or Talus Slopes. 	No
Sand Barren	-	Not present.	No	<ul style="list-style-type: none"> Confirm any ELC Vegetation Type for Sand Barrens. Site must not be dominated by exotic/introduced species (<50% vegetative cover exotic sp.). 	No
Alvar	-	Not present.	No	<ul style="list-style-type: none"> Field studies that identify 4 of the 5 Alvar Indicator Species at a Candidate Alvar site is significant. Site must not be dominated by exotic/introduced species (<50% vegetative cover exotic sp.). The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses. 	No
Old Growth Forest	-	Not present. No woodlands >0.5 ha.	No	<p>Field Studies will determine:</p> <ul style="list-style-type: none"> If dominant trees species are >140 years old, then the area containing these trees is SWH. The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present) The area of forest ecosites combined or an eco-element within an ecosite that contain the old growth characteristics is the SWH. Determine ELC vegetation types for the forest area containing the old growth characteristics. 	No
Savannah	-	Not present.	No	<ul style="list-style-type: none"> Field studies confirm one or more of the Savannah indicator species listed in Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 7E should be used. Area of the ELC Ecosite is the SWH. Site must not be dominated by exotic/introduced species (<50% vegetative cover exotic sp.). 	No
Tallgrass Prairie	-	Not present.	No	<ul style="list-style-type: none"> Field studies confirm one or more of the Prairie indicator species listed in Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 7E should be used. Area of the ELC Ecosite is the SWH. Site must not be dominated by exotic/introduced species (<50% vegetative cover exotic sp.). 	No
Other Rare Vegetation	-	Not present.	No	<ul style="list-style-type: none"> Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG. Area of the ELC Vegetation Type polygon is the SWH. 	No

Specialized Habitats of Wildlife considered SWH

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	Confirmed SWH
Waterfowl Nesting Area	MAM2 inclusion, SWT1 inclusion, SWD3 (adjacent), SAS1	<ul style="list-style-type: none"> - Wetland habitat is available but the wetland size requirements are not met for the SAS1 pond or inclusion A2a (SWT1). No wetlands >0.5ha are present. - The two sections of the PSW and the MAM2 inclusion make up a cluster of wetlands that are <0.5 ha each. Lands adjacent to PSW are included. 	Yes	<p>Studies confirmed:</p> <ul style="list-style-type: none"> • Presence of 3 or more nesting pairs for listed species excluding Mallards, or; • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • 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”. • 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 from the wetland and will provide enough habitat for waterfowl to successfully nest. 	No
Bald Eagle and Osprey Nesting, Foraging, Perching	SWD3 (adjacent)	<ul style="list-style-type: none"> - Bald Eagle was not identified by NHIC in the 17MH75 atlas square that includes the Subject Lands. - Bald Eagle and Osprey were not observed in the 2001-2005 OBBA records in the general area of the Subject Lands. - A stick nest was observed, but likely belonging to a Red-tailed Hawk. - No Osprey feeding or resting areas identified in the area of the Subject Lands on LIO wildlife values mapping. 	No	<p>Studies confirm the use of these nests by:</p> <ul style="list-style-type: none"> • One or more active Osprey or Bald Eagle nests in an area. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is important. • For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant. • Observational studies to determine nest site use, perching sites and foraging areas need to be done from early March to mid-August. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. 	No
Woodland Raptor Nesting Habitat	SWD3 (adjacent)	<ul style="list-style-type: none"> - No natural or conifer plantation woodlands/forest stands >30ha with >4ha of interior habitat. Criteria not met. 	No	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of 1 or more active nests from species list is considered significant. • Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha area of habitat is the SWH. (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest) • Barred Owl – A 200m radius around the nest is the SWH. • Broad-winged Hawk and Coopers Hawk, – A 100m radius around the nest is SWH. • Sharp-Shinned Hawk – A 50m radius around the nest is the SWH. • Conduct field investigations from early 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. 	No
Turtle Nesting Areas	SAS1	<ul style="list-style-type: none"> - No areas with exposed mineral soils were observed adjacent to the wetland. - The wetland is bordered on one side by Southdale Road West, which is not 	No	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of 5 or more nesting Midland Painted Turtles. • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH. • The area or collection of sites within an area of exposed mineral soils where the 	No

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Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	Confirmed SWH
		favourable for nesting, and the surrounding areas are highly vegetated.		turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH. <ul style="list-style-type: none"> • 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. 	
Springs and Seeps	SWD3 (adjacent)	- No seeps or springs observed within the Subject Lands. - No seeps identified within the North Talbot PSW in the 2009 OWES evaluation.	No	Field Studies confirm: <ul style="list-style-type: none"> • Presence of a site with 2 or more 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. 	No
Amphibian Breeding Habitat (Woodland)	SWD3 (adjacent)	- The adjacent North Talbot PSW is forested and bordered by Silver Maple trees.	Yes	Studies confirm; <ul style="list-style-type: none"> • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog species with Call Level Code 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. 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 	Yes (North Talbot PSW – SWD3)
Amphibian Breeding Habitat (Wetlands)	SAS1, SWT1 inclusion	- Several small wetlands located >120m from woodland ecosites are present. - The SWT1 inclusion is too small (<500m ²) to be significant.	Yes	Studies confirm: <ul style="list-style-type: none"> • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/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 will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. <p>-Amphibian breeding surveys conducted in 2019 confirm SWH criteria are not met.</p>	No
Woodland Area-Sensitive Bird Breeding Habitat	SWD3 (adjacent)	- No large mature (>60yrs old) forest stands or woodlots >30 ha are present within or adjacent to the Subject Lands.	No	Studies confirm: <ul style="list-style-type: none"> • 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”. 	No

Habitats of Species of Conservation Concern considered SWH

Wildlife Habitat	ELC Codes Triggers	Candidate Habitat Criteria	Candidate SWH	SWH Defining Criteria	Confirmed SWH
Marsh Breeding Bird Habitat	MAM2 inclusion, SAS1	- Community 3 (SAS1) and the 1a inclusion (MAM2) may provide suitable habitat for marsh breeding birds, but they are too small to support concentrations of the target species.	No	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species. • Note: any wetland with breeding of 1 or more 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”. 	No
Open Country Bird Breeding Habitat	CUM1-1	- Natural and cultural fields >30 ha are not present.	No	<p>Field studies confirm:</p> <ul style="list-style-type: none"> • Presence of nesting or breeding of 2 or more of the listed species. • A field with 1 or more breeding Short-eared Owls is to be considered SWH. • 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”. 	No
Shrub/Early Successional Bird Breeding Habitat	-	- No large fields succeeding to shrub and thicket habitats >10 ha in size are present.	No	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species. • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered SWH. • 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”. 	No
Terrestrial Crayfish	MAM2 inclusion, SWD3 (adjacent), MAS2 (adjacent)	- Chimney observed in the MAM2 inclusion (1a). - Chimneys and crayfish observed approximately 90 metres south of the Subject Lands in the south patch of the North Talbot PSW.	Yes	<p>Studies Confirm:</p> <ul style="list-style-type: none"> • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites. • Area of ELC ecosite or an eco-element 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. <p>Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult.</p>	Yes (MAM2, SWD3) Unconfirmed (MAS2)

735 Southdale Road West (Project #42128-200)

Wildlife Habitat	ELC Codes Triggers	Candidate Habitat Criteria	Candidate SWH	SWH Defining Criteria	Confirmed SWH
Special Concern and Rare Wildlife Species (NHIC and MNRFP pre-consultation)	-	<ul style="list-style-type: none"> - NHIC identified several Special Concern or rare species as potentially present within the area of the Subject Lands. These include Green Dragon [SC], Snapping Turtle [SC], and Hoary Tick-trefoil [S2]. - The adjacent North Talbot PSW was not thoroughly investigated for potential Special Concern or rare wildlife. 	Yes	<p>Studies Confirm:</p> <ul style="list-style-type: none"> • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. 	<p>No (Subject Lands)</p> <p>Unconfirmed (North Talbot PSW)</p>

Animal Movement Corridors

Wildlife Habitat	ELC Codes Triggers*	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	Confirmed SWH
Amphibian Movement Corridors	-	- Movement corridors are determined when there is confirmed amphibian breeding habitat in wetlands. Only woodland amphibian breeding SWH has been identified.	No	<ul style="list-style-type: none"> • Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant. • Corridors should have at least 15m of vegetation on both sides of waterway or be up to 200m wide of woodland habitat and with gaps <20m. • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat. 	No

SWH exceptions

Wildlife Habitat	Ecosites	Habitat Criteria and Information	Candidate SWH	SWH Defining Criteria	Confirmed SWH
Bat Migratory Stopover Area	No triggers	- The site is not near Long Point.	No	• The confirmation criteria and habitat areas for this SWH are still being determined.	No



Hydrogeological Assessment

FINAL REPORT

Western Prestige Village

Project Name:

Proposed Apartment Complex
735 Southdale Road West
London, Ontario

Project Number:

KCH-00257251-A0

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April 25, 2022

Hydrogeological Assessment

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Date Submitted:

April 25, 2022

Executive Summary

EXP Services Inc. (EXP) was retained by **Western Prestige Village** to conduct a hydrogeological assessment relating to the proposed development of an apartment complex to be located at 735 Southdale Road West in London, Ontario, hereinafter referred to as the 'Site'.

The objective of the hydrogeological assessment was to examine the hydrogeological characteristics of the Site by reviewing the Ministry of the Environment, Conservation and Parks (MECP) Water Well Records (WWR), reviewing the soils and groundwater information provided from a series of sampled boreholes and monitoring wells at the Site, compiling a site wide water balance, collecting a full year of groundwater elevations to identify any seasonal variations, and assess the natural heritage features on the property. It is understood that the hydrogeological assessment will be submitted for review and approval by the City of London and the Upper Thames River Conservation Authority (UTRCA).

Based on the results of the hydrogeological assessment, the following findings are presented:

- The Site is situated within the Dingman Creek sub-watershed;
- A Provincially Significant Wetland (PSW) as designated by the MECP is located at the southern border of the Site. Unevaluated Wetlands (UWs) are also present at the east and west side of the Site, as classified by the City of London in Natural Heritage Map 5. An area encompassing both the PSW and west UW is considered regulated lands of the UTRCA;
- An EIS Report completed by MTE consultants identified the PSW on the Site as part of the North Talbot Wetlands. The western UW is classified as a Mineral Meadow Marsh Ecosite Inclusion (MAM2) and the eastern UW is classified as a Submerged Shallow Aquatic Ecosite (SAS1);
- The Site is covered with a low-permeability silty clay till with occasional wet sand and silt pockets. The till unit thins out towards the west part of the Site. Underlying the till in this area is an extensive sand stratum. The sand stratum was found to be dry and is likely connected to a fluvial terrace extending west of the Site;
- Overall, groundwater elevations within the shallow till wells installed on Site (MW3, MW8B) ranged from seasonal lows of roughly 3.2 mbgs (November 2020) to seasonal highs of 0.5 mbgs (April 2020). The saturated conditions of the shallow soils will need to be considered for construction and design;
- The PSW shows surface water fluctuations with seasonal ponding up to 1m of water and dry surface conditions occurring throughout summer into fall, 2020;
- A total of two (2) domestic groundwater supply wells are located within a 500 m radius of the Site. These wells were installed into overburden sand aquifers encountered at depths of 39 m and 49 mbgs;
- The domestic water supply well for the original farmhouse will need to be properly decommissioned prior to development of the property;

- Single Well Response Tests (SWRT) were completed on three (3) of the monitoring wells. Three (3) grain size analyses were carried out on samples of the silty clay till. The average estimated hydraulic conductivity of the dominant silty clay till soils at the Site was 5.0×10^{-9} cm/s based on the test results;
- During construction, short term dewatering may be required where excavations extend into the shallow groundwater table. Based on the water levels and hydraulic conductivity of the shallow soils on Site, it is not expected that a dewatering permit from the MECP will be required;
- Surface drainage follows Site topography and generally drains towards the PSW and both UWs. Due to the low permeability surficial soils across the Site, the surface water ponds at these locations during periods of rainfall;
- The monitoring wells on Site have been maintained for ongoing study past the completion of this report. When the wells are no longer required, they should be decommissioned in accordance with O. Reg. 903;
- Water balance calculations are provided and indicate secondary infiltration opportunities will be required to provide appropriate infiltration volumes to the wetland feature in the post-development environment. The current stormwater management plans for the Site include routing clean rooftop runoff to the wetland feature which will assist in providing these necessary volumes;
- It is recommended that prior to construction, additional monitoring wells be installed to the depths of construction in order to confirm the dry sand conditions at the appropriate excavation depths.

Groundwater and surface water elevations were collected for 1 year from November 2019 to December 2020. Pre-consultation meetings were held with the UTRCA and City and the results of the scoped study requirements are included in the following report.

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1. Introduction

1.1 Background

EXP Services Inc. (EXP) was retained by **Western Prestige Village** to conduct a hydrogeological study and water balance assessment relating to the proposed development of an apartment building complex to be located at 735 Southdale Road West in London, Ontario, hereinafter referred to as the 'Site' (**Appendix A, Drawing 1**).

The objective of the hydrogeological study was to examine the hydrogeological characteristics of the Site by reviewing the Ministry of the Environment, Conservation and Parks (MECP) Water Well Records (WWR), reviewing the soil and groundwater information provided from a series of sampled boreholes and monitoring wells at the Site, compiling a Site wide water balance, collecting a full year of groundwater elevations to identify any seasonal variations; and assess the natural heritage features on the property. The assessment provides comments pertaining to potential impacts on hydrogeological conditions at the Site and provides recommendations and design/construction measures, where applicable, to mitigate this potential for impact.

It is understood that the hydrogeological study and water balance assessment will be submitted for review and approval by the City of London and the Upper Thames River Conservation Authority (UTRCA) as part of the Draft Plan Approval for the proposed development. The study design and report have been compiled in accordance with the City of London Design Specification & Requirements Manual (2019) as well as the Conservation Authority Guidelines for Hydrogeological Assessments (2013).

A Provincially Significant Wetland (PSW) is located along the south boundary of the Site and primarily resides on the adjacent property to the south. Two (2) Unevaluated Wetlands (UW) are located at the east and west limits of the Site. Refer to **Drawing 2** for locations. These natural features have been assessed based on their impact to, and dependence on, groundwater resources on the Site.

The UTRCA administers a regulation made under Section 28 of the Conservation Authorities Act, known as Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (O.Reg. 157/06). The regulation was approved by the Minister of Natural Resources and Forestry on May 4, 2006. This regulation allows the UTRCA to ensure that proposed development and other activities have regard for natural hazard features. The UTRCA implements the regulation by issuing Section 28 permits for works in or near watercourses, valleys, wetlands, or shorelines, when required.

Property owners must obtain permission and/or a letter of clearance from the local Conservation Authority before beginning any development, site alteration, construction, or placement of fill within the regulated area. Permits are also required for any wetland interference, or for altering, straightening, diverting or interfering in any way with the existing channel of a creek, stream or river. It is EXP's understanding that the Site is subject to this regulation, and required a Section 28 permit, as the Site contains wetland features.

1.2 Development Plan and Stormwater Management Strategies

The development plan for the Site is currently proposed to include four (4) apartment buildings ranging in height from 9 to 12 storeys containing 560 units, with 656 parking spaces. Underground parking structures will accommodate 470 parking areas with the remainder above surface parking. The current development plan is included in **Appendix B**.

Stormwater management on Site will include catch basins directing impervious flows (surface parking area, rooftops, walkways, patios) offsite to an existing stormwater management (SWM) pond. Open space areas and green spaces will allow for infiltration into the subsurface soils on Site.

Low Impact Development (LID) strategies proposed for implementation include directing clean rooftop runoff from Building A towards the wetland feature. Additional runoff from landscaped areas surrounding Building A will also be directed towards the wetland to aid in achieving development infiltration targets.

1.3 Terms of Reference and Scope of Work

The hydrogeological assessment was generally completed in accordance with the scope of work outlined in EXP's Proposal 999-25001656-PP dated October 22, 2019. Authorization to proceed with this investigation was received from Mr. Farhad Noory, President of Royal Premier Homes, in an email dated November 12, 2019. In person consultation was held with the UTRCA at the Watershed Conservation Centre on January 24, 2020. Comments received from the UTRCA Hydrogeologist, Linda Nicks, included a request for an additional monitoring station within the UW in the southwest of the Site to monitor surface water and shallow groundwater interaction within this feature. This additional monitoring station was installed and is labelled Station 3 on **Drawing 2**.

The purpose of the assessment was to examine the subsoil and groundwater conditions at the Site by advancing a series of boreholes at the locations chosen by EXP and illustrated on the attached Borehole Location Plan (**Drawing 2**). Subsoil and groundwater information from the Geotechnical Investigation prepared by EXP in December 2019 was used to assist in the preparation of this report.

The scope of work for the Hydrogeological Assessment consisted of the following tasks:

1. **Desktop Study:** This task consisted of a review of existing information including Site plans, previous reports, geological maps, geological cross sections, groundwater level information, borehole logs, and MECP WWR.

EXP completed a Preliminary Geotechnical Investigation at the Site (EXP, 2019) in conjunction with this investigation as well as a Hydrogeological Assessment of the neighbouring property to the south (EXP, 2020), owned by Southside Construction and called Toppings Lands or Talbot Village Phase 7. Relevant details from these investigations are provided in this report, where applicable. In addition, EXP has completed several Geotechnical Investigations and Hydrogeological Assessments for the surrounding properties and relevant details from those studies have been incorporated, where appropriate.

2. **Field Program:** Drilling of ten (10) boreholes was carried out as part of the field program in collaboration with the Geotechnical Investigation, with monitoring wells installed in three (3) of the boreholes (BH3/MW, BH7/MW, and BH8/MW). One (1) additional 'nested' monitoring well was installed adjacent to the PSW (BH8/MW – A/B). In addition, a total of three (3) surface water monitoring stations were installed within wetland features on Site. Water levels were measured, groundwater samples were collected, and single well response tests (SWRT) were completed for the purposes of characterizing the hydrogeological conditions at

the Site. Water levels were collected from the monitoring wells and wetlands for a period of 14 months (November 2019 to December 2020) to identify seasonal fluctuations in the groundwater elevations and the hydroperiod of the wetlands.

3. Data Evaluation: Evaluation of the available field and laboratory data, assessment of the dewatering requirements and potential dewatering effects on the surrounding environment, as applicable.
4. Water Balance: Preparation of a water balance assessment of the subject Site evaluating pre- and post-development conditions will be completed in the final report, once a development plan has been finalized.
5. Reporting: This task consisted of preparing this hydrogeological assessment report. In preparing this report, EXP has considered the guidance material available in the Conservation Ontario Guidelines for Hydrogeological Assessments (Conservation Ontario, 2013) and City of London Design Specification & Requirements Manual (2019).

Reference is made to **Appendix J** of this report, which contains further information necessary for the proper interpretation and use of this report.

2. Methodology

Prior to conducting the field work, it was not anticipated that significant amounts of shallow, near surface groundwater would be present at the Site. EXP has had a great deal of experience with the soil and shallow groundwater in the area of the Site, having carried out several hydrogeological and geotechnical investigations and providing inspection and testing services for much of the nearby residential developments in the area.

However, based on that experience, it was anticipated that discontinuous sand and silt lenses may be present within the till soils, and that those pockets may contain shallow groundwater which has infiltrated through weathered zones in the near-surface soils. Given that much of the servicing and potential underground parking depths at the Site are expected to be at conventional depths (some 2 to 5 m below final grades), it was determined that where wet sand and silt seams were encountered, it would be reasonable to install shallow wells to characterize any shallow groundwater which may be present. Additional wells were installed at greater depths within the aquitard layers to assist in developing a conceptual model for the groundwater flow system at the Site.

The monitoring wells were also installed for the purpose of providing insight on potential impacts of development on local natural heritage features and how groundwater conditions may impact the progress of construction activities such as excavations for basement construction and site servicing.

2.1 Borehole Drilling and Monitoring Well Installations

The borehole drilling program for the Site was completed in conjunction with the Geotechnical Investigation. The drilling program included completion of ten (10) boreholes across the Site with installation of monitoring wells in three (3) boreholes (BH3/MW, BH7/MW, and BH8/MW), with one (1) additional ‘nested’ well adjacent to the Provincially Significant Wetland (PSW), to allow for hydrogeological evaluation (BH8/MW – A/B). Borehole drilling and monitoring well installation was completed from November 21st to November 23rd, 2019 under the technical supervision of EXP. The location and depth of the boreholes was based on the proposed development plan which was provided to EXP and locations of significant natural features. Boreholes were advanced to depths ranging from 3.5 and 11.1 m below grade.

The boreholes were completed using a track-mounted drill rig and standard 21 cm (8”) OD hollow stem auger drilling techniques with split spoon sampling. During the drilling, the stratigraphy in the boreholes was examined and logged in the field by EXP technical personnel. Representative samples of the soils found in the boreholes were submitted for laboratory testing that included moisture content and gradation. Copies of the field borehole logs are provided in **Appendix C**. Copies of the soil gradation analyses are included in **Appendix D**. Monitoring well data and a gradation analysis completed as part of the Hydrogeological Assessment on the neighbouring property to the south (EXP, 2020) have also been included in **Appendices C and D**.

Four (4) groundwater monitoring wells were installed within the clayey silt till. All wells were constructed from 5.1 cm (2”) diameter, schedule 40, polyvinyl chloride (PVC), flush-threaded casing. The appropriate number of risers were coupled with screen sections via threaded joints to construct the well. The well screens consisted of PVC pipe with 0.010-inch factory-generated slots. A summary of the well installation details is provided in **Table 1**, with the well locations shown in **Drawing 2**. In addition to the four (4) monitoring wells installed on the Site, **Table 1** also includes the five (5) monitoring wells installed within the property immediately to the south, owned by Southside Construction, called Topping Lands or Talbot Village Phase 7.

A primary filter pack consisting of Silica Sand was placed around the well screen in the borehole and extended above the top of the well screen. Hole Plug, a swelling Bentonite clay that forms an effective barrier to the vertical movement of fluids when installed in a borehole, was used as a seal above the filter pack.

Table 1 – Monitoring Well Construction Details

Well ID	Ground Surface Elevation (m AMSL)	Top of Standpipe Elevation (m AMSL)	Completion Depth (m bgs)	Screen Length (m)	Screened Strata
BH3/MW	281.85	282.64	3.05	1.52	Silty Clay Till
BH7/MW	277.96	278.83	9.14	3.05	Silty Clay Till
BH8/MW-A	278.15	279.09	7.62	1.52	Silty Clay Till
BH8/MW-B	277.88	279.06	4.88	1.52	Silty Clay Till
<i>BH2/MW (EXP, 2020)*</i>	<i>274.51</i>	<i>275.27</i>	<i>12.19</i>	<i>1.52</i>	<i>Sandy Silt</i>
<i>BH6/MW (EXP, 2020)*</i>	<i>277.29</i>	<i>277.99</i>	<i>8.38</i>	<i>1.52</i>	<i>Silty Clay Till/Sand and Gravel</i>
<i>BH7/MW (EXP, 2020)*</i>	<i>274.81</i>	<i>275.47</i>	<i>9.75</i>	<i>1.52</i>	<i>Silt</i>
<i>BH9/MW (EXP, 2020)*</i>	<i>279.19</i>	<i>280.25</i>	<i>15.24</i>	<i>3.05</i>	<i>Sand</i>
<i>BH11/MW (EXP, 2020)*</i>	<i>277.82</i>	<i>278.70</i>	<i>15.24</i>	<i>3.05</i>	<i>Sand</i>

Notes: 1. m AMSL denotes metres above mean sea level.

2. m bgs denotes metres below ground surface.

* Indicates monitoring wells installed within the property immediately to the south, Southside Construction Talbot Village Phase 7.

2.2 Piezometer and Staff Gauge Installation

A total of two (2) shallow groundwater piezometers and two (2) staff gauges were installed on December 13, 2019 in the PSW and eastern Unevaluated Wetland (UW) area of the Site where surface water was present (Station 1 and Station 2). Following consultation with the Upper Thames River Conservation Authority, an additional shallow groundwater piezometer was installed in the UW at the west end of the Site on February 17, 2020 (Station 3). The locations are shown on **Drawing 2**. The following **Table 2** outlines the piezometer construction details.

The piezometers were installed with a 6-inch Solinst drive point end (6-inch screen length). The Solinst drive point piezometer ends have a stainless steel, 50 mesh cylindrical filter screen, within a ¾" (20mm) stainless steel drive-point body.

Staff gauges were installed at Stations 1 and 2 within the surface water body in order to capture monthly surface water elevations. These staff gauges are referred to as SG1 (Station 1) and SG2 (Station 2).

Table 2 – Surface Water Station Details

Station ID	Piezometer ID	Ground Surface Elevation (m AMSL)	Top of Piezometer Elevation (m AMSL)	Completion Depth (m bgs)	Screen Length (m)	Screened Strata	Staff Gauge Installed
Station 1	P-1	277.51	279.29	1.08	0.15	Silty Clay Till	Yes (SG1)
Station 2	P-2	273.35	274.58	1.20	0.15	Silty Clay Till	Yes (SG2)
Station 3	P-3	278.73	279.69	1.24	0.15	Silty Clay Till	No

Notes: 1. m AMSL denotes metres above mean sea level.
 2. m bgs denotes metres below ground surface.

2.3 Well Development and Groundwater Sampling

Monitoring wells were developed after installation. The wells were developed to:

- remove fine soil particles adjacent to the well screen that may otherwise interfere with water quality analyses;
- restore the groundwater properties that may have been disturbed during the drilling process;
- improve the hydraulic communication between the well and the geologic materials; and,
- remove water, if any, added during the drilling process.

Wells were generally developed by removing a minimum of ten times the volume of water contained in the well casing (casing volume) where possible using rigid high-density polyethylene (HDPE) tubing fitted with Waterra™ inertial pumps.

After appropriate well development, groundwater samples were collected for analysis of groundwater quality. Samples were collected from monitoring wells on February 17th and April 27th, 2020 to establish baseline water quality.

Prior to collecting groundwater samples for chemical analysis during each sampling event, the stagnant water in the well was purged to allow groundwater representative of the aquifer to enter the well. A minimum of three casing volumes of water was removed (“purged”) from each well immediately prior to sampling.

Monitoring wells were purged using either a peristaltic pump or rigid high-density polyethylene (HDPE) tubing fitted with Waterra™ inertial pumps that are dedicated to each monitoring well. Water samples were collected by direct transfer of groundwater from the Waterra™ pumping system to appropriate pre-labelled containers, with filtering and preservation as appropriate, before submission to Bureau Veritas Laboratories in London, ON for chemical analysis. The samples were submitted for laboratory analysis of dissolved metals, cations and anions, nitrogen species (nitrate, nitrite, and ammonia), phosphate and chloride.

2.4 Surface Water Sampling

Surface water sampling has occurred at Station 1 and Station 2 in order to establish baseline surface water quality. Surface water samples were collected on two (2) occasions on February 17th and April 27th, 2020. The samples were submitted for laboratory analysis of total and dissolved metals, cations and anions, nitrogen species (nitrate, nitrite, and ammonia), phosphate and chloride.

2.5 Long-Term Groundwater Elevation Monitoring

Water level monitoring in all monitoring wells and piezometers installed on Site was completed on a monthly basis since installation. Measurements are manually collected using a battery-signal water level tape.

Water level dataloggers were installed in monitoring wells BH7/MW, BH8/MW-A and BH8/MW-B, as well as in piezometers P-1 and P-2 to assist in the evaluation of groundwater elevations and influence of precipitation on groundwater levels. An additional logger was placed at surface and used for barometric compensation. The water level dataloggers were installed on December 13, 2019 and remained in place for continued monitoring for a total monitoring period of 12 months. Water level measurements were logged every 24 hours.

2.6 Hydraulic Conductivity Testing

Hydraulic conductivity estimates for the soils were determined using two methods. The first method is applicable to saturated soils at depth and involves single well recovery tests (SWRT) within the installed monitoring wells.

The second method involves a calculated estimation of hydraulic conductivity based on soil sample particle size analysis using the Puckett method. The two methods used for this study area are described in the following subsections.

2.6.1 Single Well Response Tests (SWRTs)

Single well response tests (SWRTs) were completed on BH7/MW, BH8/MW-A and BH8/MW-B to evaluate the hydraulic characteristics of the screened overburden. The test method consisted of an initial purging of the well and subsequently monitoring the rise in the water level in the well over time.

The mathematical solution by Hvorslev (1951) was used to interpret the data and involved matching a straight-line solution to water-level displacement data collected during the recovery test. The time required for the water level in the well to reach 37% of the initial change (T_o) is determined from the plot, and used in the following equation to estimate the hydraulic conductivity (K);

$$K \text{ (m/s)} = [r^2 \ln(L/R)] / [2 L T_o]$$

where: r is the radius of the well casing;
R is the radius of the well screen; and,
L is the length of the well screen.

2.6.2 Grain Size Analyses

A total of three (3) soil samples were selected for grain size distribution analysis testing. Due to the nature of the Site soils, estimated hydraulic conductivity (K) values were determined using the methodology derived by Puckett et

al. The Puckett method of correlating the grain size distribution analysis to the soil hydraulic conductivity is based on the following relationship:

$$K \text{ (cm/s)} = 4.36 (10^{-5}) e^{[-0.1975 (\% \text{ clay})]}$$

3. Site Description and Geologic Setting

3.1 Site Location and Description

The Site is located south of Southdale Road West, west of Bostwick Road and east of Colonel Talbot Road. The municipal address is 735 Southdale Road in London Ontario. The Site is triangular in shape and approximately 3.85 ha in size (**Drawing 1**). The Site is generally bounded by residential development to the north and west and agricultural land to the south and east.

A Provincially Significant Wetland (PSW) is located on the southern edge of the Site (**Drawing 2**) which is primarily within the adjacent property to the south. The part of the wetland that borders the Site contains mature trees and shrubs. Two (2) Unevaluated Wetlands (UW) are located at the east and west side of the Site, as shown on **Drawing 2**. A small, wooded area is located on the west side of the Site and along the south adjacent to the PSW. The Site contains a residential house and barn.

The development plan for the Site is currently proposed to include four (4) apartment buildings ranging in height from 9 to 12 storeys containing 560 units, with 656 parking spaces. Underground parking structures will accommodate 470 parking areas with the remainder above surface parking. The Site will be serviced with municipal water and sewer services set at conventional depths. The proposed development plan is included in **Appendix B**.

3.2 Topography and Drainage

The existing topography at the Site is generally sloped towards the southeast with the eastern section draining east towards an UW and the western section draining south towards a PSW. The Site ground elevations range between 282 and 274 metres (m).

Drainage from the Site is primarily through surface infiltration and overland flow. Runoff generally follows topography. The Ministry of Agriculture, Food and Rural Affairs (OMAFRA) mapping used in **Drawing 3** does not have drainage information for the Site but suggests the agricultural fields of surrounding properties to be randomly tile drained. The OMAFRA drainage mapping further supports this, as no municipal drains are noted in the area.

Ponding of water was noted in the low-lying area near the east side of the Site, designated as the Unevaluated Wetland (UW) mapped in the City of London's Natural Heritage Map 5. The ponded water is generally responsive to rainfall events, as evidenced through site observations throughout the seasons. This eastern UW is also fed from surface flows originating from the pond north of Southdale Road, through a culvert.

Ponding of water has also been observed within the PSW on the south edge of the Site.

The Site is located in the subwatershed of Dingman Creek. The majority of the west half of the Site surrounding the PSW is regulated by the Upper Thames River Conservation Authority (UTRCA) as shown on **Drawing 4**.

3.3 Wetlands and Ecology

The ecology of the Site has been studied by MTE Consultants (MTE), and a detailed study is completed under separate cover. The Ecological Land Classification (ELC) as completed by MTE, defines the PSW on Site as part of the North Talbot Wetlands. The western Unevaluated Wetland (UW) is classified as a Mineral Meadow Marsh Ecosite inclusion (MAM2), and the eastern UW is classified as a Submerged Shallow Aquatic Ecosite (SAS1).

3.4 Site Geology

3.4.1 Bedrock Geology

The Site is underlain by limestone, dolostone and shale of the Dundee Formation (OGS, 2011). This formation consists of 60 to 160 feet (18 to 49 m) of light brown, medium-grained with some minor chert (Hewitt, 1972), and is part of the Algonquin Arch, which forms a ridge along the southwestern Ontario peninsula between the Michigan Basin (to the northwest) and the Appalachian Basin (to the southwest). Bedrock is generally not exposed in the area.

Review of bedrock topography mapping (**Drawing 5**; OGS, 1978) indicates the bedrock surface at an elevation in the range of 198 to 206 m at the Site. The bedrock surface generally slopes to the south or southwest in this area. Review of MECP Well records for the area (**Appendix F**) indicates that there are no wells within 500 m of the Site that were drilled to bedrock. Bedrock was not encountered during the drilling program completed as part of this investigation.

3.4.2 Overburden Geology

The physiography of Southwestern Ontario was altered significantly by the glacial and interglacial periods that took place throughout the Quaternary period. The overburden deposits which are present in the study area were formed by numerous glacial events during the late Wisconsinan glacial stage approximately 10,000 to 23,000 years before present. There were two distinct glacial lobes present in Southwestern Ontario during this period. The Huron Lobe advanced from Lake Huron southwards, and the Erie Lobe advanced from the northeast, receding to the east.

During the advancement of the glacial ice sheets, bedrock and unconsolidated sediments were eroded. During the recession of the glaciers, the eroded materials were deposited in lakes, rivers and along spillways, contributing to the present configuration of moraines, abandoned spillways, drumlins, eskers, abandoned shorelines, and various still-water sediment deposits.

Deposits in the area can be contributed to the Port Bruce Stadial period. In the London area, a series of east-west recessional and end moraines were formed, along with the Port Stanley Till Plain. Deposition of the basal portion of the Port Stanley Till was formed during the initial advance of the Erie Lobe. Overlying till was deposited during subsequent cycles of advance and retreat, resulting in silt and sand layering within the till plain.

The surficial deposits were mapped and categorized into a number of physiographic regions by Chapman and Putnam (1984). The Site is part of the physiographic region known as the Mount Elgin Ridges (**Drawing 6**). The Site is located on the Ingersoll Till Moraine (**Drawing 7**).

Quaternary mapping completed by Barnett et. al. (1981) indicates that the quaternary geology at the Site consists of glaciofluvial outwash deposits: gravel and sand including proglacial river and deltaic deposits (**Drawing 8**).

Surficial geology has also been described by Ontario Geological Survey MRD128 (OGS, 2010) as being glaciolacustrine deposits consisting of clay to silt-textured till (Ingersoll Till Moraine) across the entire Site. A fluvial terrace is mapped to be present west of the Site (**Drawing 9**).

3.4.3 Site Specific Surficial Geology

In conjunction with the Preliminary Geotechnical Investigation for the Site (EXP, 2019), ten (10) boreholes were completed by EXP, with installation of monitoring wells in three (3) boreholes, with one (1) additional 'nested' well

adjacent to the Provincially Significant Wetland (PSW), to allow for hydrogeological evaluation. The locations of the boreholes are provided in **Drawing 2**. The boreholes were terminated at a maximum depth of between 3.5 and 11.1 m below existing grade. Borehole logs are provided in **Appendix C**.

Generalized stratigraphic cross sections through the Site, as shown in **Drawing 10**, are provided as **Drawings 11** and **12**. The cross sections include wells from EXP's Hydrogeological Assessment of the neighbouring property to the south (EXP, 2020) and Ministry of Environment, Conservation and Parks (MECP) Water Well Records (WWR), and generally shows a low permeability clayey silt/silty clay till layer overlying the Site, with fill noted at surface of some boreholes. Permeable sand and silt layering is noted within the till layer and an extensive sand unit is noted beneath the till at the west end of the Site. The detailed stratigraphy encountered in the boreholes is summarized below.

Generally, the Site is overlain by a layer of topsoil. Fill material was encountered beneath the topsoil at Boreholes BH7/MW and BH10, extended to depths of 2.0 to 3.3 m bgs and consisted of loose clayey silt with some sand and some topsoil inclusions. All other boreholes encountered clayey silt till or clayey silt beneath the topsoil. Sandy silt till was encountered under the clayey silt till in Borehole BH3/MW. Beneath the till, sand was encountered in Boreholes BH1 and BH3/MW. A sand and gravel lens within the till was noted in Borehole BH4. Review of MECP Well Records for the area suggests that an extensive sand to sand and gravel stratum is located below the clayey silt till at elevations ranging between 253 m and 272 m. The layer was noted as dry in the upper levels, with static water levels at approximate depths of 234 m to 236 m.

A total of three (3) grain size analyses were completed from samples collected during drilling at various locations across the Site. The grain size results, and the results of gradations carried out on samples collected from the neighbouring property to the south (EXP, 2020) are discussed in Section 4.5 *Hydraulic Conductivity*. Laboratory results and graphs are provided in **Appendix D**.

4. Hydrogeologic Setting

In addition to the groundwater information collected from the monitoring wells installed at the Site, the following documents were reviewed to gain an understanding of the hydrogeological conditions in the area:

- Dillon Consulting Limited and Golder Associates Ltd. Middlesex-Elgin Groundwater Study, Final Report, submitted to Middlesex and Elgin Counties, dated July 2004, henceforth referred to as the Middlesex-Elgin Groundwater Study;
- Goff, K and D.R. Brown, 1981. Ground-Water Resources – Summary. Thames River Basin Water Management Study Technical Report. Ontario Ministry of the Environment, Water Resources Report 14;
- Thames-Sydenham and Region Source Protection Committee. 2011. Upper Thames River Source Protection Area, Approved Updated Assessment Report. 12 August; and,
- MECP Water Well Records (WWR) within 500 m of the perimeter of the Site.

4.1 Regional Aquifer

Goff and Brown (1981) described the potential for four regional aquifers in the study area; shallow unconfined overburden aquifer, intermediate and deep confined aquifers and a bedrock aquifer.

4.1.1 Overburden Aquifers

The uppermost shallow and unconfined overburden aquifer was described as consisting of lacustrine or glacio-fluvial sands that may, in some locations, be overlain by lower permeability silts and clays. Regionally, the shallow aquifer is generally associated with the Caradoc Sand Plain and glacial deposits and are typically less than 15 m in thickness. Shallow overburden aquifers are discontinuous in nature and are expected to be linked more directly to precipitation and recharge compared to the intermediate and deep overburden aquifers.

Intermediate depth (15 to 30 m below ground surface (bgs)) and deep overburden (>30 m bgs) aquifers generally consist of saturated sand and gravel deposits in the overburden and are very discontinuous in nature due to the heterogeneous nature of glacial deposits. Sand and gravel layers are present in the Port Stanley and Catfish Creek glacial till sheets. The intermediate depth and deep overburden aquifers are generally confined by overlying silt, clay and glacial till deposits which limit vertical migration of shallow groundwater.

Locally, shallow groundwater flow is expected to follow the local topography, and generally drain towards Dingman Creek, to the southwest of the Site. On a regional scale, the deep overburden aquifer flow direction is reported to be towards the south-southwest (Dillon and Golder, 2004).

Based on the well record information reviewed for this investigation (discussed below), the occurrence of shallow overburden water supply wells in the immediate vicinity of the Site is low.

4.1.2 Bedrock Aquifer

The bedrock aquifer is contained within limestone of the Dundee Formation. The water quality is generally good with elevated levels of iron, sodium and chloride in some wells. As with the intermediate and deep overburden aquifers, the bedrock aquifer is confined by the overlying till material, which generally ranges in thickness up to 17 m in the vicinity of the Site. Wells extending into the shallow fractured bedrock (up to about 3 m) are typically considered to be hydraulically connected to the overlying sand and gravel deposits that are present at the bedrock-overburden interface.

Flow direction in the deeper confined aquifer(s) and regional groundwater system has not been assessed as part of this investigation. However, as part of the Middlesex-Elgin Groundwater Study (Dillon and Golder, 2004), groundwater flow within the deeper aquifer is generally in a south-southwest direction towards Lake Erie.

4.2 MECP Water Well Records

A search of the Ontario Ministry of Environment, Conservation and Parks (MECP) Water Well Records (WWR) database resulted in the identification of nine (9) records for an area within approximately 500 m of the Site boundary. Identified wells are generally situated to the south of the Site (**Drawing 13**), with no well records found within 500 m of the Site to the north.

Water uses in the area include the following:

- domestic water supply (2 wells);
- monitoring or test holes (6 wells); and
- 1 abandoned well.

The approximate locations of identified wells are shown on **Drawing 13**, with the MECP WWR Summary provided in **Appendix F**.

Domestic water supply in the local area wells are drawing from the confined deep sand/sand and gravel aquifer, with static water levels ranging between 35 m and 43 m bgs. The one (1) domestic water supply well listed as being on the Site is for the original farmhouse and will be decommissioned during development of the property.

The monitoring/test holes range in depth between 6.1 m and 15.2 m and typically are terminated in the surficial glacial till deposit.

4.3 Well Survey

Municipal services are available along Southdale Road and in the residential subdivisions north, south and west of the Site. Based on the results obtained during the MECP WWR database search, there is a low likelihood for shallow wells to be presently used or to be impacted by construction activities at the Site. Therefore, a door to door well survey was not completed by EXP.

4.4 Site Specific Groundwater Elevations

4.4.1 Monitoring Well Hydrographs

Manual water levels in the monitoring wells have been collected monthly since November 2019. Details of the monthly water levels are summarized in **Appendix G**. Overall, groundwater elevations within the shallow till wells installed on Site (MW3, MW8B) ranged from seasonal lows of roughly 3.2 mbgs (November 2020) to seasonal highs of 0.5 mbgs (April 2020). Wells installed deeper in the till (MW7, MW8A) ranged from seasonal lows of roughly 5.6 mbgs (November 2020) to seasonal highs of 0.93 mbgs (March 2020).

Dataloggers were installed in three (3) selected monitoring wells (monitoring wells BH7/MW, BH8/MW-A and BH8/MW-B) to provide continuous groundwater elevation monitoring. Results are presented in **Appendix G**. Manual measurements generally correlate well with datalogger results, indicating reliable results.

The hydrographs from monitoring wells BH7/MW, BH8/MW-A and BH8/MW-B, which are each screened across the shallow glacial till, do not indicate a notable response to rain events. The groundwater sampling events on February 17th and April 27th, 2020 were captured in the graphs and illustrate the low permeability of the screened stratum, with some of the wells requiring months to recharge to static levels.

Monitoring well BH7/MW recovered the fastest of the wells with dataloggers following the sampling events, taking approximately one week for groundwater to return to static levels. Groundwater elevations in this well increased from logger installation in December 2019 to mid January 2020, and then remained fairly consistent until June 2020, apart from the large decreases following groundwater sampling events. Beginning in June 2020 a decreasing trend is noted through the summer months, eventually levelling off through September and early November. Beginning in the middle of November 2020 an increasing trend is noted in this well. The groundwater temperature remained consistent throughout the monitoring period in this well.

Monitoring well BH8/MW-A had the slowest recovery following the SWRT and sampling event on April 27, 2020, taking nearly two months to return to static levels. The sampling event in February 2020 produced a much less significant response in this well. This monitoring well showed an increasing trend from datalogger installation in December 2019 until the SWRT and sampling event in April 2020. Following the April 2020 event water levels steadily increased again until June 2020. Beginning in July 2020 a decreasing trend is noted at this well, continuing until early December 2020 when groundwater elevations began to increase again. The groundwater temperature in this well also remained consistent throughout the monitoring period.

Monitoring well BH8/MW-B took approximately two weeks to recover from the February 2020 sampling event and approximately one month to recover from the April 2020 SWRT and sampling event. This well showed a similar pattern to BH8/MW-A, showing increasing groundwater elevations from December 2020 until March 2020 when they began to level off until the April 2020 monitoring event. Following the April 2020 event groundwater elevations increased steadily until early June 2020 when they then began to decrease. This decrease in groundwater elevations continued until late November 2020, at which point groundwater elevations again began to increase. The temperature in this well showed the most variation of the three monitoring wells with dataloggers, showing a decrease from datalogger installation in December 2019 to May 2020, at which point the temperature began a slow increase until December 2020.

4.4.1 Surface Water Station Hydrographs

Dataloggers were installed in the piezometer (P-1) as well as surface water staff gauge (SG1) at Station 1, located within the PSW. The piezometer was installed into the underlying silty clay soils, adjacent to the surface water body. The hydrograph of Station 1 is located in **Appendix G**. From the point of installation of P-1, it took approximately 2 weeks for the water level to reach static levels within the piezometer. The winter rainstorm on January 11, 2020 is seen on the hydrograph and both the surface water and shallow groundwater elevations rose approximately 20-30 cm due to this weather event. The datalogger and manual measurements show the surface water readings are consistently higher than the piezometer readings, indicating downward recharging conditions.

The datalogger installed at SG1 no longer collected reliable information after the July 2020 monitoring event, which was also followed by dry surface conditions within the PSW from August to November 2020. The datalogger installed in P-1 was noted as stolen during the field visit in October 2020.

The Station 2 hydrograph includes datalogger information from piezometer P-2 as well as manual water levels collected from P-2 and from staff gauge SG2. The hydrograph is included in **Appendix G**. The water levels collected in piezometer P-2 and SG2 show similar patterns throughout the monitoring period with the surface water readings showing consistently higher elevations compared to the piezometer readings. This water body was frozen over for most of the winter and receives runoff from Southdale Road as well as from the pond to the north of the road, through a culvert. The groundwater elevation in P-2 showed some variation at the beginning of the monitoring period but remained consistent throughout the monitoring period. The groundwater temperature in this piezometer has fluctuated throughout the monitoring period with a general increasing trend from March 2020 to late July 2020, and then a decreasing trend from July 2020 to December 2020.

4.5 Groundwater Flow and Hydraulic Gradients

Shallow groundwater flow across the Site is affected by hydraulic conductivity, topography, drainage, and geology. A groundwater elevation map was created based on groundwater measurements collected from monitoring wells on May 23, 2020. Based on the shallow groundwater elevations collected from monitoring wells across the Site, combined with groundwater elevation information from the site to the south (EXP, 2020), it is determined that groundwater is generally flowing in a southeasterly direction. Groundwater elevations and flow direction is presented in **Drawing 14**.

The nested groundwater wells, BH8/MW-A and BH8/MW-B, were both installed in the till and the measurements collected from both locations allow us to identify the hydraulic gradient within the till. The following table presents the groundwater elevations collected from both wells during the monitoring period thus far.

Table 3 – Hydraulic Gradient

	Completion Depth (m AMSL)	Groundwater Elevation (m AMSL)											
		Jan 28/20	Feb 17/20	Mar 14/20	Apr 27/20	May 23/20	Jun 10/20	Jul 11/20	Aug 26/20	Sep 17/20	Oct 28/20	Nov 14/20	Dec 17/20
BH8/MW-A (Deep)	270.53	271.58	272.30	273.14	274.15	271.93	273.99	273.79	273.51	273.31	272.82	272.54	2272.86
BH8/MW-B (Shallow)	273.08	276.04	276.87	277.22	277.38	277.00	277.22	276.83	276.03	275.78	275.06	274.61	276.43
Hydraulic Gradient		Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down	Down

Notes: 1. m AMSL denotes metres above mean sea level.

The groundwater elevations collected in the nested well set indicate that the hydraulic gradient is consistently downwards during each of the monitoring events, due to the shallow well having higher groundwater elevations than the deeper well.

4.6 Hydraulic Conductivity

Single Well Recovery Tests (SWRT) were carried out on monitoring wells BH7/MW, BH8/MW-A and BH8/MW-B with results shown graphically in **Appendix E**. The mathematical solution by Hvorslev (1951) was used to interpret the SWRT data and involved matching a straight-line solution to water-level displacement data collected during the recovery test. The time required for the water level in the well to reach 37% of the initial change (T_0) is determined from the plot, and used in the following equation to estimate the hydraulic conductivity (K);

$$K \text{ (m/s)} = [r^2 \ln(L/R)] / [2 L T_0]$$

where: r is the radius of the well casing;
R is the radius of the well screen; and,
L is the length of the well screen.

The results from the SWRT of BH7/MW and BH8/MW-B indicate the estimated hydraulic conductivity of the silty clay till ranges from approximately 1.7×10^{-9} m/s to 4.5×10^{-10} m/s respectively (**Table 4**). Monitoring well BH8/MW-A took over two months to recover fully following the SWRT. These results are within the estimated range of hydraulic conductivity values reported by Freeze and Cherry (1979) for similar soils.

Grain size analyses were carried out on select soil samples collected from the boreholes, with results summarized in **Table 4**, and shown graphically in **Appendix D**.

A total of three (3) soil samples from Site were selected for grain size distribution analysis testing. Due to the nature of the Site soils, estimated hydraulic conductivity (K) values were determined using the methodology derived by Puckett et al. The Puckett method of correlating the grain size distribution analysis to the soil hydraulic conductivity is based on the following relationship:

$$K \text{ (cm/s)} = 4.36 (10^{-5}) e^{[-0.1975 (\% \text{ clay})]}$$

Based on the grain size analyses, the hydraulic conductivities for the silty clay till soils range from 2.2×10^{-7} m/s to 7.3×10^{-7} m/s. The results of all hydraulic conductivity testing are compiled in the table below.

Table 4 – Hydraulic Conductivity Testing Results

Sample ID	Lithology	Hydraulic Conductivity (m/s)
Grain Size Analyses		
BH7/MW	Silty Clay Till	6.0×10^{-7}
BH8/MW-A	Silty Clay Till	2.2×10^{-7}
BH8/MW-B	Silty Clay Till	7.3×10^{-7}
Single Well Response Tests		
BH7/MW	Silty Clay Till	1.7×10^{-9}
BH8/MW-B	Silty Clay Till	4.5×10^{-10}

4.7 Groundwater and Surface Water Quality

Groundwater samples were collected from three (3) selected monitoring wells (BH7/MW, BH8/MW-A, and BH8/MW-B) on February 17th and April 27th, 2020 to establish baseline water quality. Surface water samples were also collected from two locations (Stations 1 and 2; **Drawing 2**) on February 17th and April 27th, 2020 to establish baseline water quality of the Provincially Significant Wetland (PSW) and east Unevaluated Wetland (UW) prior to development. The Bureau Veritas laboratory results and chain of custodies are included in **Appendix H**.

Groundwater quality was compared to the Ontario Drinking Water Standards, Objectives and Guidelines (ODWQS) (O.Reg. 169/03) maximum allowable concentrations (MAC). Although the groundwater on site is not planned for use as drinking water, the MAC guidelines are used for comparison's sake only. In comparison to these guidelines, groundwater was found to meet all of the ODWQS. The groundwater results are tabulated in **Appendix H**.

Surface water quality was compared to Ontario Provincial Water Quality Objectives (PWQO). Surface water quality was found to exceed the PWQO guidelines for a number of parameters in both sampling events. The following table summarizes the detected exceedances. Total phosphorus was found to exceed PWQO guidelines at both stations during both events, indicating impacts from fertilizers.

Table 5 – Surface Water Quality Exceedances

Parameter	PWQO Guideline	Station 1		Station 2	
		17-Feb-20	27-Apr-20	17-Feb-20	27-Apr-20
pH	6.5 – 8.5	*	*	*	8.94
Total Phosphorus	0.01 mg/L	0.041	0.11	0.028	0.062
Total Aluminum	75 ug/L	*	89	*	120
Total Iron	300 ug/L	*	*	*	720
Total Zinc	20 ug/L	*	*	60	*

Note: * meets PWQO

The water quality results were plotted on a Piper Diagram and Schoeller Diagram and are presented in **Drawings 15 and 16**, respectively. The chemical results show that the water quality within the monitoring wells are generally consistent and relatively similar. The surface water quality at Station 1 (the PSW) and Station 2 (the UW) show somewhat different results, indicating variability in their sources and/or impacts. Station 1 plots closer to the groundwater results whereas Station 2 shows quite the variability from the groundwater results. These results suggest that Station 1 may have some groundwater influence on the PSW whereas Station 2 is likely influenced more by surface flows.

5. Sourcewater Protection Considerations

5.1 Significant Groundwater Recharge Areas (SGRA)

Groundwater recharge is largely controlled by soil conditions, and typically occurs in upland areas. The groundwater flow direction has been previously identified as flowing in a southeastern direction.

As defined in the Clean Water Act (2006), an area is a significant groundwater recharge area if,

1. the area annually recharges water to the underlying aquifer at a rate that is greater than the rate of recharge across the whole of the related groundwater recharge area by a factor of 1.15 or more; or
2. the area annually recharges a volume of water to the underlying aquifer that is 55% or more of the volume determined by subtracting the annual evapotranspiration for the whole of the related groundwater recharge area from the annual precipitation for the whole of the related groundwater recharge area.

An assessment report for the Upper Thames River Source Protection Area was completed by the Thames-Sydenham and Region Source Protection Committee. As defined by the Clean Water Act (2006) and identified by the Thames-Sydenham and Region Source Protection Committee, the Site is located outside of a SGRA (**Drawing 17**). This is consistent with the observed low permeable surficial soils observed at Site.

5.2 Highly Vulnerable Aquifers (HVA)

The susceptibility of an aquifer to contamination is a function of the susceptibility of its recharge area to the infiltration of contaminants. As defined in the *Clean Water Act (2006)*, the vulnerability of groundwater within a source protection area shall be assessed using one or more of the following groundwater vulnerability assessment methods:

1. Intrinsic susceptibility index (ISI).
2. Aquifer vulnerability index (AVI).
3. Surface to aquifer advection time (SAAT).
4. Surface to well advection time (SWAT).

In the Thames-Sydenham and Region, HVAs were mapped using the ISI method. The ISI method is an indexing approach using existing provincial Water Well Information System (WWIS) database. The ISI method is described in detail in the MECP's Technical Terms of Reference (2001). However, in short, the ISI method is a scoring system that takes into consideration the unique hydrogeologic conditions at a particular location. The scores are determined using a combination of the saturated thickness of each unit and an index number related to the soil type, and as such, the scores reflect the susceptibility of the aquifer to contamination.

As defined in the MECP's 2001 Technical Rules,

- an area having an ISI score of less than 30 is considered to be an area of high vulnerability;
- an area having an ISI score greater than or equal to 30, but less than or equal to 80, is considered to be an area of medium vulnerability; and,
- an area having an ISI score of greater than 80 is considered to be an area of low vulnerability.

The Thames-Sydenham and Region Source Protection Committee has determined, using the ISI method, that the Site is not located within HVA areas (**Drawing 18**).

6. Monthly Water Balance Assessment

The monthly water balance assessments for the Site were completed in accordance with the recommendations indicated in the guidance document “Hydrogeological Assessment Submissions: Conservation Authority Guidelines to Support Development Applications” (Conservation Ontario, 2013), and using appropriate site condition values obtained from Table 3.1 of the MOE Stormwater Management Planning and Design Manual (MOE, 2003). The results of the water balance are provided in **Appendix M**.

The water balance accounts for all water in and out-flows in the hydrologic cycle. Precipitation (P) falls as rain and snow. It can then run off towards wetlands, ponds, lakes, and streams (R), infiltrate into the ground (I), or evaporate from surface water and vegetation (ET). When long-term average values of P, R, I, and ET are used, then minimal or no net change to groundwater storage (ΔS) is assumed.

The annual water balance can be stated as follows:

$$P = ET + R + I + \Delta S$$

Where:

P = precipitation (mm/year)

ET = evapotranspiration (mm/year)

R = runoff (mm/year)

I = Infiltration (mm/year)

ΔS = change in groundwater storage (taken as zero) (mm/year).

6.1 Precipitation and Evapotranspiration

The annual total precipitation used for this water balance (1011.5 mm/yr) is based on data provided by Environment Canada, based on the 30 year average data for climate normals, using the nearest local weather station information (London, ON). In this detailed monthly water balance, precipitation as rain and snow are both considered. Snow storage and resulting snow melt in the winter and early spring months is considered as part of the evapotranspiration volumes.

Evapotranspiration combines evaporation and transpiration and refers to the water lost to the atmosphere. The rate of evapotranspiration is a function of the water holding capacity of the soil and varies with soil and vegetation type and amount of impermeable surface cover.

Monthly evapotranspiration volumes were calculated using the monthly water balance graphical interface created by the U.S. Geological Survey (USGS), Open-File report 2007-1088 (McCabe and Markstrom, 2007). This interface uses the principles outlined by Thornthwaite and Mather (1957) and permits the user to easily modify water balance parameters and provide useful estimates of water balance components for a specified location.

The difference between the annual precipitation and the annual evapotranspiration represents the surplus water which is available for infiltration and surface run-off. Distribution of the surplus water to infiltration is based on an infiltration factor based on site conditions for topography, cover vegetation and soil.

6.2 Infiltration and Runoff

The soil water holding capacities and infiltration rate were determined using values presented in Table 3.1 of the MOE Stormwater Management Planning and Design Manual (MOE, 2003) based on the vegetative cover and the hydrologic soil group. The weighted values based on the Site conditions are presented in the calculation sheets provided in **Appendix M**.

Localized infiltration rates will vary based on factors such as the saturated hydraulic conductivity of surface soils, land slope, rainfall intensity, relative soil moisture at the start of a rainfall event, and type of cover on the ground surface.

Based on soil mapping by the Ministry of Agriculture, Food and Rural Affairs the surficial soils at the Site are predominantly C and B-type soils (silt and sand loam). Based on borehole logs from the Site, the soil cover ranges from sandy silt till to clayey silt till (CD-type soil). For the water balance analysis, soil moisture capacity for B and CD-type soils was utilized. CD-type soils have a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture.

6.3 Pre-development and Post-development Calculations

Pre-development and Post-development water balance calculations have been carried out and are based on preliminary and available design data. The development consists of four (4) apartment buildings with associated roadway, underground parking and above ground parking, as presented in **Appendix B**.

In general, the Site comprises a land area of about 3.85 hectares and currently contains a residential property and driveways. A forested area is present in the west portion of the Site. Post-development will consist of apartment buildings with non-impervious areas consisting of a vegetative cover classification of urban lawns and landscaping. Low Impact Development (LID) strategies proposed for implementation include directing clean rooftop runoff from a portion of Building A towards the wetland feature. Additional runoff from landscaped areas surrounding Building A will also be directed towards the wetland to aid in achieving development infiltration targets.

The Site was divided into 2 areas representing drainage to separate regions, as shown in **Drawing 19**. Area A (2.26 ha) consists of lands in the western portion of the Site and drains to the south towards the PSW and Area B (1.59 ha) includes the eastern portion of the property which drains east toward the UW. As no grading plans have been finalized, the drainage patterns between pre and post development have been assumed to be similar.

For pre-development conditions, Area A currently contains roughly 0.07 ha of impermeable surfaces (existing driveway), and Area B currently contains 0.02 ha of rooftop area from the existing residential property. Post development pervious and impervious cover is presented in **Table 6**.

Under post-development conditions, it is assumed at this time that the total rooftop area from Building A contributing runoff volume to the wetland feature is 0.18 ha. In addition, the landscaped area surrounding Building A will direct runoff towards the wetland feature. This landscaped area contribution is estimated to be 0.54 ha.

Table 6: Summary of Post-Development Cover

	Drainage Area A (Ha)	Drainage Area B (Ha)
Rooftop runoff to wetland	0.18	n/a
Landscaped Area – runoff contribution to wetland	0.54	n/a
Open Space	0.45	0.61
Impervious cover (rooftops, surface parking, roads, sidewalks, patios)	1.09	0.98
TOTAL AREA	2.26	1.59

Table 7 provides a summary of the pre and post development water balance calculations. Calculation worksheets are provided in **Appendix I**. Calculations have been completed for the additional volume of runoff from the landscaped areas surrounding Building A (0.54 ha) as well as the rooftop area of a portion of Building A (0.18 ha). The added runoff from the landscaped area will provide 74% of existing conditions infiltration to the wetland feature. The additional rooftop volume will provide an added 1,269 m³/year of secondary infiltration into the wetland, resulting in roughly 116% of pre-development infiltration volumes to the wetland feature.

Table 7: Summary of Water Balance Estimates

	Pre-Development	Post-Development with Landscaped Area (0.54 ha)	% Difference	Post-Development with Added Rooftop Flows (0.18 ha)	% Difference With Rooftop Mitigation
Drainage Area A					
Estimated Runoff (m³/year)	8,343	10,635	127%	-	-
Estimated Infiltration (m³/year)	3,030	2,249	74%	3,518	116%
Drainage Area B					
Estimated Runoff (m³/year)	5,965	10,290	173%	-	-
Estimated Infiltration (m³/year)	1,933	844	44%	-	-

Conservation Ontario Guidelines (Conservation Ontario, 2013) suggest a target of 80% of the pre-development infiltration be maintained in the post-development conditions. Calculations for the Site are indicative of the post-development infiltration being at approximately 74% of the pre-development infiltration in Area A with just the landscaped area contributing infiltration volumes to the wetland feature. As discussed above, the addition of rooftop runoff volumes to the wetland feature on Site will increase the infiltration volumes to exceed the recommended infiltration guidelines.

7. Impact Assessment

7.1 Water Well Users

Potable wells in the area are typically sourced from deep sand and gravel aquifers which are confined below low permeability silty clay overburden. Domestic water supply in the local area wells is sourced from the deep aquifer sand and gravel wells extending to depths between 41 and 71 m. Site development is not expected to impact any local potable wells. In addition, municipal water servicing is available along Southdale Road, in the subdivisions north, south and west of the Site.

Wells set at depths greater than 10 m are not expected to be impacted by the construction of site services or typical excavations associated with the residential development of the site. The silty clay strata noted in the boreholes will limit both the vertical and horizontal zone of influence impacting the wells due to the lower permeability of the founding soils. No significant long-term impact is anticipated on the deep wells, either quantitatively or qualitatively since the inverts of the sewers are not expected to be deep enough to penetrate into the underlying aquifers. Any temporary dewatering operations which may be required to deal with groundwater seepage from the overburden soils are not expected to cause any long-term impacts to the intermediate and deep overburden and bedrock aquifers supplying the water supply wells near the Site.

Monitoring wells have been installed at the Site as part of the Site investigations to document stabilized groundwater conditions. Prior to the Site grading work, and when the monitoring wells are determined to be no longer required, the wells should be properly decommissioned in accordance with Ontario Regulation 903. Decommissioning a well which is no longer in use helps to ensure the safety of those in the vicinity of the well, prevents surface water infiltration into an aquifer via the well, prevents the vertical movement of water within a well, conserves aquifer yield and hydraulic head and can potentially remove a physical hazard.

7.2 Surface Water Features

7.2.1 Provincially Significant Wetland (PSW)

As evidenced through previous Site investigations on the neighbouring property to the south (EXP, 2020), the Provincially Significant Wetland (PSW) has standing water seasonally with dry conditions occurring through summer into fall. Near surface soils across the Site and in the area of the PSW generally consist of silty clay till over sand. The sand was encountered at approximate depths ranging between 5.0 m and 8.6 m bgs in the area of the PSW. Groundwater elevations in the nested well set directly beside the PSW recorded consistent downward gradients throughout the monitoring period, suggesting the shallow groundwater is recharged from precipitation and surface runoff.

7.2.2 Unevaluated Wetlands (UW)

Two (2) unevaluated wetlands (UW) are documented in the City of London's Natural Heritage Map 5 and are depicted in **Drawing 2**. The eastern UW has ponded water year-round and is fed by surface runoff from Southdale Road West as well as from flows originating from the pond north of Southdale Road West, and directed through the culvert. The western UW was noted to be seasonally dry through Site monitoring carried out by EXP.

7.2.3 General Comments

Preliminary water balance calculations have been completed for the Site based on the current development plan and the results suggest that storm water management designs will need to include assessment of runoff to Site features to maintain similar conditions as those observed under pre-development.

The PSW and UWs are considered as being vulnerable to contamination from surface sources. During construction, short term impacts to the surface water may be anticipated, particularly where vegetation on nearby land is stripped and area grading works are underway.

The following comments are provided with recommendations to help minimize impact to surface water features observed at the site:

- During the site grading work, suitable sedimentation controls will be required to help control and reduce the turbidity of run-off water which may flow towards the surface water features;
- A Best Management Practice (BMP) and spill contingency plan (including a spill action response plan) should be in place for fuel handling, storage and onsite equipment maintenance activities to minimize the risk of contaminant releases as a result of the proposed construction activities;
- Re-establishing vegetative cover in disturbed areas following the completion of the construction work;
- Limit the use of commercial fertilizers in landscaped areas which border a habitat feature; and,

Limit the use of salts or other additives for ice and snow control on the roadways and parking areas.

7.3 Water Quality Monitoring Considerations

A monitoring program to assess the characteristics of the shallow groundwater collected in the monitoring wells and the surface water at the Site has been carried out. Baseline water quality testing was carried out on samples of the shallow groundwater collected from selected monitoring wells, the surface water in the PSW and surface water from the eastern UW.

In comparison with ODWQS and the PWQO, which is considered appropriate for assessing potential impacts of groundwater discharge to surface or nearby surface water features (which may occur during construction dewatering activities associated with site servicing), the test results for the water samples do not indicate a high potential for adverse effects for aquatic receptors which may be present in nearby surface water features.

There are a number of items which can be considered during construction and for the future residential development which can assist in maintaining groundwater and surface water quality. The following comments are provided for consideration, but are not intended as an exhaustive list in this regard:

- In the event that imported materials are required to restore onsite excavations, or to raise grades in portions of the Site, analytical testing of the imported material may be considered to ensure that any material brought to the Site meets the applicable standards under Ontario Regulation 153 for residential lands.
- Contractors working at the Site should ensure that construction equipment is in good working order. Equipment operators should have spill-prevention kits, where appropriate.

- Chemical application in landscaped and grassed areas should be limited. Consideration may be given to using grass varieties which are heartier and require less extensive watering or fertilizers.

Consideration may be given to carrying out additional water quality testing during construction, where construction activities are in close proximity to surface water features, where a concern for potential impact is identified.

Monitoring stations to assess post-development changes to water quality may be considered; however, the specific purpose and long-term responsibility for servicing and maintenance of the monitoring stations would need to be established.

7.4 Construction Dewatering Considerations

The proposed construction at the Site is expected to involve excavations for the installation of underground parking garages as well as servicing across the Site (typically to a maximum depth of 3 m bgs). According to Sections 34 and 98 of the Ontario Water Resources Act R.S.O. 1990 and the Water Taking and Transfer Regulation O. Reg. 387/04, groundwater construction dewatering in excess of 50,000 litres per day requires either an Environmental Activity and Sector Registry (EASR) or a Permit to Take Water (PTTW). EASR's are required for dewatering volumes up to 400,000 litres per day. For volumes of 400,000 litres per day or more, Category 3 PTTW applications will need to be approved by the MECP.

Based on the information collected during this study, the soils at the Site are predominantly characterized by clayey silt till overlying dry sand. Hydraulic conductivities based on SWRTs and grain size analyses was 5.0×10^{-9} cm/s for the till soils. Water levels across the Site were relatively shallow and within a meter of ground surface in several locations (BH7/MW and BH8B/MW). Due to the low hydraulic conductivities of the soils on Site, it is not anticipated that a PTTW will be required for construction. However, detailed dewatering calculations should be completed once detailed designs are provided for the proposed underground parking structures in order to confirm this assumption.

Any collected water from service trenches and temporary excavations should be discharged a sufficient distance away from the excavated area to prevent the discharge water from returning to the excavation. Sediment control measures should be provided at the discharge point of the dewatering system.

7.5 Secondary Infiltration Opportunities

Due to the increased impermeable surfaces (such as roof-tops, roadways, sidewalks), the proposed development is expected to result in a reduction in the post-development infiltration level, and a corresponding increase in the estimated run-off. The use of Low Impact Development (LID) strategies on Site are recommended to assist in maintaining the pre-development infiltration volumes across the Site, in particular the volumes which currently feed the wetland.

These recommendations and water balance calculations should be provided to the Stormwater and Civil Engineers in order to present the benefits of designing LID features, in addition to the volumes required to obtain water balance.

8. Qualifications of Assessors

EXP Services Inc. provides a full range of environmental services through a full-time Earth and Environmental Services Group. EXP's Environmental Services Group has developed a strong working relationship with clients in both the private and public sectors and has developed a positive relationship with the Ontario Ministry of the Environment, Conservation and Parks (MECP). Personnel in the numerous branch offices form part of a large network of full-time dedicated environmental professionals in the EXP organization.

This report was authored by Mr. Eric Buchanan, P.Eng. Mr. Buchanan works in the Earth and Environment Discipline and has been thoroughly trained in conducting geotechnical and hydrogeological assessments. He obtained a Bachelor of Engineering Degree from Lakehead University and has been working in the geo-science field for 9 years. He has authored and reviewed reports for numerous projects including residential and commercial developments that require geotechnical and hydrogeological input, Level 2 hydrogeological assessments for underwater aggregate extraction, groundwater impact assessments and calculated groundwater removal quantities for short- and long-term construction. Mr. Buchanan oversees coordinating all of EXP's hydrogeological field operations for London and surrounding area. His responsibilities include designing work plans and hydrogeological modelling.

This report was reviewed by Ms. Heather Jaggard, M.Sc., P.Geo. Ms. Jaggard is a hydrogeologist and environmental geoscientist with more than 9 years in the environmental field and is a licensed Professional Geoscientist (P.Geo.) in Ontario. She obtained a Master's of Science (M.Sc.) in 2012 from Queen's University in Kingston, and is a Qualified Person (QP) registered with the Ontario Ministry of Environment, Conservation and Parks (MECP). She has worked in the Hydrogeological and Environmental fields since that time. In her professional career for the past few years, Ms. Jaggard has completed numerous hydrogeological assessments and modelling works for land development sites. Environmental site assessments and preparation of submissions for Permit to Take Water (PTTW) have been part of her routine assignments.

9. References

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Thornthwaite, C. W. & J. R. Mather. 1957. Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance. Centerton, N.J., Laboratory of Climatology, *Publications in Climatology*, v. 10, no. 3, p. 185-311.

Toronto and Region Conservation Authority and Credit Valley Conservation Authority (TRCA and CVC) 2010. Low Impact Development Stormwater Management Planning and Design Guide. Version 1.0.

10. General Limitations

The information presented in this report is based on a limited investigation designed to provide information to support an assessment of the current environmental conditions within the subject property. The conclusions and recommendations presented in this report reflect Site conditions existing at the time of the investigation. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent. Should this occur, EXP Services Inc. should be contacted to assess the situation, and the need for additional testing and reporting. EXP has qualified personnel to provide assistance in regards to any future geotechnical and environmental issues related to this property.

Our undertaking at EXP, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the engineering profession. It is intended that the outcome of this investigation assist in reducing the client's risk associated with environmental impairment. Our work should not be considered 'risk mitigation'. No other warranty or representation, either expressed or implied, is included or intended in this report.

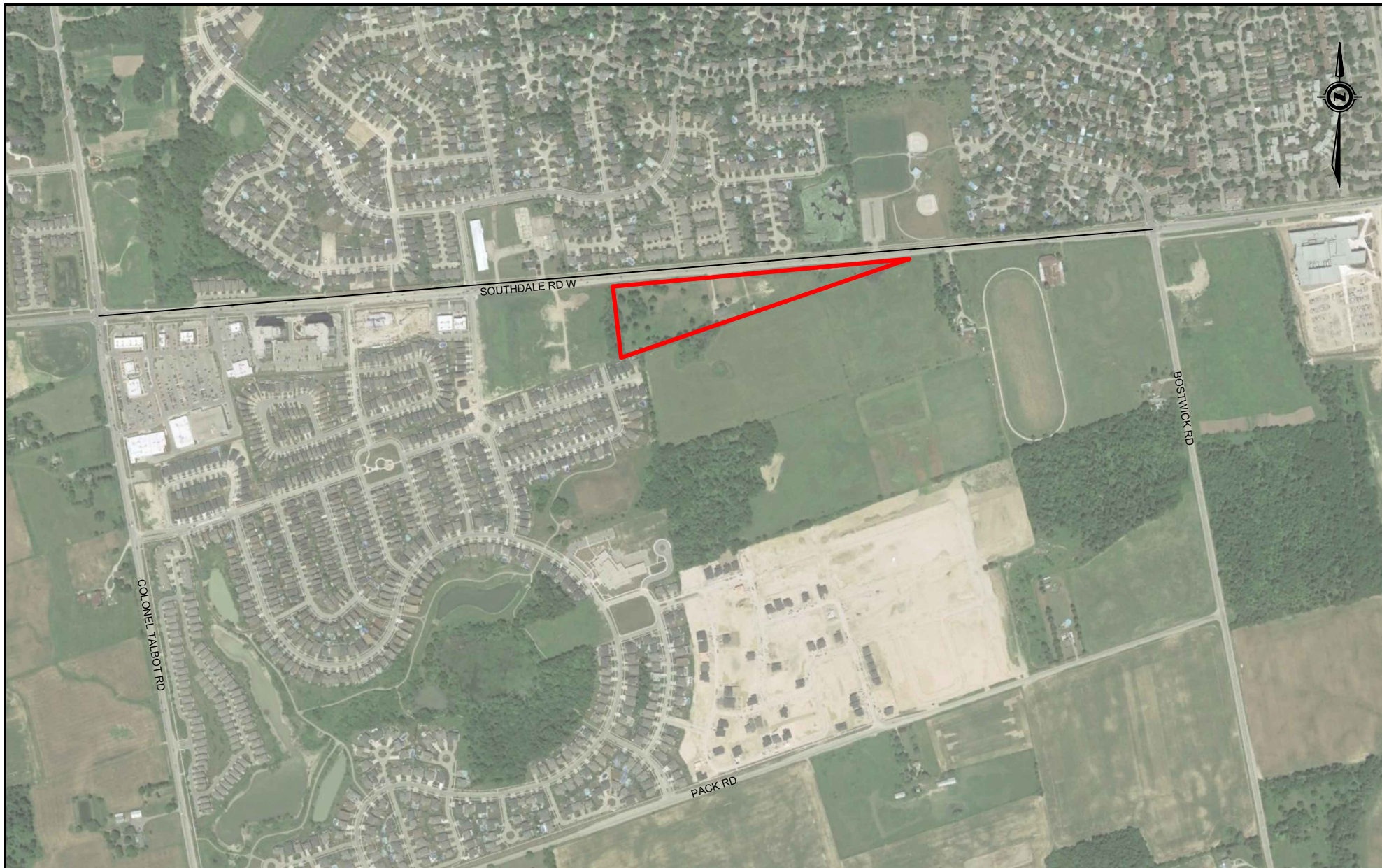
The comments given in this report are intended only for the guidance of design engineers. The number of test holes required to determine the localized underground conditions between test holes affecting construction costs, techniques, sequencing, equipment, scheduling, etc. would be much greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results, so that they may draw their own conclusions as to how the subsurface conditions may affect them.

EXP Services Inc. should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not afforded the privilege of making this review, EXP Services Inc. will assume no responsibility for interpretation of the recommendations in this report


This report was prepared for the exclusive use of **Western Prestige Village** and may not be reproduced in whole or in part, without the prior written consent of EXP, or used or relied upon in whole or in part by other parties for any purposes whatsoever. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust this report is satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.


Appendix A - Drawings



-LEGEND-

 Approximate Site Boundary

Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village			
TITLE Site Location Plan			
Prepared By: E.B.		Reviewed By: H.J.	
		EXP Services Inc.	
		15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:10,000	PROJECT NO. KCH-00257251-A0	DWG. 1




- LEGEND-**
- ◆ BH1 Approximate Borehole Location
 - ✦ Station 1 Approximate Surface Water Station Location
 - Approximate Site Boundary
 - ◆ BH9/MW Approximate Monitoring Well Location (Project 16262)
 - ◆ SW Station 1 Approximate Surface Water Location (Project 16262)
 - ▨ Unevaluated Wetland
 - ▨ Provincially Significant Wetland

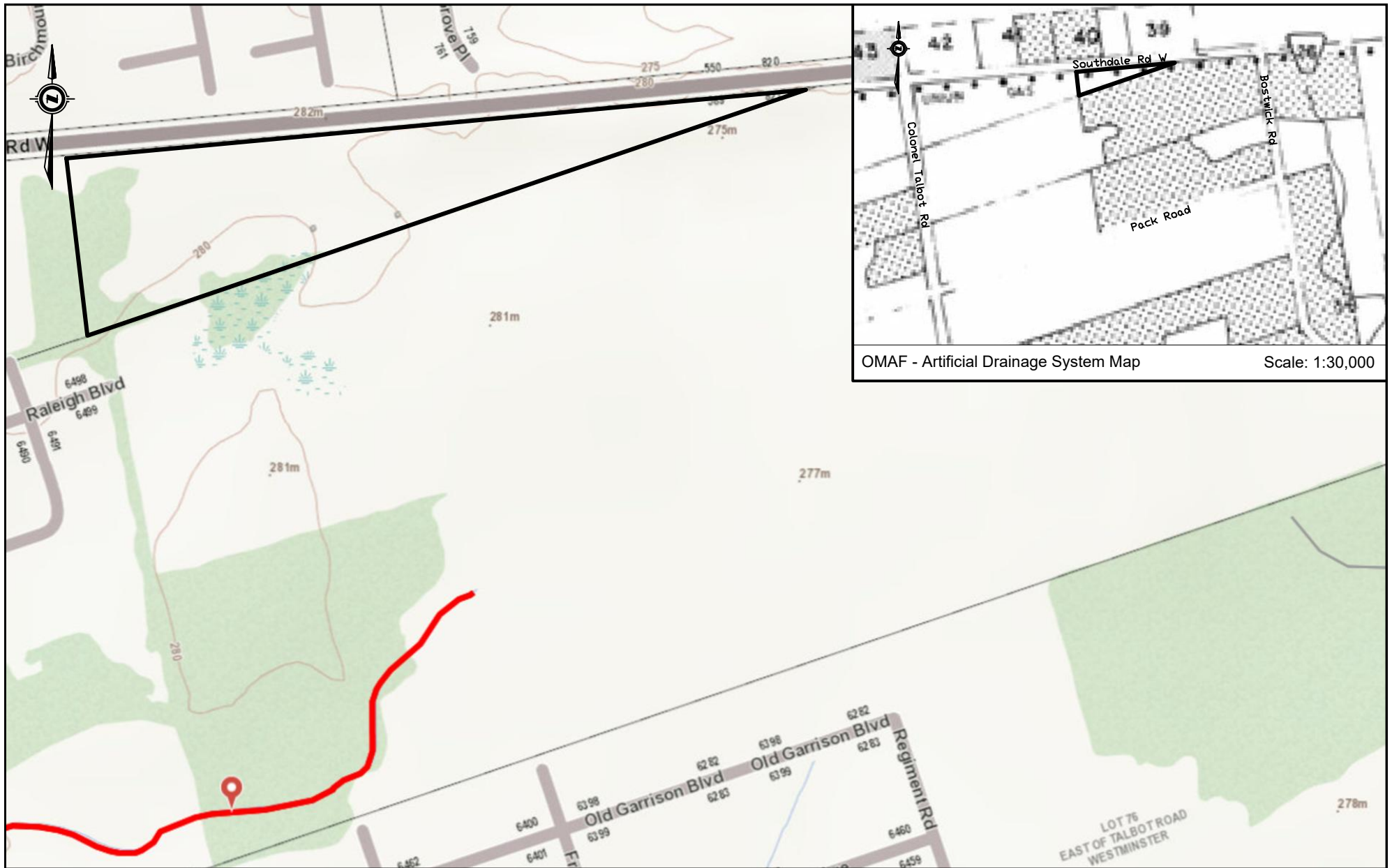
Image Source: Google Earth Pro (July 2018)
 Note: Natural Heritage Feature boundaries obtained from City of London's Natural Heritage Map 5.

Hydrogeological Assessment

Proposed Apartment Complex

735 Southdale Road West, London, Ontario





CLIENT Western Prestige Village			
TITLE Borehole Location Plan and Natural Heritage Features			
Prepared By: K.D.		Reviewed By: H.J.	
		EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE NOVEMBER 2020	APPROXIMATE SCALE 1:3,500	PROJECT NO. KCH-00257251-A0	DWG. 2



OMAF - Artificial Drainage System Map


Scale: 1:30,000

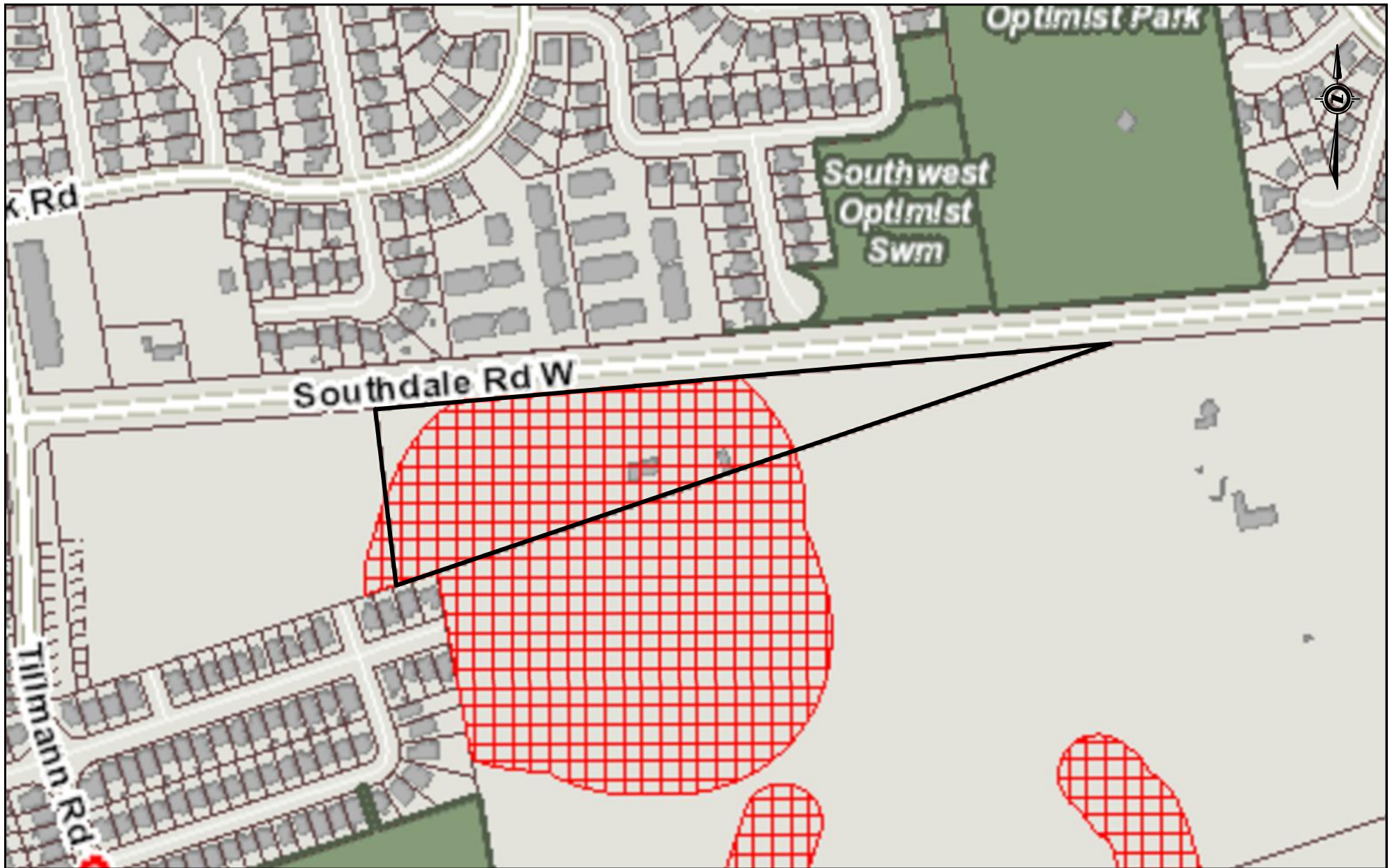
-LEGEND-

-  Approximate Site Boundary
-  Department of Fisheries and Oceans Class 'F' Drain
-  Tile Drain Random
-  Pipeline/Main



Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

Image Source 1: OMAFRA Mapping; www.gisapplication.lrc.gov.on.ca
 Image Source 2: Ontario Ministry of Agriculture and Food. Artificial Drainage System, County of Middlesex, Township of Westminster. Drawing No. 19-220. July 23, 1981.

CLIENT Western Prestige Village			
TITLE Site Area Drainage			
Prepared By: E.B.		Reviewed By: H.J.	
		EXP Services Inc.	
		15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:4,000	PROJECT NO. KCH-00257251-A0	DWG. 3




-LEGEND-

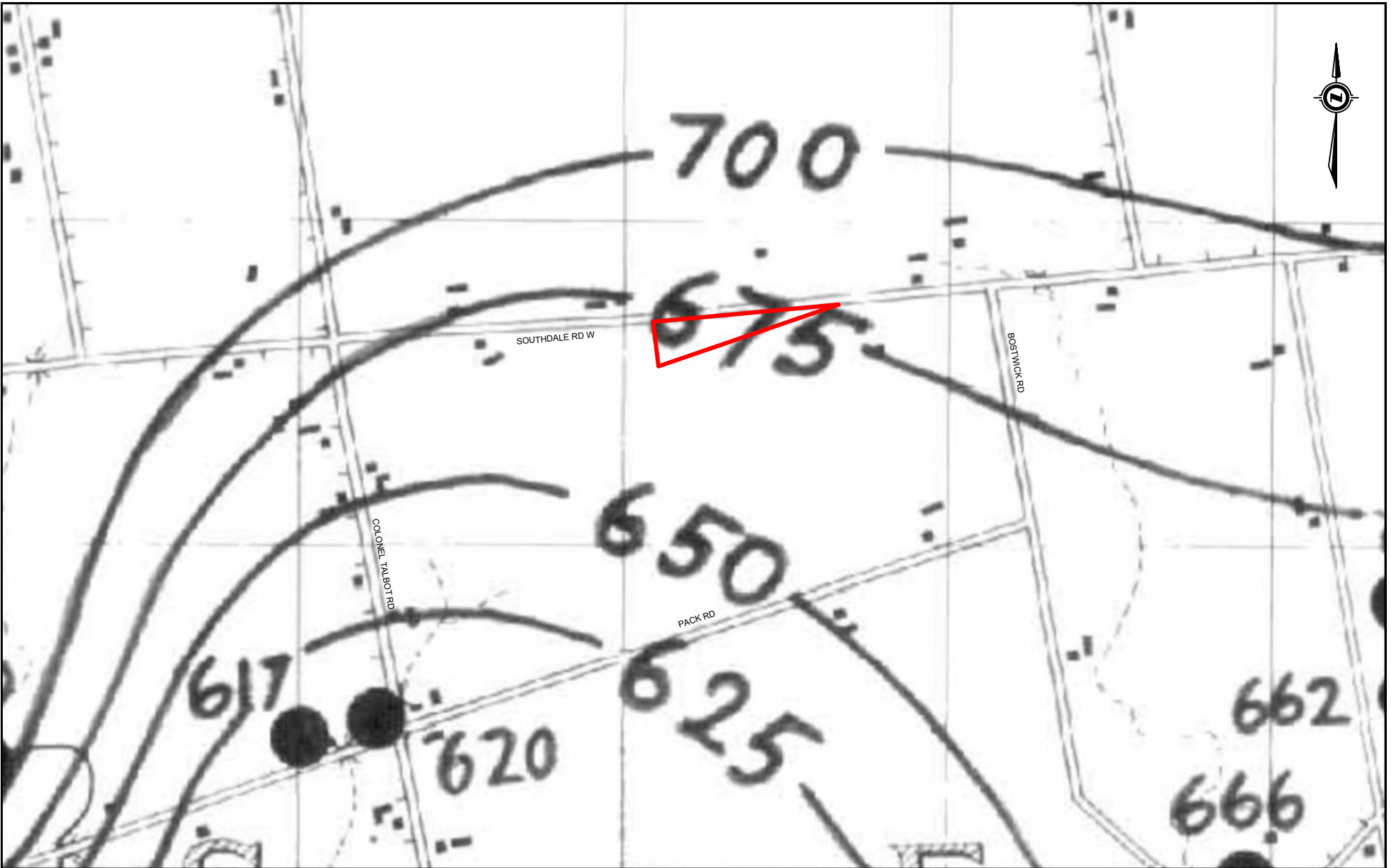
-  Approximate Site Boundary
-  Regulated Lands of the Upper Thames River Conservation Authority

Hydrogeological Assessment




Proposed Apartment Complex

735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village			
TITLE Regulated Lands of the UTRCA			
Prepared By: E.B.		Reviewed By: H.J.	
		EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:4,000	PROJECT NO. KCH-00257251-A0	DWG. 4



-LEGEND-

-  Approximate Site Boundary
-  617 Bedrock Surface Elevation (feet) in a Well or Test Hole
-  675 Contours on Bedrock Surface (feet)

Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario


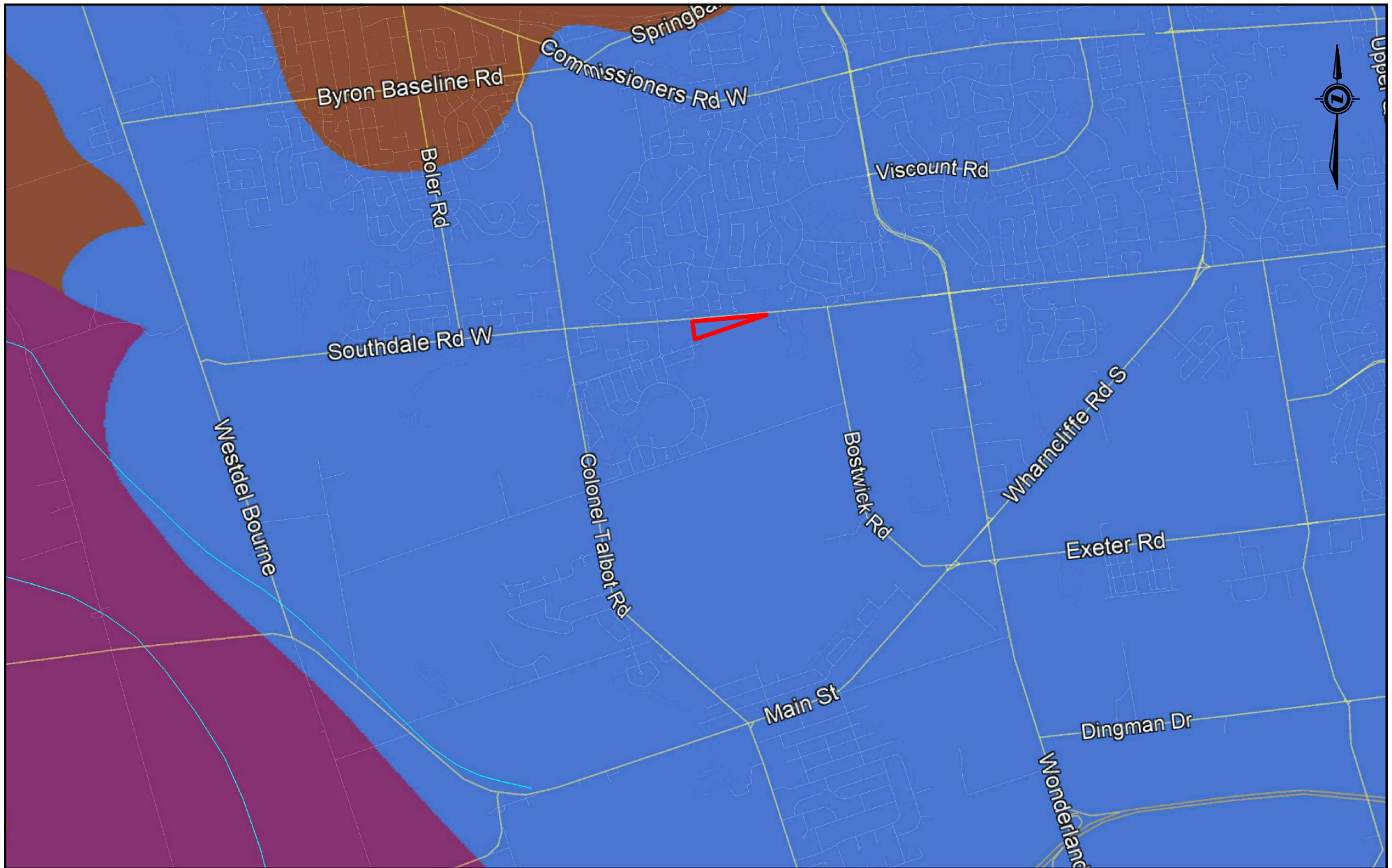
CLIENT Western Prestige Village	
TITLE Bedrock Topography	
Prepared By: E.B.	Reviewed By: H.J.
 EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:16,000
PROJECT NO. KCH-00257251-A0	DWG. 5

Image Source: Ontario Geological Survey. 1968. Bedrock Topography Series, St. Thomas Sheet, Southern Ontario, Preliminary Map P.482.



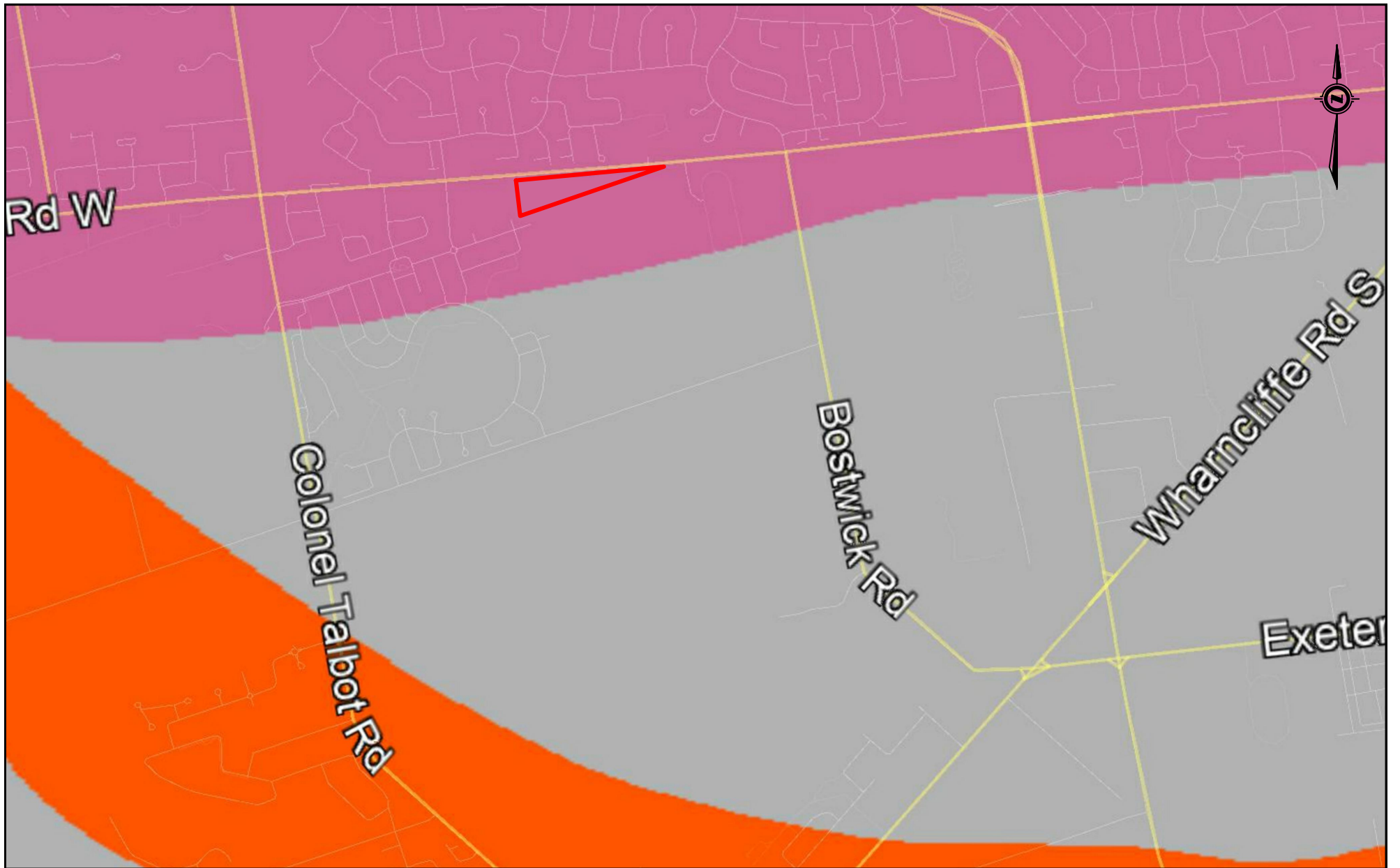
-LEGEND-

- ▬ Approximate Site Boundary
- Mount Elgin Ridges
- Caradoc Sand Plains and London Annex
- Ekfrid Clay Plain

Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

Image Source: Chapman, L.J. and Putnam, D.F. 2007 The Physiography of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 228.

CLIENT Western Prestige Village			
TITLE Physiographic Regions			
Prepared By: E.B.		Reviewed By: H.J.	
exp		EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:40,000	PROJECT NO. KCH-00257251-A0	DWG. 6



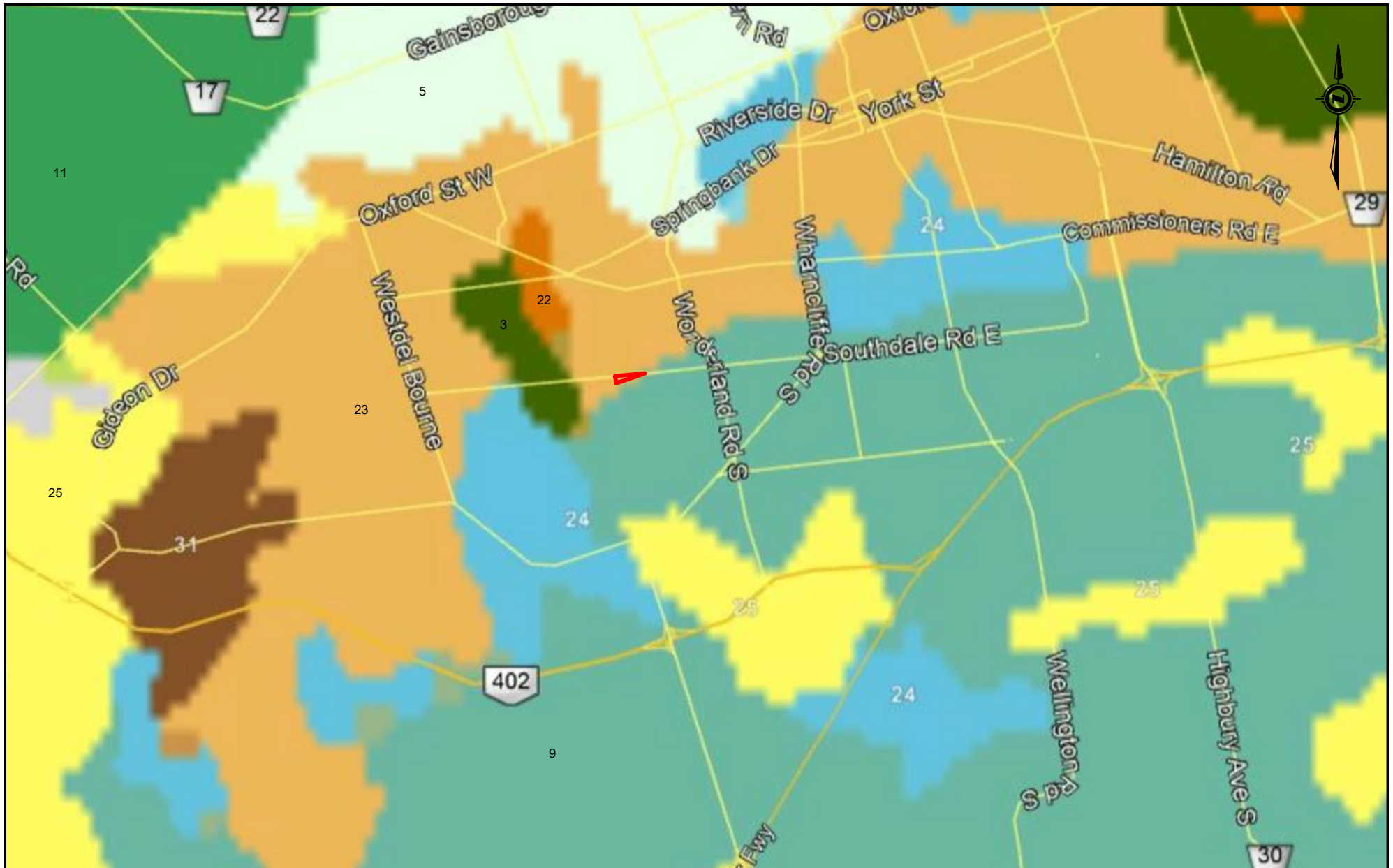
-LEGEND-

- ▬ Approximate Site Boundary
- Till Morains
- Spillways
- Till Plains (Undrumlinized)

Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village			
TITLE Physiographic Landforms			
Prepared By: E.B.		Reviewed By: H.J.	
exp.		EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:20,000	PROJECT NO. KCH-00257251-A0	DWG. 7

Image Source: Chapman, L.J. and Putnam, D.F. 2007 The Physiography of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 228.



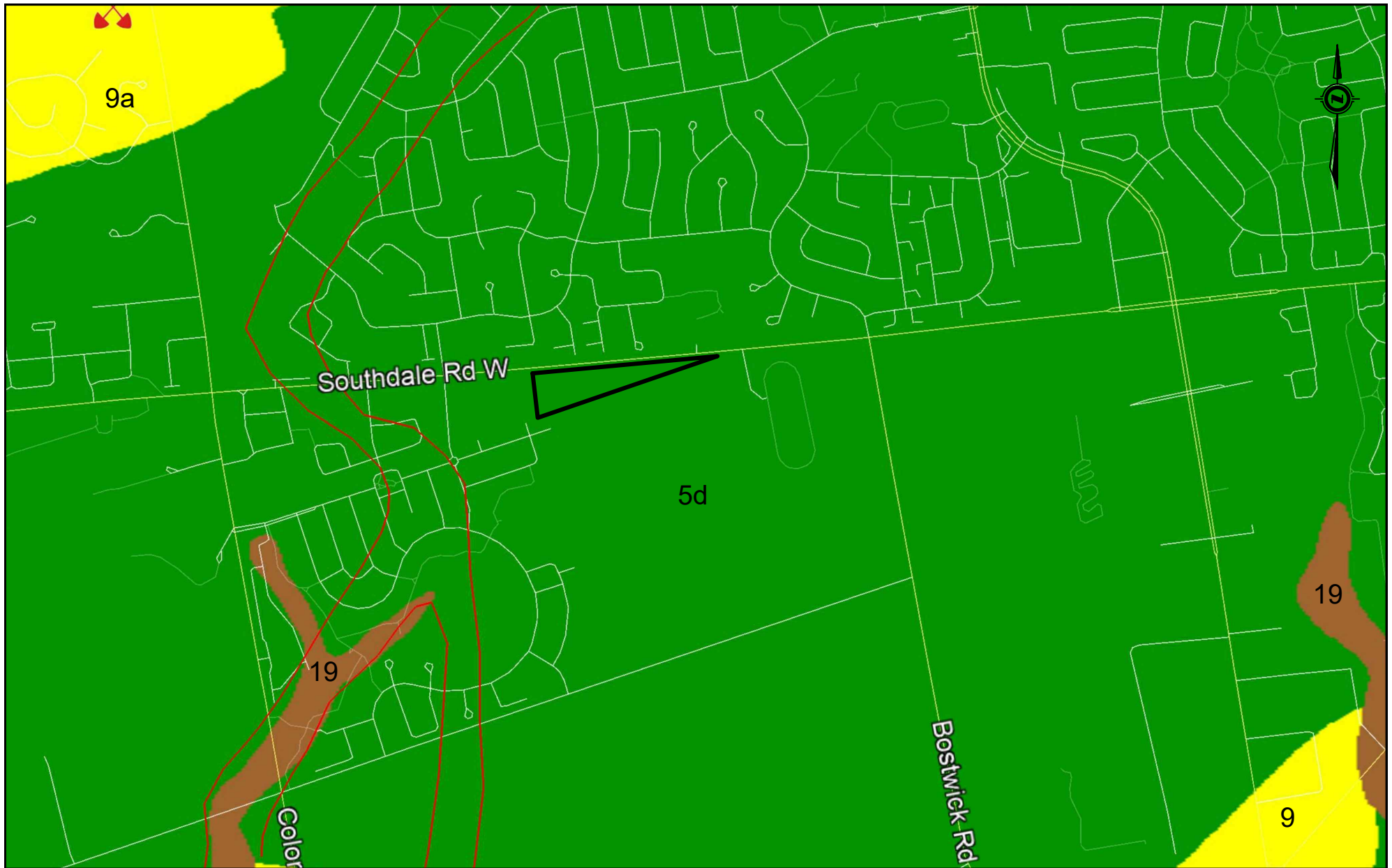
-LEGEND-

- Approximate Site Boundary
- 3 Catfish Creek Till
- 5 Tavistock Till
- 9 Port Stanley Till
- 11 Rannoch Till
- 22 Glaciofluvial Ice
- 23 Glaciofluvial Outwash deposits
- 24 Glaciolacustrine deposits- silt and clay
- 25 Glaciolacustrine deposits- sand and gravel
- 31 Fluvial deposits






Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

Image Source: Barnett, P.J., Cowan, W.R. and Henry, A.P. 1991. Quaternary geology of Ontario, southern sheet; Ontario Geological Survey, Map 2556.

CLIENT Western Prestige Village			
TITLE Quaternary Geology			
Prepared By: E.B.		Reviewed By: H.J.	
exp		EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:100,000	PROJECT NO. KCH-00257251-A0	DWG. 8



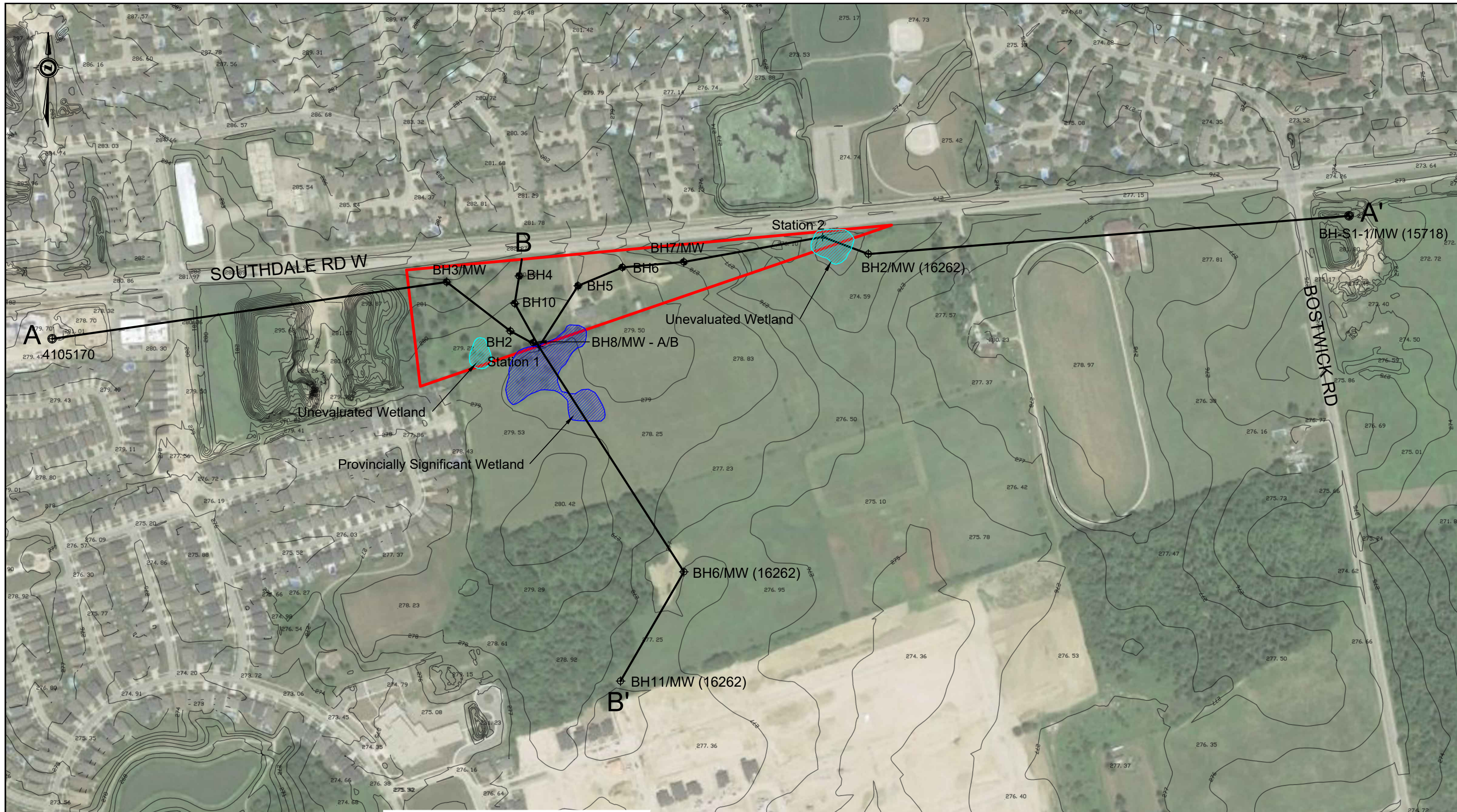
-LEGEND-

-  Approximate Site Boundary
-  Till: Clay to silt-textured till
-  Coarse-textured glaciolacustrine deposits
-  Modern alluvial deposits
-  Fluvial Terrace

Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

Image Source: The Ontario Geological Survey. 2003. Surficial Geology of Southern Ontario

CLIENT Western Prestige Village			
TITLE Surficial Geology			
Prepared By: E.B.		Reviewed By: H.J.	
		EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:16,000	PROJECT NO. KCH-00257251-A0	DWG. 9



-LEGEND-

	Approximate Borehole Location
	Surface Water Station Location
	Approximate Borehole Location (16262)
	Approximate Borehole Location (15718)
	Approximate MECP Well Location
	Approximate Site Boundary
	Cross Section Location

-NOTES-

1. The site plan was reproduced from Google Earth Pro satellite imagery (July 2018) and City of London Digital Mapping (2017) and should be read in conjunction with EXP Hydrogeological Assessment KCH-00257251-A0.

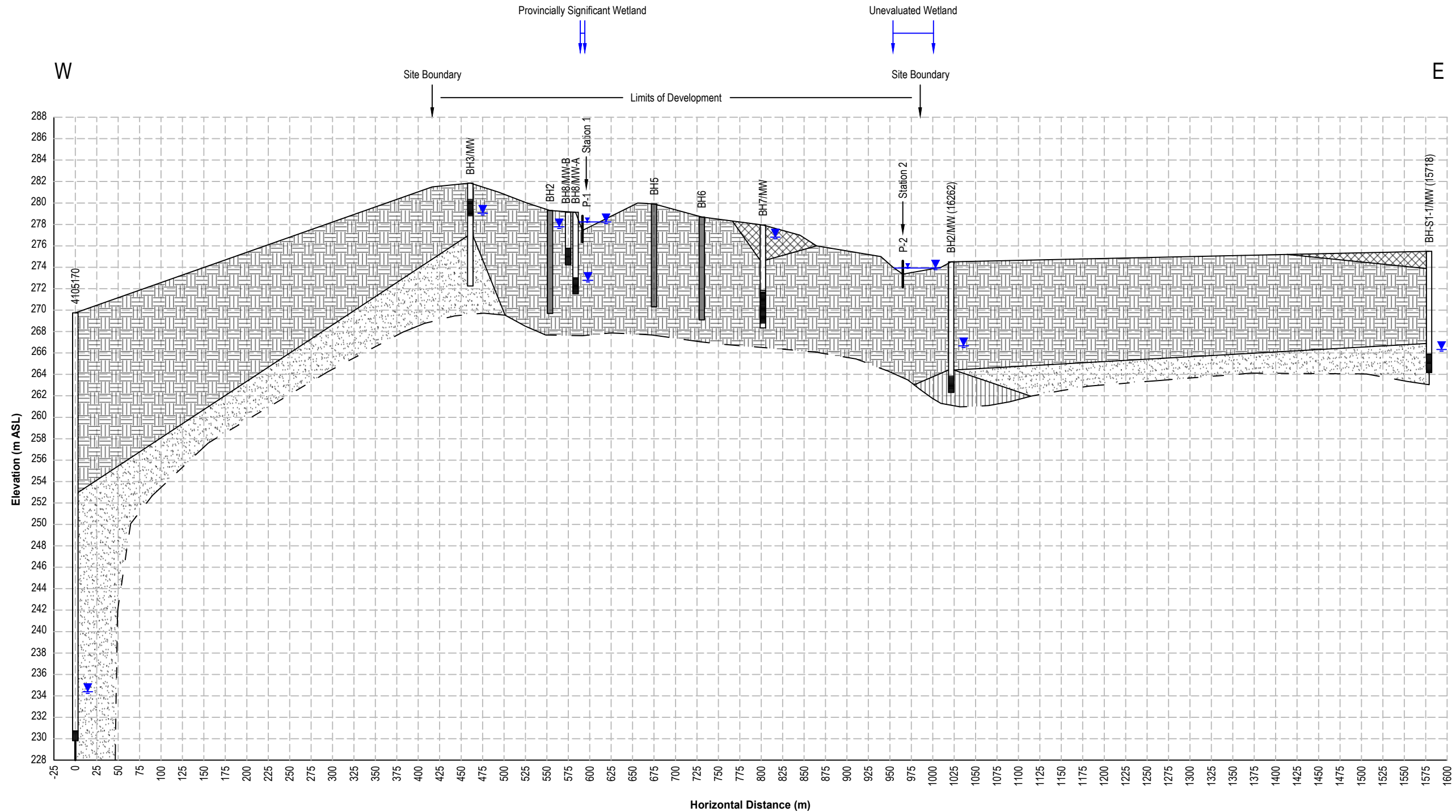
Hydrogeological Assessment

Proposed Apartment Complex

735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village		
TITLE Cross Section Location Plan		
DRAWN BY: E.B.	REVIEWED BY: H.J.	DATE JUNE 2020
		EXP Services Inc. 15701 Robin's Hill Road London, ON, N5V 0A5
SCALE 1:4,000	PROJECT NO. KCH-00257251-A0	DWG. 10

Generalized Cross Section A - A'



-LEGEND-

	Groundwater Measurement
	Fill
	Clayey Silt/Silty Clay/Glacial Till
	Sand and Silt
	Sand

- NOTES-**
1. The cross section should be read in conjunction with EXP Hydrogeological Assessment KCH-00257251-A0.
 2. The water levels in the MECP Wells displayed in the cross section are based on static water levels recorded in the well records.
 3. The water levels in the EXP boreholes were measured in May 2020.
 4. The water level in BH-S1-1/MW was measured in May 2019.

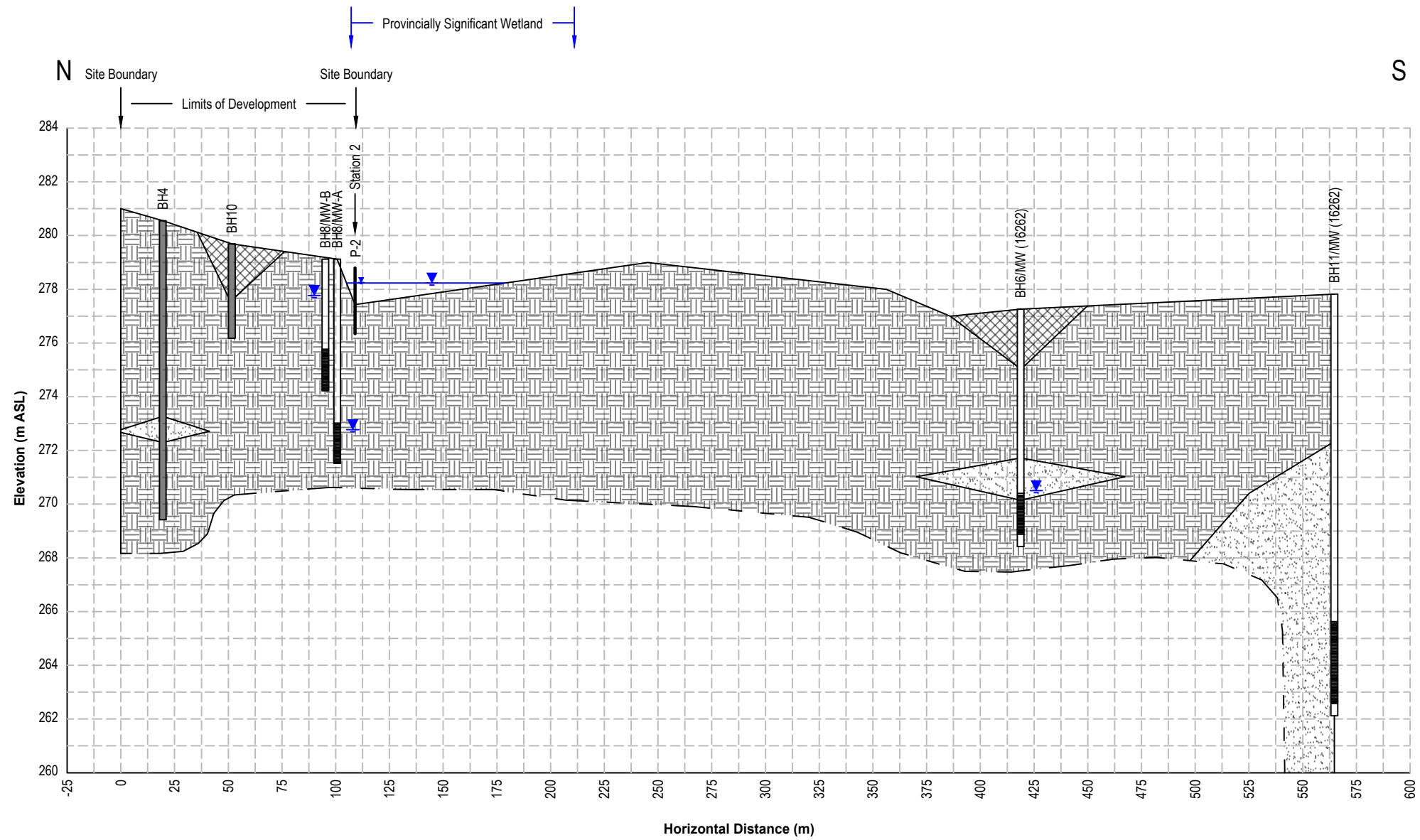
Hydrogeological Assessment

Proposed Apartment Complex

735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village		
TITLE Generalized Cross Section A - A'		
DRAWN BY: E.B.	REVIEWED BY: H.J.	DATE JUNE 2020
		EXP Services Inc. 15701 Robin's Hill Road London, ON, N5V 0A5
SCALE H=1:5000, V=1:400	PROJECT NO. KCH-00257251-A0	DWG. 11

Generalized Cross Section B - B'



-LEGEND-

	Groundwater Measurement
	Fill
	Clayey Silt/Silty Clay/Glacial Till
	Sand and Silt
	Sand

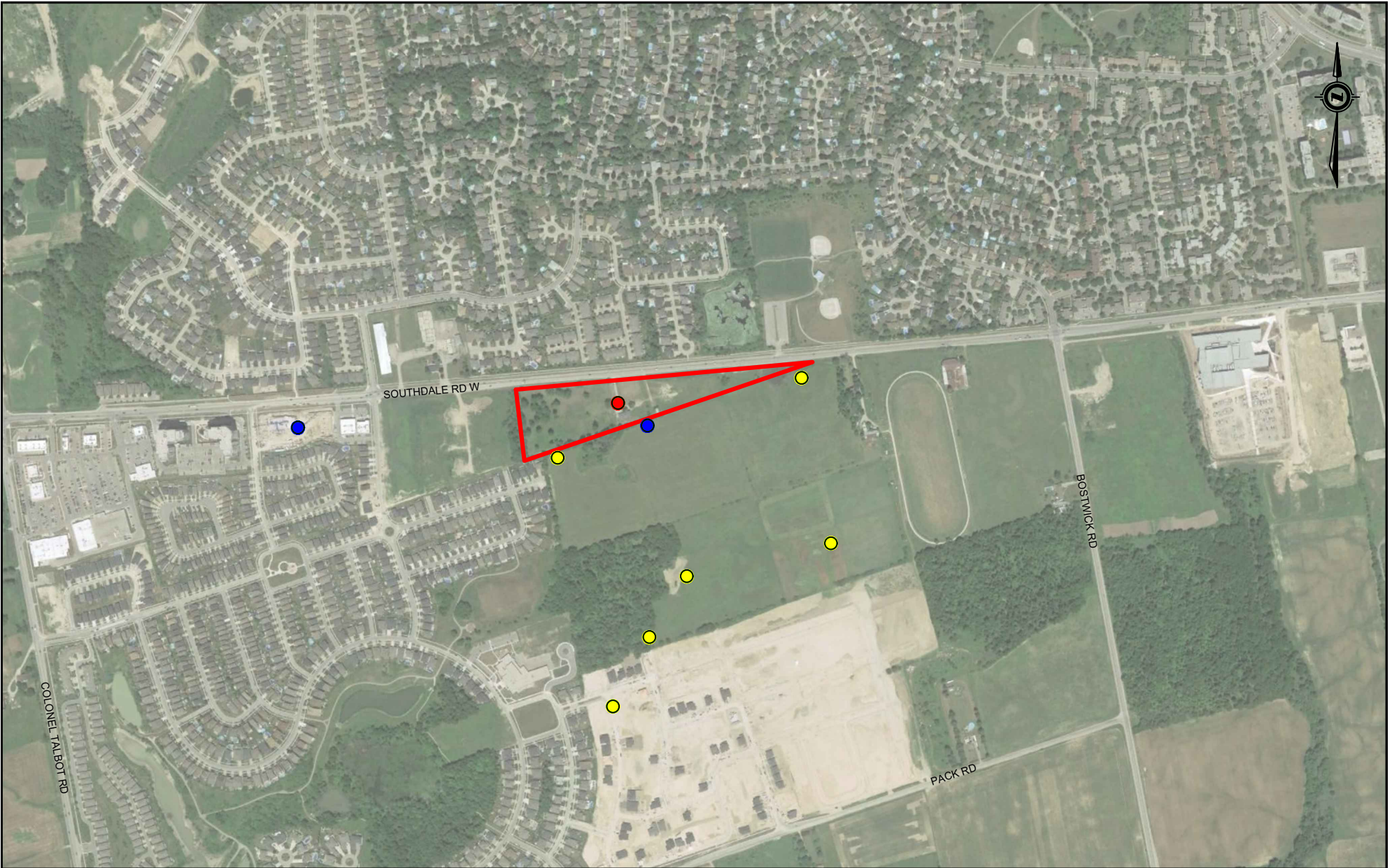
- NOTES-
1. The cross section should be read in conjunction with EXP Hydrogeological Assessment KCH-00257251-A0.
 2. The water levels in the MECP Wells displayed in the cross section are based on static water levels recorded in the well records.
 3. The water levels in the EXP boreholes were measured in May 2020.

Hydrogeological Assessment

Proposed Apartment Complex

735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village		
TITLE Generalized Cross Section B - B'		
DRAWN BY: E.B.	REVIEWED BY: H.J.	DATE JUNE 2020
		EXP Services Inc. 15701 Robin's Hill Road London, ON, N5V 0A5
SCALE H=1:2,500; V=1:200	PROJECT NO. KCH-00257251-A0	DWG. 12



-LEGEND-

- Approximate Site Boundary
- Water Supply - Domestic
- Monitoring/Test Hole
- Abandoned

Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village			
TITLE Approximate Location of MECP Registered Wells			
Prepared By: E.B.		Reviewed By: H.J.	
exp		EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:10,000	PROJECT NO. KCH-00257251-A0	DWG. 13



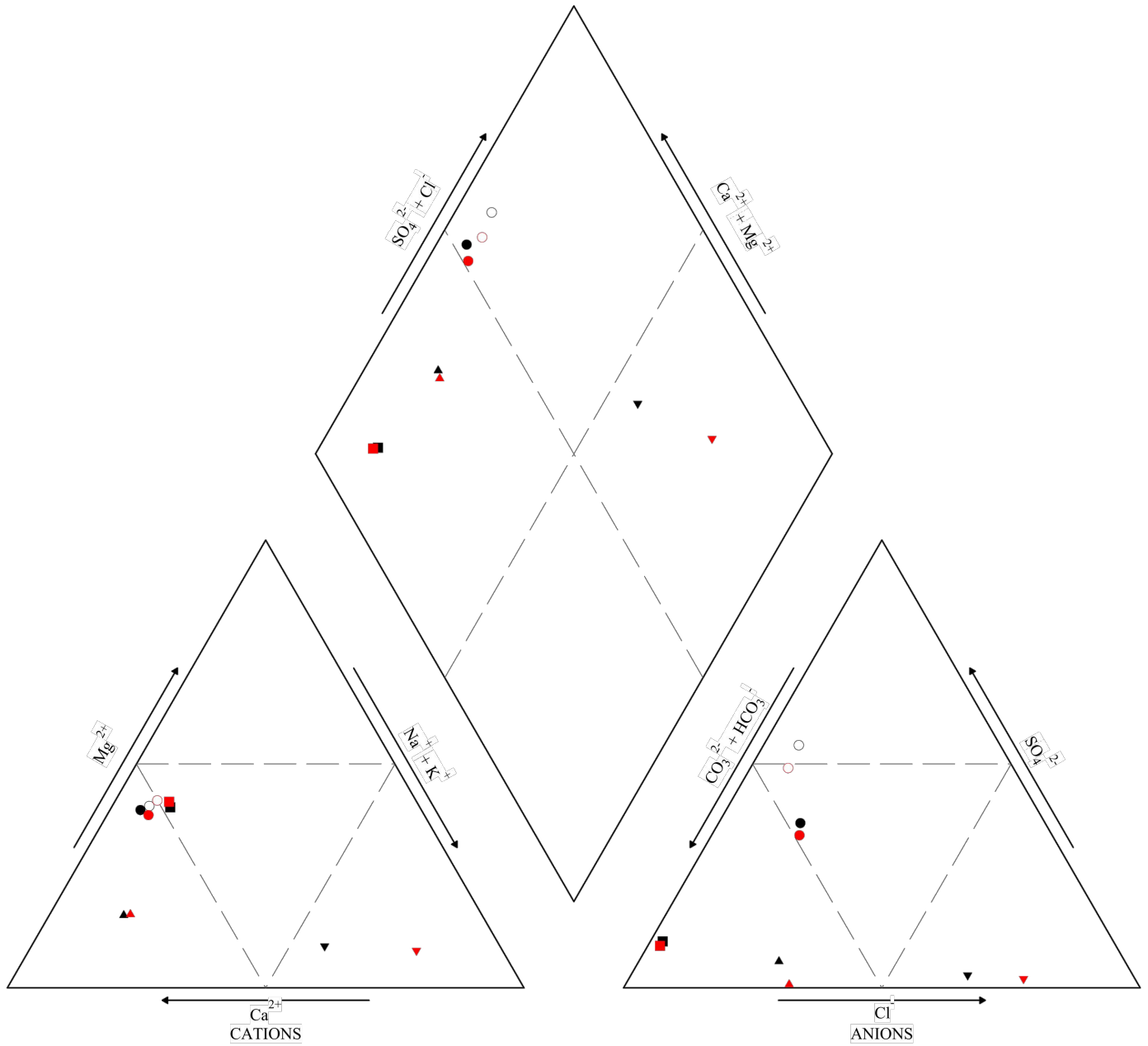
-LEGEND-

- Approximate Site Boundary
- ◆ BH3/MW Approximate Borehole Location
- ◆ BH6/MW Approximate Borehole Location (16262)
- 279.04 Groundwater Measurement (May 23, 2020)
- Groundwater Equipotential Line
- ➔ Groundwater Flow Direction

Image Source: Google Earth Pro (July 2018)

Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village			
TITLE Groundwater Flow Direction			
Prepared By: E.B.		Reviewed By: H.J.	
exp		EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:5,000	PROJECT NO. KCH-00257251-A0	DWG. 14

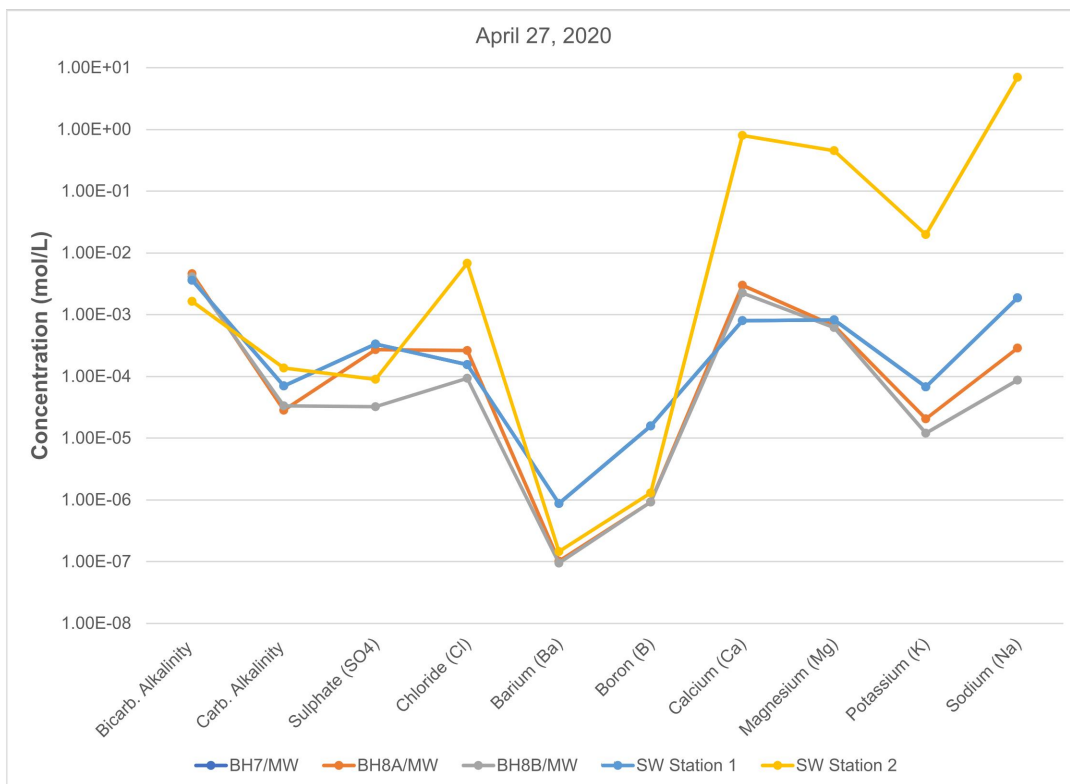
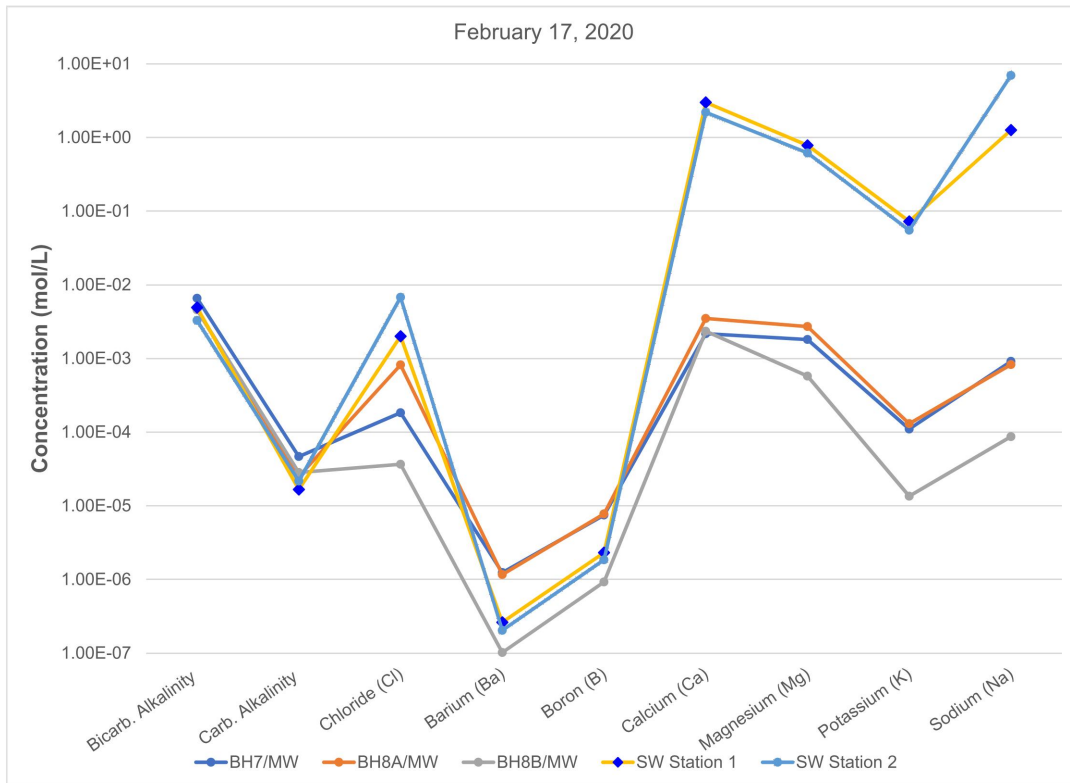


-LEGEND-

- BH7/MW (February 2020) ■ BH7/MW (April 2020)
- BH8A/MW (February 2020) ○ BH8A/MW (April 2020)
- BH8B/MW (February 2020) ● BH8B/MW (April 2020)
- ▲ SW Station 1 (February 2020) ▲ SW Station 1 (April 2020)
- ▼ SW Station 2 (February 2020) ▼ SW Station 2 (April 2020)

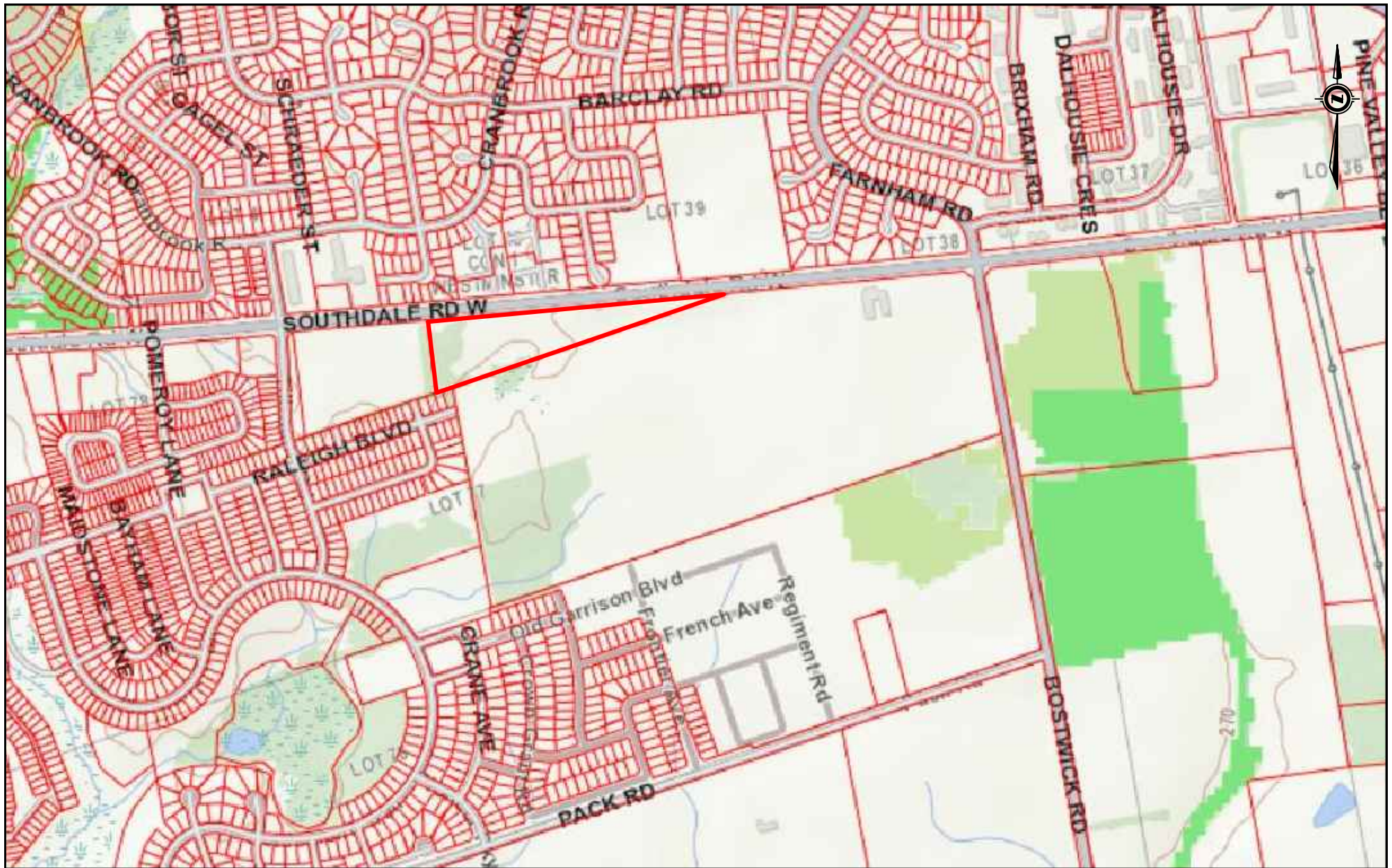
Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village		
TITLE Piper Diagram		
DRAWN BY: M.B.	REVIEWED BY: E.B.	
		EXP Services Inc. 15701 Robin's Hill Road London, ON, N5V 0A5
DATE JUNE 2020	PROJECT NO. KCH-00257251-A0	DWG. 15



Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village		
TITLE Schoeller Diagrams for Water Quality		
DRAWN BY: E.B.	REVIEWED BY: H.J.	
EXP Services Inc. 15701 Robin's Hill Road London, ON, N5V 0A5		DATE JUNE 2020
		PROJECT NO. KCH-00257251-A0
		DWG. 16

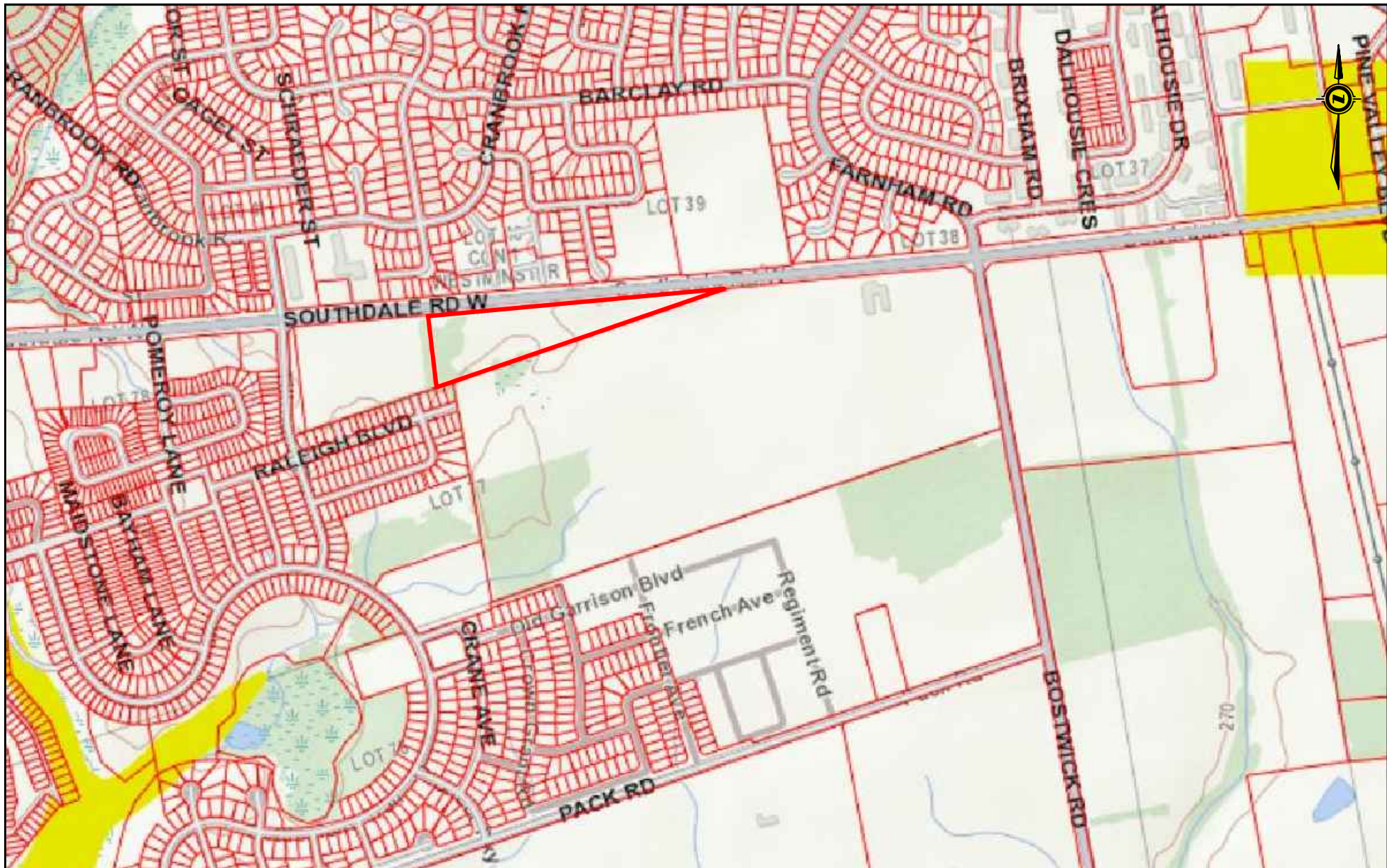


-LEGEND-

- Approximate Site Boundary
- Vulnerability = 2
- Vulnerability = 4
- Vulnerability = 6

Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village			
TITLE Significant Groundwater Recharge Areas			
Prepared By: E.B.		Reviewed By: H.J.	
		EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:10,000	PROJECT NO. KCH-00257251-A0	DWG. 17



-LEGEND-

- Approximate Site Boundary
- Highly Vulnerable Aquifer - Approved


Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

CLIENT Western Prestige Village			
TITLE Highly Vulnerable Aquifers			
Prepared By: E.B.		Reviewed By: H.J.	
exp		EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE JUNE 2020	APPROXIMATE SCALE 1:10,000	PROJECT NO. KCH-00257251-A0	DWG. 18


Image Source: UTRCA online mapping software; maps.thamesriver.on.ca



-LEGEND-

 Approximate Site Boundary

Hydrogeological Assessment
Proposed Apartment Complex
 735 Southdale Road West, London, Ontario

CLIENT Royal Premier Homes			
TITLE Site Drainage Areas			
Prepared By: K.D.		Reviewed By: H.J.	
		EXP Services Inc.	
		15701 Robin's Hill Road, London, ON, N5V 0A5	
DATE NOVEMBER 2020	APPROXIMATE SCALE 1:4,000	PROJECT NO. KCH-00257251-A0	DWG. 19

Appendix B – Development Plan



365 TOTAL UNITS @ 1,100SF AVERAGE
369 CARS PROVIDED (1:1)

313 TOTAL UNITS @ 1,100SF AVERAGE
341 CARS PROVIDED (1:1.1)

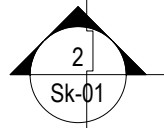
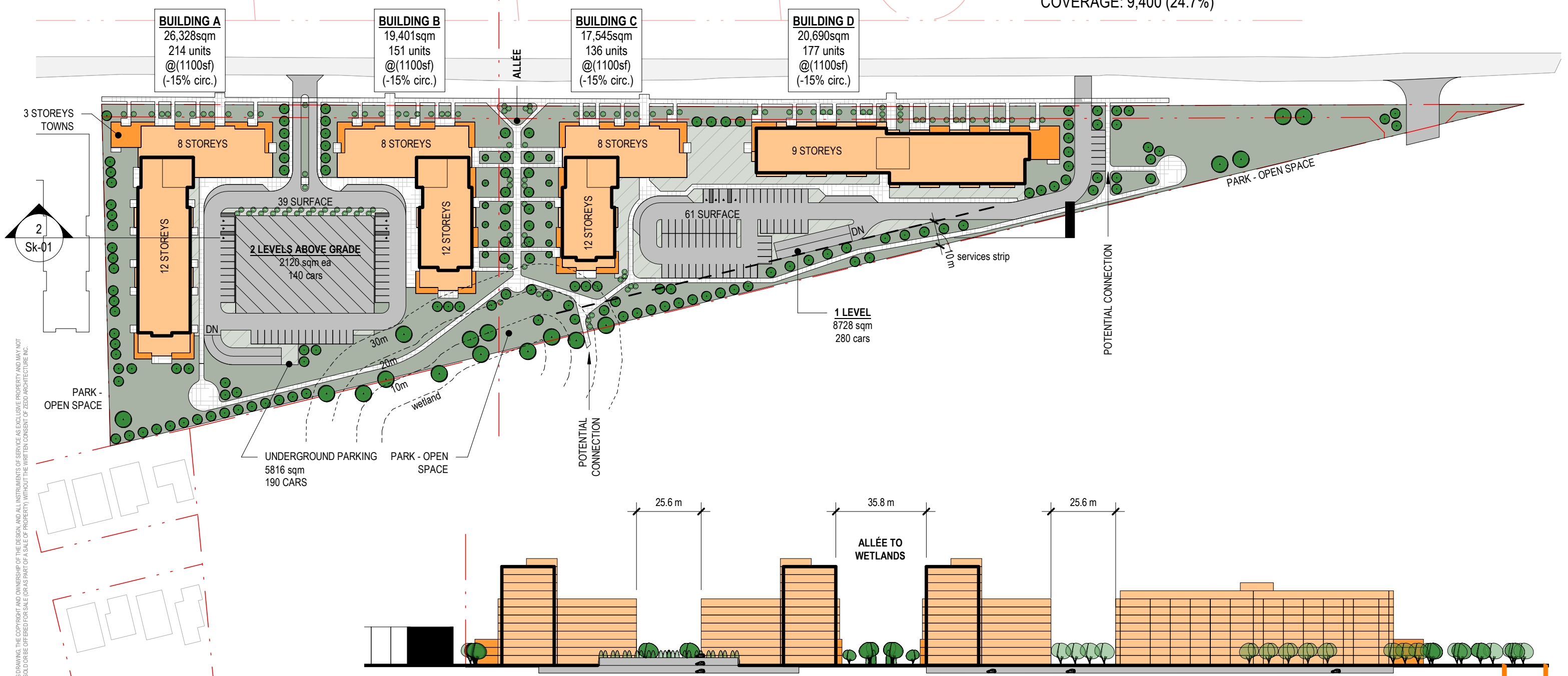
SITE AREA: 38,035 (3.8ha)
DENSITY: 678 UNITS (178uph)
COVERAGE: 9,400 (24.7%)

BUILDING A
 26,328sqm
 214 units
 @(1100sf)
 (-15% circ.)

BUILDING B
 19,401sqm
 151 units
 @(1100sf)
 (-15% circ.)

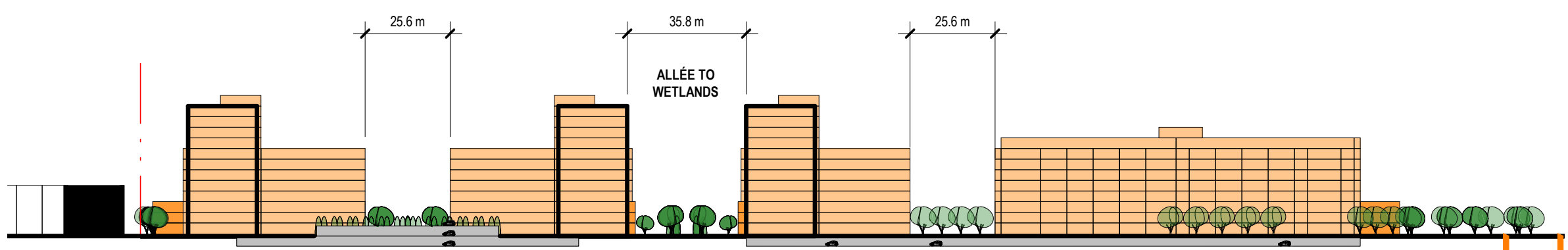
BUILDING C
 17,545sqm
 136 units
 @(1100sf)
 (-15% circ.)

BUILDING D
 20,690sqm
 177 units
 @(1100sf)
 (-15% circ.)



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Scale : 1 : 1500



zedd
 ARCHITECTURE

Z-627 mailand street london ontario N5Y 2V7 519 518 9333
 www.zeddarchitecture.com info@zeddarchitecture.com

Appendix C – Borehole Logs



BOREHOLE LOG

BH1

Sheet 1 of 1

CLIENT Western Prestige Village PROJECT NO. KCH-00257251-A0
 PROJECT Proposed Apartment Complex DATUM Geodetic
 LOCATION 735 Southdale Road West, London, ON DATES: Boring November 21, 2019 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH		
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	Field Vane Test (#=Sensitivity)	Penetrometer
0	279.3	TOPSOIL - 300 mm									
0	279.0	SILTY CLAY TILL - brown, trace sand, trace gravel, very stiff to hard, moist - becoming grey near 2.9 m bgs			SS	S1	300	22	17		
1					SS	S2	350	31	15		
2					SS	S3	400	24	17		
3					SS	S4	200	21	22		
4					SS	S5	400	17	23		
5					SS	S6	300	31	18		
5	273.8	SAND - brown, fine to medium grained, trace silt, trace gravel, dense to very dense, damp to moist - silty in upper level			SS	S7	450	81	5		81
6					SS	S8	300	65	3		65
7					SS	S9	300	48	3		
8					SS	S10	300	44	4		
11	268.2	End of Borehole at 11.1 m bgs.									

NOTES
 1) Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report KCH-00257251-A0.
 2) Borehole was open to 9.8 m bgs and dry upon completion of drilling.
 3) bgs denotes below ground surface.
 4) No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND
 AS Auger Sample SS Split Spoon ST Shelby Tube
 Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS
 G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS
 Apparent Measured Artesian (see Notes)



BOREHOLE LOG

BH2

Sheet 1 of 1

CLIENT Western Prestige Village PROJECT NO. KCH-00257251-A0
 PROJECT Proposed Apartment Complex DATUM Geodetic
 LOCATION 735 Southdale Road West, London, ON DATES: Boring November 21, 2019 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH	
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	Field Vane Test (#=Sensitivity)
0	279.3	TOPSOIL - 250 mm								
0	279.1	SILTY CLAY TILL - brown, trace sand, trace gravel, very stiff, moist			SS	S1	350	23	18	
1					SS	S2	450	26	16	
2					SS	S3	400	22	16	
3					SS	S4	0	21	18	
4		- becoming grey near 3.7 m bgs			SS	S5	450	20	17	
5					SS	S6	0	20	17	
6					SS	S7	400	15	15	
7		- becoming damp near 7.1 m bgs			SS	S8	450	23	9	
8		- moist sand layer encountered near 7.6 m bgs			SS	S9	300	28	9	
9	269.7	End of Borehole at 9.6 m bgs.								

NOTES

- Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report KCH-00257251-A0.
- Borehole was open to 8.8 m bgs and dry upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

AS Auger Sample SS Split Spoon ST Shelby Tube
 Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS

G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 γ Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS

Apparent Measured Artesian (see Notes)



BOREHOLE LOG

BH3/MW

Sheet 1 of 1

CLIENT Western Prestige Village PROJECT NO. KCH-00257251-A0
 PROJECT Proposed Apartment Complex DATUM Geodetic
 LOCATION 735 Southdale Road West, London, ON DATES: Boring November 22, 2019 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH	
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	Field Vane Test (#=Sensitivity)
0	281.9	TOPSOIL - 350 mm								
0.5	281.5	SILTY CLAY TILL - brown, trace sand, trace gravel, very stiff, moist			SS	S1	300	19	13	
1.5					SS	S2	300	28	14	
2.5					SS	S3	350	20	19	
3.5					SS	S4	200	25	19	
4.5	277.8	SANDY SILT TILL - brown, trace clay, trace gravel, compact, moist			SS	S5	300	11	13	
5.5	276.9	SAND - brown, fine to medium grained, trace silt, trace gravel, dense, damp to moist			SS	S6	300	21	10	
6.5					SS	S7	400	35	6	
8.5		- some gravel near 7.6 m bgs			SS	S8	400	45	3	
9.5	272.3	End of Borehole at 9.6 m bgs.			SS	S9	450	33	3	

NOTES

- Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report KCH-00257251-A0.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

AS Auger Sample SS Split Spoon ST Shelby Tube
 Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS

G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 γ Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS

Apparent Measured Artesian (see Notes)



BOREHOLE LOG

BH4

Sheet 1 of 1

CLIENT Western Prestige Village PROJECT NO. KCH-00257251-A0
 PROJECT Proposed Apartment Complex DATUM Geodetic
 LOCATION 735 Southdale Road West, London, ON DATES: Boring November 21, 2019 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH	
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	Field Vane Test (#=Sensitivity)
0	280.6	TOPSOIL - 350 mm								
0.2	280.2	SILTY CLAY TILL - brown, trace sand, trace gravel, stiff to hard, moist			SS	S1	250	14	18	
1					SS	S2	400	28	14	
2		- possible cobble encountered near 2.4 m bgs			SS	S3	300	36	16	
3					SS	S4	400	20	17	
4					SS	S5	300	17	18	
5		- becoming grey near 5.6 m bgs			SS	S6	400	20	18	
6					SS	S7	400	17	16	
7	273.2	SAND AND GRAVEL - grey, trace silt, compact, moist			SS	S8	300	24	10	
8	272.3	SILTY CLAY TILL - grey, trace sand, trace gravel, hard, damp to moist			SS	S9	400	42	16	
9					SS	S10	300	72	9	
11	269.4	End of Borehole at 11.1 m bgs.								

NOTES

- Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report KCH-00257251-A0.
- Borehole was open to 10.4 m bgs and dry upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

AS Auger Sample SS Split Spoon ST Shelby Tube
 Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS

G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 γ Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS

Apparent Measured Artesian (see Notes)



BOREHOLE LOG

BH5

Sheet 1 of 1

CLIENT Western Prestige Village PROJECT NO. KCH-00257251-A0
 PROJECT Proposed Apartment Complex DATUM Geodetic
 LOCATION 735 Southdale Road West, London, ON DATES: Boring November 22, 2019 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH	
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	Field Vane Test (#=Sensitivity)
0	279.9	TOPSOIL - 300 mm								
0	279.6	SILTY CLAY TILL - brown, trace sand, trace gravel, stiff to very stiff, moist								
1				SS	S1	300	13	16		
2				SS	S2	400	20	16		
3				SS	S3	400	26	18		
4		- becoming grey near 4.0 m bgs		AS	S5			18		
5				SS	S6	450	15	18		
6				SS	S7	450	18	16		
8				SS	S8	450	17	12		
9				SS	S9	450	16	15		
10	270.3	End of Borehole at 9.6 m bgs.								

NOTES

- Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report KCH-00257251-A0.
- Borehole was open to 9.1 m bgs and dry upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND
 AS Auger Sample SS Split Spoon ST Shelby Tube
 Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS
 G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS
 Apparent Measured Artesian (see Notes)



BOREHOLE LOG

BH6

Sheet 1 of 1

CLIENT Western Prestige Village PROJECT NO. KCH-00257251-A0
 PROJECT Proposed Apartment Complex DATUM Geodetic
 LOCATION 735 Southdale Road West, London, ON DATES: Boring November 22, 2019 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH	
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	◆ S Field Vane Test (#=Sensitivity)
0	278.7	TOPSOIL - 300 mm								
1	277.3	CLAYEY SILT - brown, weathered, some sand, firm, very moist			SS	S1	300	7	20	● ○
2		SILTY CLAY TILL - brown, trace sand, trace gravel, stiff to hard, moist			SS	S2	400	22	20	● ○
3		- becoming grey near 2.9 m bgs			SS	S3	450	41	16	○ ●
4					SS	S4	450	24	16	○ ●
5					SS	S5	450	14	17	● ○
6					SS	S6	450	15	15	●
7										
8					SS	S8	0	16	16	●
9	269.1	End of Borehole at 9.6 m bgs.			SS	S9	350	19	15	○ ●

NOTES

- Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report KCH-00257251-A0.
- Borehole was open to 9.1 m bgs and dry upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND
 AS Auger Sample SS Split Spoon ST Shelby Tube
 RC Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS
 G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 γ Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS
 ▽ Apparent ▼ Measured ▲ Artesian (see Notes)



BOREHOLE LOG

BH7/MW

Sheet 1 of 1

CLIENT Western Prestige Village PROJECT NO. KCH-00257251-A0
 PROJECT Proposed Apartment Complex DATUM Geodetic
 LOCATION 735 Southdale Road West, London, ON DATES: Boring November 22, 2019 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH		
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	Field Vane Test (#=Sensitivity)	Penetrometer
0	277.9	TOPSOIL - 300 mm									
0	277.6	FILL - clayey silt, brown/grey, some sand, some topsoil inclusions, very loose to loose, moist			SS	S1	250	9	20		
1					SS	S2	250	2	24		
2					SS	S3	300	5	21		
3	274.7	SILTY CLAY TILL - brown, trace sand, trace gravel, stiff to very stiff, moist			SS	S4	300	12	24		
4					SS	S5	50	24	19		
5					SS	S6	450	26	18		
6		- becoming grey near 5.6 m bgs									
7					SS	S7	450	13	18		
8					SS	S8	450	14	17		
9	268.3	End of Borehole at 9.6 m bgs.			SS	S9	300	16	16		
10											
11											
12											

NOTES

- Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report KCH-00257251-A0.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

AS Auger Sample SS Split Spoon ST Shelby Tube
 Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS

G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 γ Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS

Apparent Measured Artesian (see Notes)



BOREHOLE LOG

BH8A/MW

Sheet 1 of 1

CLIENT Western Prestige Village PROJECT NO. KCH-00257251-A0
 PROJECT Proposed Apartment Complex DATUM Geodetic
 LOCATION 735 Southdale Road West, London, ON DATES: Boring November 23, 2019 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH	
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	◆ S Field Vane Test (#=Sensitivity)
0	279.1	TOPSOIL - 250 mm						100	200 kPa	
0	278.9	SILTY CLAY TILL - brown, trace sand, trace gravel, moist								
1										
2										
3										
4		- becoming grey near 3.7 m bgs								
5										
6										
7										
7.6	271.5	End of Borehole at 7.6 m bgs.								
8										
9										
10										
11										
12										

NOTES

- Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report KCH-00257251-A0.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

AS Auger Sample SS Split Spoon ST Shelby Tube
 Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS

G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 γ Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS

Apparent Measured Artesian (see Notes)



BOREHOLE LOG

BH8B/MW

Sheet 1 of 1

CLIENT Western Prestige Village PROJECT NO. KCH-00257251-A0
 PROJECT Proposed Apartment Complex DATUM Geodetic
 LOCATION 735 Southdale Road West, London, ON DATES: Boring November 23, 2019 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH				
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	◆ S Field Vane Test (#=Sensitivity)	▲ Penetrometer	■ Torvane	Atterberg Limits and Moisture
									100	200	kPa		
									W_p W_L		● SPT N Value × Dynamic Cone		
									10	20	30	40	
0	279.1	TOPSOIL - 250 mm											
0	278.9	SILTY CLAY TILL - brown, trace sand, trace gravel, moist											
1													
2													
3													
4		- becoming grey near 3.7 m bgs											
5	274.2	End of Borehole at 4.9 m bgs.											
6													
7													
8													
9													
10													
11													
12													

NOTES

- Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report KCH-00257251-A0.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

- ☒ AS Auger Sample ☒ SS Split Spoon ■ ST Shelby Tube
- ☐ Rock Core (eg. BQ, NQ, etc.) ☐ VN Vane Sample

OTHER TESTS

- G Specific Gravity C Consolidation
- H Hydrometer CD Consolidated Drained Triaxial
- S Sieve Analysis CU Consolidated Undrained Triaxial
- γ Unit Weight UU Unconsolidated Undrained Triaxial
- P Field Permeability UC Unconfined Compression
- K Lab Permeability DS Direct Shear

WATER LEVELS

- ▽ Apparent ▼ Measured ▲ Artesian (see Notes)



BOREHOLE LOG

BH9

Sheet 1 of 1

CLIENT Western Prestige Village PROJECT NO. KCH-00257251-A0
 PROJECT Proposed Apartment Complex DATUM Geodetic
 LOCATION 735 Southdale Road West, London, ON DATES: Boring November 22, 2019 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH	
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	◆ S Field Vane Test (#=Sensitivity)
0	278.8	TOPSOIL - 300 mm								
0	278.5	SILTY CLAY TILL - brown, trace sand, trace gravel, very stiff, moist			SS	S1	300	23	18	
1					SS	S2	400	26	16	
2					SS	S3	450	18	19	
3					SS	S4	450	20	18	
3	275.3									
4		End of Borehole at 3.5 m bgs.								
5										
6										
7										
8										
9										
10										
11										
12										

NOTES

- Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report KCH-00257251-A0.
- Borehole was open to 3.1 m bgs and dry upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND
 AS Auger Sample SS Split Spoon ST Shelby Tube
 Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS
 G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 γ Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS
 ∇ Apparent ▼ Measured ▲ Artesian (see Notes)



BOREHOLE LOG

BH10

Sheet 1 of 1

CLIENT Western Prestige Village PROJECT NO. KCH-00257251-A0
 PROJECT Proposed Apartment Complex DATUM Geodetic
 LOCATION 735 Southdale Road West, London, ON DATES: Boring November 21, 2019 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH		
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	Field Vane Test (#-Sensitivity)	Penetrometer
0	279.7	TOPSOIL - 300 mm									
1		FILL - clayey silt, brown/grey, some sand, some topsoil inclusions, loose, moist			SS	S1	300	6	31		
2	277.7	SILTY CLAY TILL - brown, trace sand, trace gravel, very stiff to hard, moist			SS	S2	200	7	17		
					SS	S3	450	18	29		
3					SS	S4	400	37	17		
4		End of Borehole at 3.5 m bgs.									

NOTES

- Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report KCH-00257251-A0.
- Borehole was open to 3.1 m bgs and dry upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND
 AS Auger Sample SS Split Spoon ST Shelby Tube
 Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS
 G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS
 Apparent Measured Artesian (see Notes)



BOREHOLE LOG

BH1
Sheet 1 of 1

CLIENT Southside Group PROJECT NO. LON-00016262-GE
 PROJECT Proposed Talbot Village Phase 7 DATUM Geodetic
 LOCATION 3095 Bostwick Road, London, ON DATES: Boring May 28, 2018 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH		
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	● S Field Vane Test (#=Sensitivity)	▲ Penetrometer ■ Torvane
0	279.0	TOPSOIL - 400 mm									
1	278.6	SILTY CLAY TILL - brown, trace sand, trace gravel, stiff to very stiff, moist - becoming grey near 2.1 m bgs			SS	S1	400	17	14	●	
2					SS	S2	450	27	14	○	●
3					SS	S3	450	26	16	○	●
4					SS	S4	300	22	16	○	●
5					SS	S5	400	12	17	●	○
6	272.5				SS	S6	450	18	16	○	●
7		End of Borehole at 6.6 m bgs.									
8											
9											
10											
11											
12											
13											
14											
15											
16											

NOTES

- Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report LON-00016262-GE.
- Borehole open and dry upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

- AS Auger Sample
- Rock Core (eg. BQ, NQ, etc.)
- SS Split Spoon
- ST Shelby Tube
- VN Vane Sample

OTHER TESTS

- G Specific Gravity
- H Hydrometer
- S Sieve Analysis
- γ Unit Weight
- P Field Permeability
- K Lab Permeability
- C Consolidation
- CD Consolidated Drained Triaxial
- CU Consolidated Undrained Triaxial
- UU Unconsolidated Undrained Triaxial
- UC Unconfined Compression
- DS Direct Shear

WATER LEVELS

- Apparent
- Measured
- Artesian (see Notes)



BOREHOLE LOG

BH2/MW

Sheet 1 of 1

Client Southside Construction Management Limited Project No. LON-00016262-GE
 Project Name Talbot Village - Phase 7 Datum Geodetic
 Site Location 3095 Bostwick Road, LONDON, ON Boring Date May 29, 2018

DEPTH		ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES				MOISTURE CONTENT (%)	REMARKS
(ft bgs)	(m bgs)					TYPE	NUMBER	RECOVERY (mm)	N VALUE (blows)		
0.0	0.0	274.1	TOPSOIL - 400 mm								
1.3	0.4		SILTY CLAY TILL - brown, trace gravel, trace sand, stiff to very stiff, moist - becoming grey near 2.9 m bgs								Well Stickup: 0.72 m Auger Hole Diameter: 200 mm Standpipe Diameter: 50 mm
				SS	S1	400	18	16			
				SS	S2	400	24	16			
9.5	2.9			SS	S3	450	19	16			
				SS	S4	450	13	18			
				SS	S5	450	12				
				SS	S6	450	13	15			
				SS	S7	400	20	13			
29.9	9.1		- sandy silt layering encountered near 9.1 m bgs								
33.2	10.1	264.4		SS	S8	450	25	16		Top of Sand Pack Elev: 264.5 m	
			SANDY SILT - grey, trace clay, very dense, wet								Top of Screen Elev: 263.9 m
40.0	12.2	262.3		AS	S10			17		Bottom of Screen Elev: 262.3 m	
			End of Borehole at 12.2 m bgs.								

NOTES

- Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report LON-00016262-GE.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

- AS Auger Sample
- SS Split Spoon
- ST Shelby Tube
- Rock Core (eg. BQ, NQ, etc.)
- VN Vane Sample

OTHER TESTS

- G Specific Gravity
- H Hydrometer
- S Sieve Analysis
- γ Unit Weight
- P Field Permeability
- K Lab Permeability
- C Consolidation
- CD Consolidated Drained Triaxial
- CU Consolidated Undrained Triaxial
- UU Unconsolidated Undrained Triaxial
- UC Unconfined Compression
- DS Direct Shear

WATER LEVELS

- ▽ Apparent
- ▼ Measured
- ▲ Artesian (see Notes)



BOREHOLE LOG

BH3

Sheet 1 of 1

CLIENT Southside Group PROJECT NO. LON-00016262-GE
 PROJECT Proposed Talbot Village Phase 7 DATUM Geodetic
 LOCATION 3095 Bostwick Road, London, ON DATES: Boring May 31, 2018 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH	
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	● S Field Vane Test (#=Sensitivity)
0	277.3	TOPSOIL - 250 mm								
	277.0	SILTY CLAY TILL - brown, trace sand, trace gravel, stiff to very stiff, moist			SS	S1	400	17	14	●
-1					SS	S2	450	15	14	●
-2					SS	S3	450	18	17	●
-3					SS	S4	450	18	17	●
-4		- becoming grey near 3.5 m bgs								
-5					SS	S5	450	14	17	●
-6	270.7				SS	S6	450	16	16	●
-7		End of Borehole at 6.6 m bgs.								
-8										
-9										
-10										
-11										
-12										
-13										
-14										
-15										
-16										

NOTES

- Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report LON-00016262-GE.
- Borehole open and dry upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

- ☒ AS Auger Sample
- ☐ Rock Core (eg. BQ, NQ, etc.)
- ☒ SS Split Spoon
- ☐ ST Shelby Tube
- ☐ VN Vane Sample

OTHER TESTS

- G Specific Gravity
- H Hydrometer
- S Sieve Analysis
- γ Unit Weight
- P Field Permeability
- K Lab Permeability
- C Consolidation
- CD Consolidated Drained Triaxial
- CU Consolidated Undrained Triaxial
- UU Unconsolidated Undrained Triaxial
- UC Unconfined Compression
- DS Direct Shear

WATER LEVELS

- ▽ Apparent
- ▼ Measured
- ▲ Artesian (see Notes)



BOREHOLE LOG

BH4

Sheet 1 of 1

CLIENT Southside Group PROJECT NO. LON-00016262-GE
 PROJECT Proposed Talbot Village Phase 7 DATUM Geodetic
 LOCATION 3095 Bostwick Road, London, ON DATES: Boring May 31, 2018 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH		
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	● S Field Vane Test (#=Sensitivity)	▲ Penetrometer ■ Torvane
0	276.2										
	275.9	TOPSOIL - 300 mm									
-1	274.9	FILL - sand to silty clay, brown, trace gravel, compact, very moist			SS	S1	400	15	18	●	
-2		SILTY CLAY TILL - brown, trace gravel, trace sand, stiff to very stiff, moist - occasional silt lenses encountered from 2.3 m to 3.4 m bgs - becoming grey near 2.9 m bgs			SS	S2	450	20	17	○	
-3					SS	S3	450	23	13	○	●
-4					SS	S4	400	18	10	○	●
-5					SS	S5	450	13	17	●	○
-6	269.7				SS	S6	450	15	15	●	
-7		End of Borehole at 6.6 m bgs.									
-8											
-9											
-10											
-11											
-12											
-13											
-14											
-15											
-16											

NOTES

- Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report LON-00016262-GE.
- Borehole open and dry upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

AS Auger Sample SS Split Spoon ST Shelby Tube
 Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS

G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 γ Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS

Apparent Measured Artesian (see Notes)



BOREHOLE LOG

BH5

Sheet 1 of 1

CLIENT Southside Group PROJECT NO. LON-00016262-GE
 PROJECT Proposed Talbot Village Phase 7 DATUM Geodetic
 LOCATION 3095 Bostwick Road, London, ON DATES: Boring May 28, 2018 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH	
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	● S Field Vane Test (#=Sensitivity)
0	277.4	TOPSOIL - 300 mm								
0	277.1	SILTY CLAY TILL - brown, trace sand, trace gravel, very stiff, moist			SS	S1	400	21	13	
1					SS	S2	450	21	15	
2					SS	S3	450	23	16	
3					SS	S4	400	18	18	
4		- becoming grey near 3.5 m bgs								
5					SS	S5	450	24	12	
6		- wet sand and gravel seam encountered near 5.2 m bgs		▽						
6	270.9				SS	S6	450	19	17	
7		End of Borehole at 6.6 m bgs.								
8										
9										
10										
11										
12										
13										
14										
15										
16										

NOTES

- Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report LON-00016262-GE.
- Borehole open to 6.1 m bgs and groundwater measured near 5.8 m bgs upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

- ☒ AS Auger Sample ☒ SS Split Spoon ■ ST Shelby Tube
- ☒ Rock Core (eg. BQ, NQ, etc.) ☒ VN Vane Sample

OTHER TESTS

- G Specific Gravity C Consolidation
- H Hydrometer CD Consolidated Drained Triaxial
- S Sieve Analysis CU Consolidated Undrained Triaxial
- γ Unit Weight UU Unconsolidated Undrained Triaxial
- P Field Permeability UC Unconfined Compression
- K Lab Permeability DS Direct Shear

WATER LEVELS

- ▽ Apparent ▼ Measured ▲ Artesian (see Notes)



BOREHOLE LOG

BH6/MW

Sheet 1 of 1

Client Southside Construction Management Limited Project No. LON-00016262-GE
 Project Name Talbot Village - Phase 7 Datum Geodetic
 Site Location 3095 Bostwick Road, LONDON, ON Boring Date May 30, 2018

DEPTH		ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES				MOISTURE CONTENT (%)	REMARKS
(ft bgs)	(m bgs)					TYPE	NUMBER	RECOVERY (mm)	N VALUE (blows)		
		277.3									
0.0	0.0	277.0	TOPSOIL - 300 mm							Well Stickup: 0.67 m	
1.0	0.3		FILL - sandy silt, brown, some clay, trace gravel, compact, moist to very moist							Auger Hole Diameter: 200 mm	
7.0	2.1	275.2								Standpipe Diameter: 50 mm	
10.0	3.1		SILTY CLAY TILL - grey, trace sand, trace gravel, stiff to very stiff, moist								
18.2	5.6	271.8									
23.3	7.1	270.2	SAND AND GRAVEL - brown, trace silt, compact, very moist to wet							Top of Sand Pack Elev: 271.2 m	
			SILTY CLAY TILL - brown, some sand, trace gravel, hard, moist - occasional sand lenses							Top of Screen Elev: 270.5 m	
29.0	8.8	268.5								Bottom of Screen Elev: 268.9 m	
			End of Borehole at 8.8 m bgs.								

NOTES

- Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report LON-00016262-GE.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

- ☒ AS Auger Sample ☒ SS Split Spoon ■ ST Shelby Tube
- ☐ Rock Core (eg. BQ, NQ, etc.) ☐ VN Vane Sample

OTHER TESTS

- G Specific Gravity C Consolidation
- H Hydrometer CD Consolidated Drained Triaxial
- S Sieve Analysis CU Consolidated Undrained Triaxial
- γ Unit Weight UU Unconsolidated Undrained Triaxial
- P Field Permeability UC Unconfined Compression
- K Lab Permeability DS Direct Shear

WATER LEVELS

- ▽ Apparent ▼ Measured ▲ Artesian (see Notes)



BOREHOLE LOG

BH7/MW

Sheet 1 of 1

Client Southside Construction Management Limited Project No. LON-00016262-GE
 Project Name Talbot Village - Phase 7 Datum Geodetic
 Site Location 3095 Bostwick Road, LONDON, ON Boring Date May 29, 2018

DEPTH		ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES				MOISTURE CONTENT (%)	REMARKS
(ft bgs)	(m bgs)					TYPE	NUMBER	RECOVERY (mm)	N VALUE (blows)		
0.0	0.0	274.4	TOPSOIL - 350 mm								
1.1	0.4		SILTY CLAY - brown/grey, weathered, trace sand, trace gravel, firm, moist								Well Stickup: 0.78 m Auger Hole Diameter: 200 mm
4.5	1.4	273.4	SILTY CLAY TILL - brown, trace sand, trace gravel, stiff to very stiff, moist								Standpipe Diameter: 50 mm
11.5	3.5		- becoming grey near 3.5 m bgs								
21.5	6.6	268.2	SILT - grey, trace clay, some sand, dilatant, dense to very dense, very moist to wet								Top of Sand Pack Elev: 267.5 m
33.2	10.1	264.7	SILTY CLAY - grey, trace sand, stiff, moist								Top of Screen Elev: 266.6 m Bottom of Screen Elev: 265.0 m
38.3	11.7	263.1	SILTY CLAY TILL - grey, trace sand, trace gravel, very stiff to hard, moist								
40.0	12.2		- possible cobble encountered near 12.2 m bgs								
46.5	14.2	260.6	End of Borehole at 14.2 m bgs.								

NOTES

- Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report LON-00016262-GE.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

- ☒ AS Auger Sample
- ☒ SS Split Spoon
- ST Shelby Tube
- ☐ Rock Core (eg. BQ, NQ, etc.)
- ☐ VN Vane Sample

OTHER TESTS

- G Specific Gravity
- H Hydrometer
- S Sieve Analysis
- γ Unit Weight
- P Field Permeability
- K Lab Permeability
- C Consolidation
- CD Consolidated Drained Triaxial
- CU Consolidated Undrained Triaxial
- UU Unconsolidated Undrained Triaxial
- UC Unconfined Compression
- DS Direct Shear

WATER LEVELS

- ▽ Apparent
- ▼ Measured
- ▲ Artesian (see Notes)



BOREHOLE LOG

BH8

Sheet 1 of 1

CLIENT Southside Group PROJECT NO. LON-00016262-GE
 PROJECT Proposed Talbot Village Phase 7 DATUM Geodetic
 LOCATION 3095 Bostwick Road, London, ON DATES: Boring May 31, 2018 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH	
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	● S Field Vane Test (#=Sensitivity)
0	275.4	TOPSOIL - 350 mm								
0	275.1	SILTY CLAY TILL - brown, trace sand, trace gravel, very stiff, moist			SS	S1	400	15	15	
1					SS	S2	450	27	13	
2		- sandy silt layering encountered near 2.3 m bgs			SS	S3	450	25	15	
3					SS	S4	450	20	15	
4										
5		- becoming grey near 4.9 m bgs			SS	S5	450	19	17	
6										
6	268.9	- dilatant silt lens encountered near 6.4 m bgs			SS	S6	450	24	15	
7		End of Borehole at 6.6 m bgs.								
8										
9										
10										
11										
12										
13										
14										
15										
16										

NOTES

- Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report LON-00016262-GE.
- Borehole open and dry upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

- ☒ AS Auger Sample ☒ SS Split Spoon ■ ST Shelby Tube
- ☒ Rock Core (eg. BQ, NQ, etc.) ☒ VN Vane Sample

OTHER TESTS

- G Specific Gravity C Consolidation
- H Hydrometer CD Consolidated Drained Triaxial
- S Sieve Analysis CU Consolidated Undrained Triaxial
- γ Unit Weight UU Unconsolidated Undrained Triaxial
- P Field Permeability UC Unconfined Compression
- K Lab Permeability DS Direct Shear

WATER LEVELS

- ▽ Apparent ▼ Measured ▲ Artesian (see Notes)



BOREHOLE LOG

BH9/MW

Sheet 1 of 1

Client Southside Construction Management Limited Project No. LON-00016262-GE
 Project Name Talbot Village - Phase 7 Datum Geodetic
 Site Location 3095 Bostwick Road, LONDON, ON Boring Date May 28, 2018

DEPTH		ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES				MOISTURE CONTENT (%)	REMARKS
(ft bgs)	(m bgs)					TYPE	NUMBER	RECOVERY (mm)	N VALUE (blows)		
0.0	0.0	279.2	TOPSOIL - 450 mm								
1.5	0.5		SILTY CLAY TILL - brown, trace sand, trace gravel, stiff to very stiff, moist								Well Stickup: 0.98 m Auger Hole Diameter: 200 mm Standpipe Diameter: 50 mm
12.5	3.8		- becoming grey near 3.8 m bgs								
20.0	6.1		- 100 mm thick wet sand and gravel seam encountered near 6.1 m bgs								
23.3	7.1	272.1	SILT TILL - brown, trace clay, some sand, trace gravel, very dense, moist								
28.2	8.6	270.6	SAND - brown, fine to medium grained, trace silt, trace gravel, dense to very dense, damp to moist								Top of Sand Pack Elev: 267.6 m Top of Screen Elev: 267.0 m
48.3	14.7	264.5	SILT - brown, trace clay, some sand, dilatant lenses, moist to very moist								Bottom of Screen Elev: 264.0 m
51.5	15.7	263.5	End of Borehole at 15.7 m bgs.								

NOTES

- Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report LON-00016262-GE.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

- ☒ AS Auger Sample
- ☒ SS Split Spoon
- ST Shelby Tube
- ☒ Rock Core (eg. BQ, NQ, etc.)
- ☒ VN Vane Sample

OTHER TESTS

- G Specific Gravity
- H Hydrometer
- S Sieve Analysis
- γ Unit Weight
- P Field Permeability
- K Lab Permeability
- C Consolidation
- CD Consolidated Drained Triaxial
- CU Consolidated Undrained Triaxial
- UU Unconsolidated Undrained Triaxial
- UC Unconfined Compression
- DS Direct Shear

WATER LEVELS

- ▽ Apparent
- ▼ Measured
- ▲ Artesian (see Notes)



BOREHOLE LOG

BH10

Sheet 1 of 1

CLIENT Southside Group PROJECT NO. LON-00016262-GE
 PROJECT Proposed Talbot Village Phase 7 DATUM Geodetic
 LOCATION 3095 Bostwick Road, London, ON DATES: Boring May 28, 2018 Water Level _____

DEPTH (m bgs)	ELEVATION (-m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES			MOISTURE CONTENT (%)	SHEAR STRENGTH		
					TYPE	NUMBER	RECOVERY (mm)		N VALUE (blows)	● S Field Vane Test (#=Sensitivity)	▲ Penetrometer ■ Torvane
0	279.6										
0	279.3	TOPSOIL - 300 mm									
1		FILL - silty clay, brown, trace sand, trace gravel, stiff, moist			SS	S1	400	13	13		
2	278.2	SILTY CLAY TILL - brown, trace sand, trace gravel, very stiff, moist			SS	S2	450	22	14		
3					SS	S3	425	15	19		
4					SS	S4	450	17	17		
5	275.6				SILT TILL - brown, trace clay, some sand, trace gravel, very dense, moist	SS	S5	350	50*	8	
6	273.0	- occasional sand seams encountered near 6.0 m bgs			SS	S6	450	60	9		
7		End of Borehole at 6.6 m bgs.									
8											
9											
10											
11											
12											
13											
14											
15											
16											

NOTES

- Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report LON-00016262-GE.
- Borehole open and dry upon completion of drilling.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.
- * denotes 50 blows per 75 mm split spoon sampler penetration.

SAMPLE LEGEND
 ☒ AS Auger Sample ☒ SS Split Spoon ■ ST Shelby Tube
 ☒ Rock Core (eg. BQ, NQ, etc.) ☒ VN Vane Sample

OTHER TESTS
 G Specific Gravity C Consolidation
 H Hydrometer CD Consolidated Drained Triaxial
 S Sieve Analysis CU Consolidated Undrained Triaxial
 γ Unit Weight UU Unconsolidated Undrained Triaxial
 P Field Permeability UC Unconfined Compression
 K Lab Permeability DS Direct Shear

WATER LEVELS
 ▽ Apparent ▼ Measured ▲ Artesian (see Notes)



BOREHOLE LOG

BH11/MW

Sheet 1 of 1

Client Southside Construction Management Limited Project No. LON-00016262-GE
 Project Name Talbot Village - Phase 7 Datum Geodetic
 Site Location 3095 Bostwick Road, LONDON, ON Boring Date May 30, 2018

DEPTH		ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES				MOISTURE CONTENT (%)	REMARKS
(ft bgs)	(m bgs)					TYPE	NUMBER	RECOVERY (mm)	N VALUE (blows)		
		277.8									
0.0	0.0	277.5	TOPSOIL - 350 mm								Well Stickup: 0.88 m
1.1	0.4		SILTY CLAY TILL - brown, trace sand, trace gravel, very stiff to hard, moist								Auger Hole Diameter: 200 mm
											Standpipe Diameter: 50 mm
10.2	3.1		- possible cobble encountered near 3.1 m bgs								
18.2	5.6	272.3	SAND - brown, fine to medium grained, trace silt, compact to very dense, damp to moist - gravelly near 6.1 m bgs								
											Top of Sand Pack Elev: 266.2 m
											Top of Screen Elev: 265.6 m
											Bottom of Screen Elev: 262.6 m
51.5	15.7	262.1									
			End of Borehole at 15.7 m bgs.								

NOTES

- Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report LON-00016262-GE.
- bgs denotes below ground surface.
- No significant methane gas concentration was detected upon completion of drilling.

SAMPLE LEGEND

- AS Auger Sample
- SS Split Spoon
- ST Shelby Tube
- Rock Core (eg. BQ, NQ, etc.)
- VN Vane Sample

OTHER TESTS

- G Specific Gravity
- H Hydrometer
- S Sieve Analysis
- γ Unit Weight
- P Field Permeability
- K Lab Permeability
- C Consolidation
- CD Consolidated Drained Triaxial
- CU Consolidated Undrained Triaxial
- UU Unconsolidated Undrained Triaxial
- UC Unconfined Compression
- DS Direct Shear

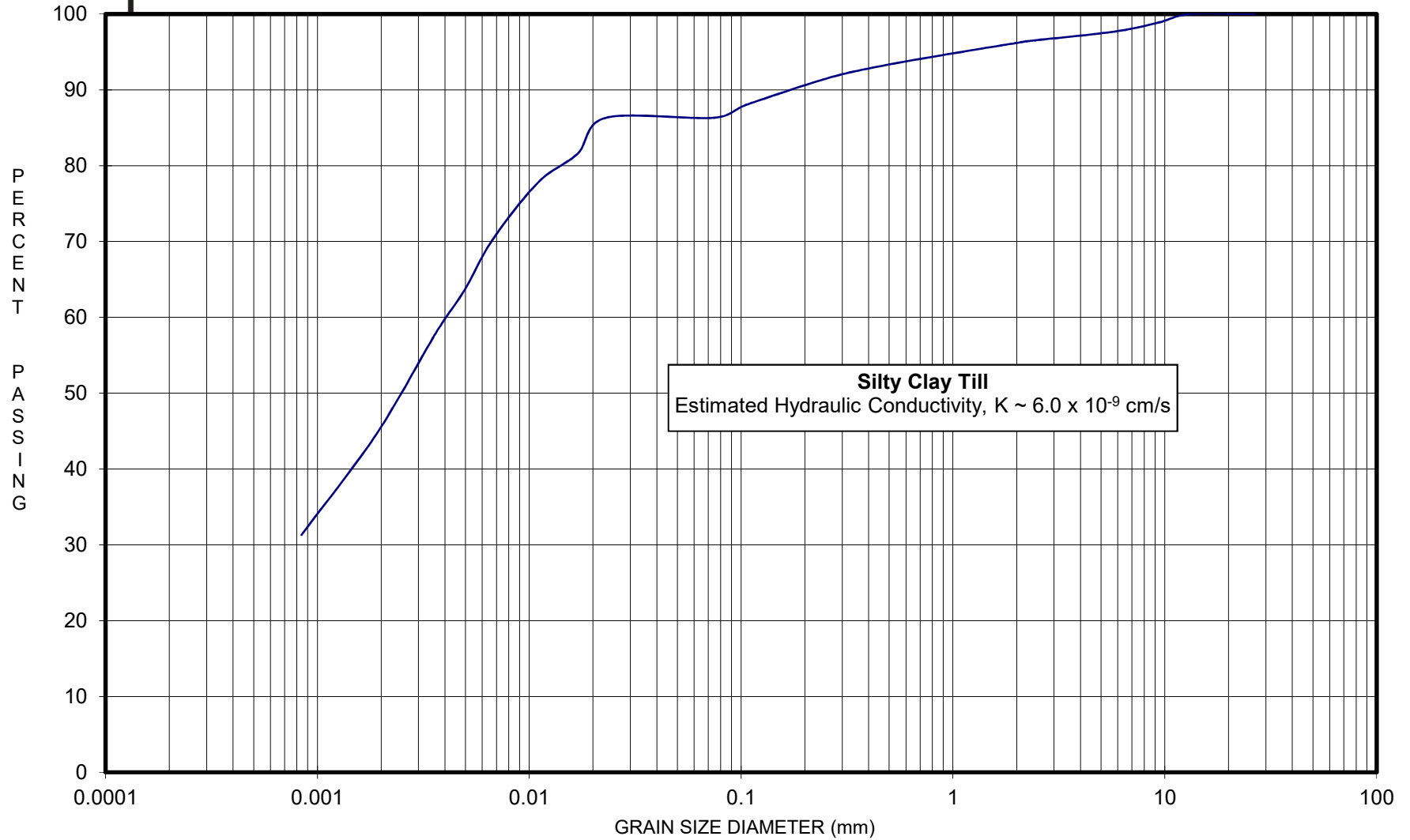
WATER LEVELS

- ▽ Apparent
- ▼ Measured
- ▲ Artesian (see Notes)

Appendix D – Grain Size Analyses



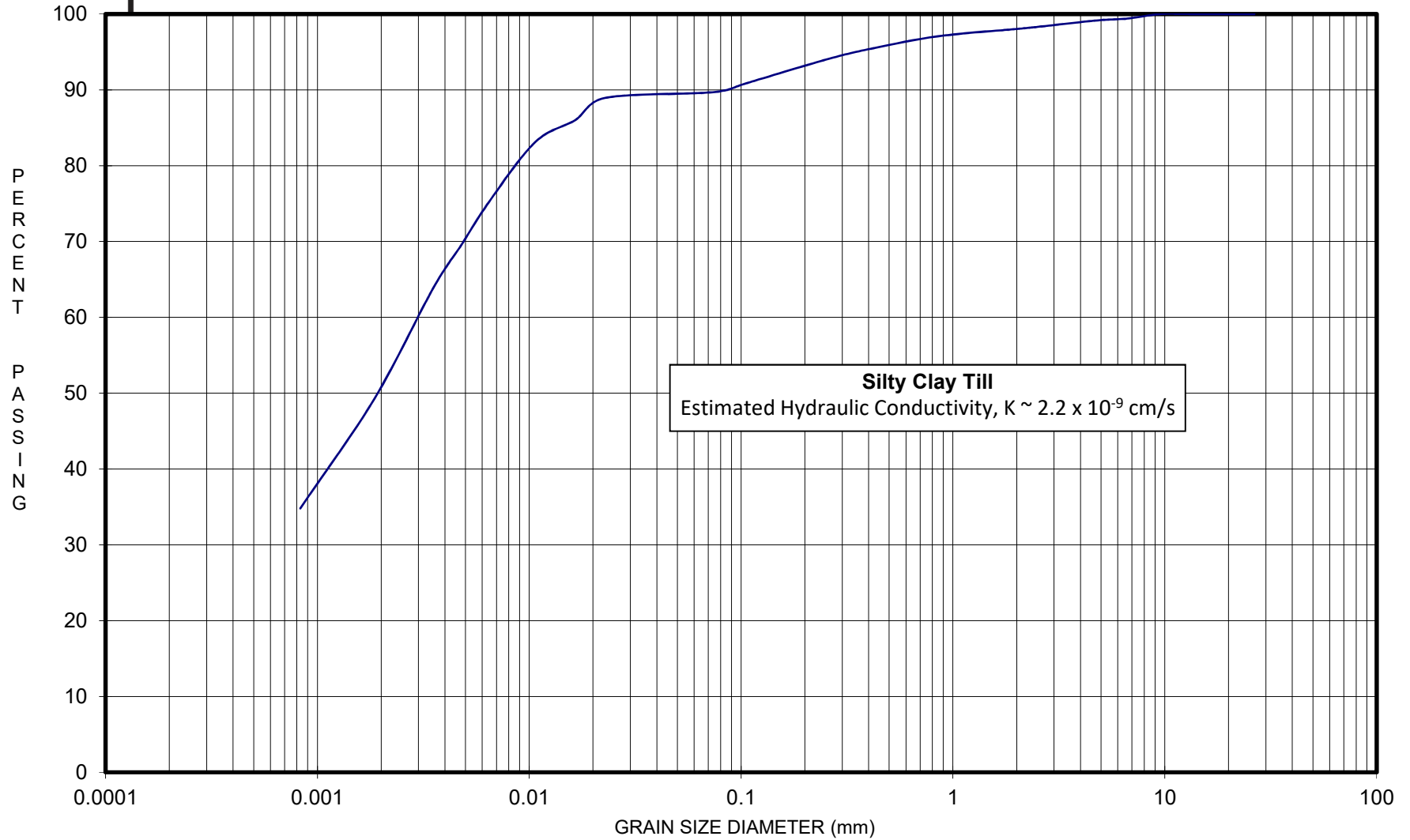
MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			
MODIFIED M.I.T. CLASSIFICATION	Sample Description: Silty Clay Till (BH2 S5, 3.8 to 4.3 m depth)						735 Southdale Rd W, London Project: KCH00257251-A0		Figure 1	



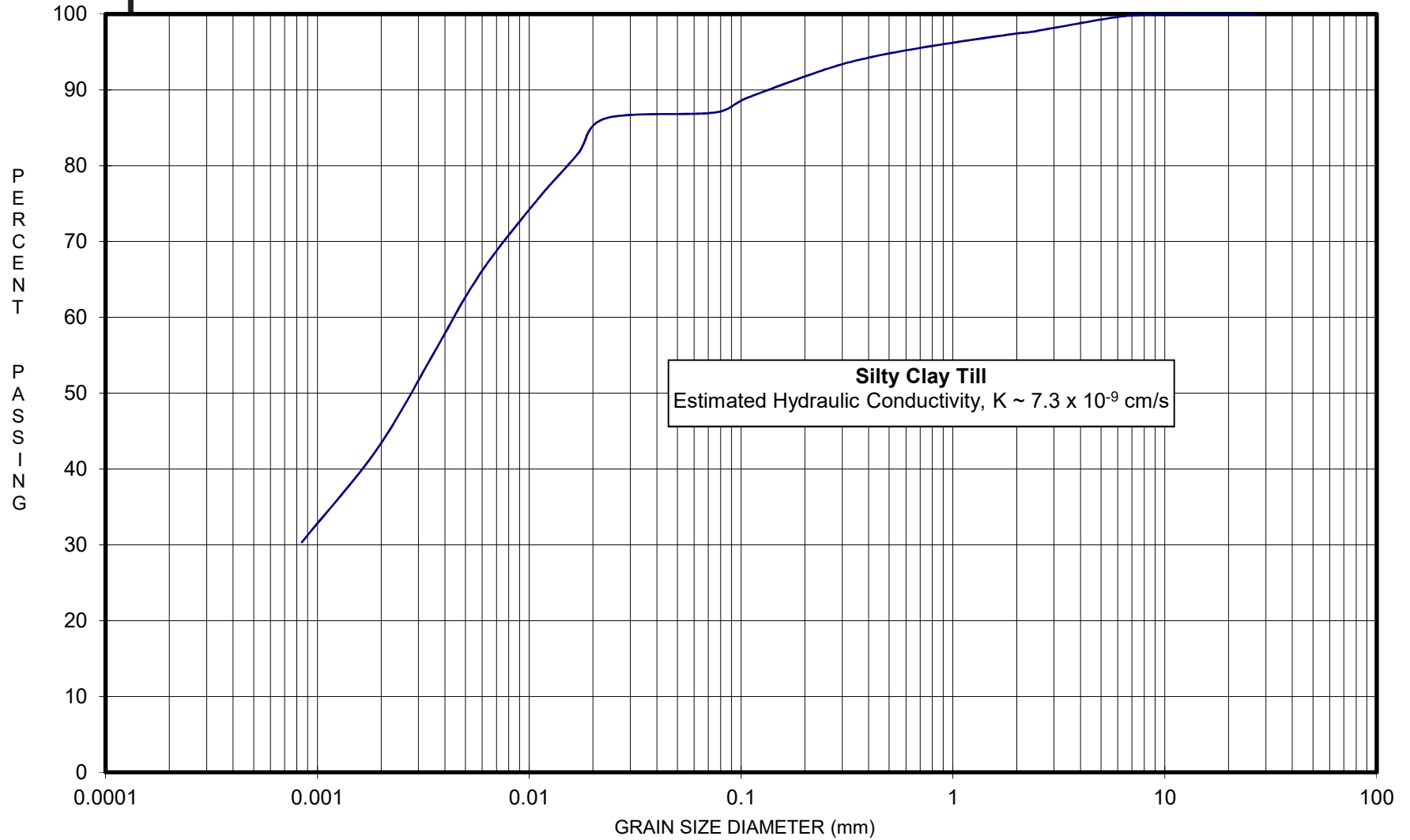
MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE
	SILT			SAND			GRAVEL		
MODIFIED M.I.T. CLASSIFICATION									
Sample Description: Silty Clay Till (BH3 S3, 2.3 to 2.7 m depth)						735 Southdale Rd W, London Project: KCH00257251-A0			Figure 2



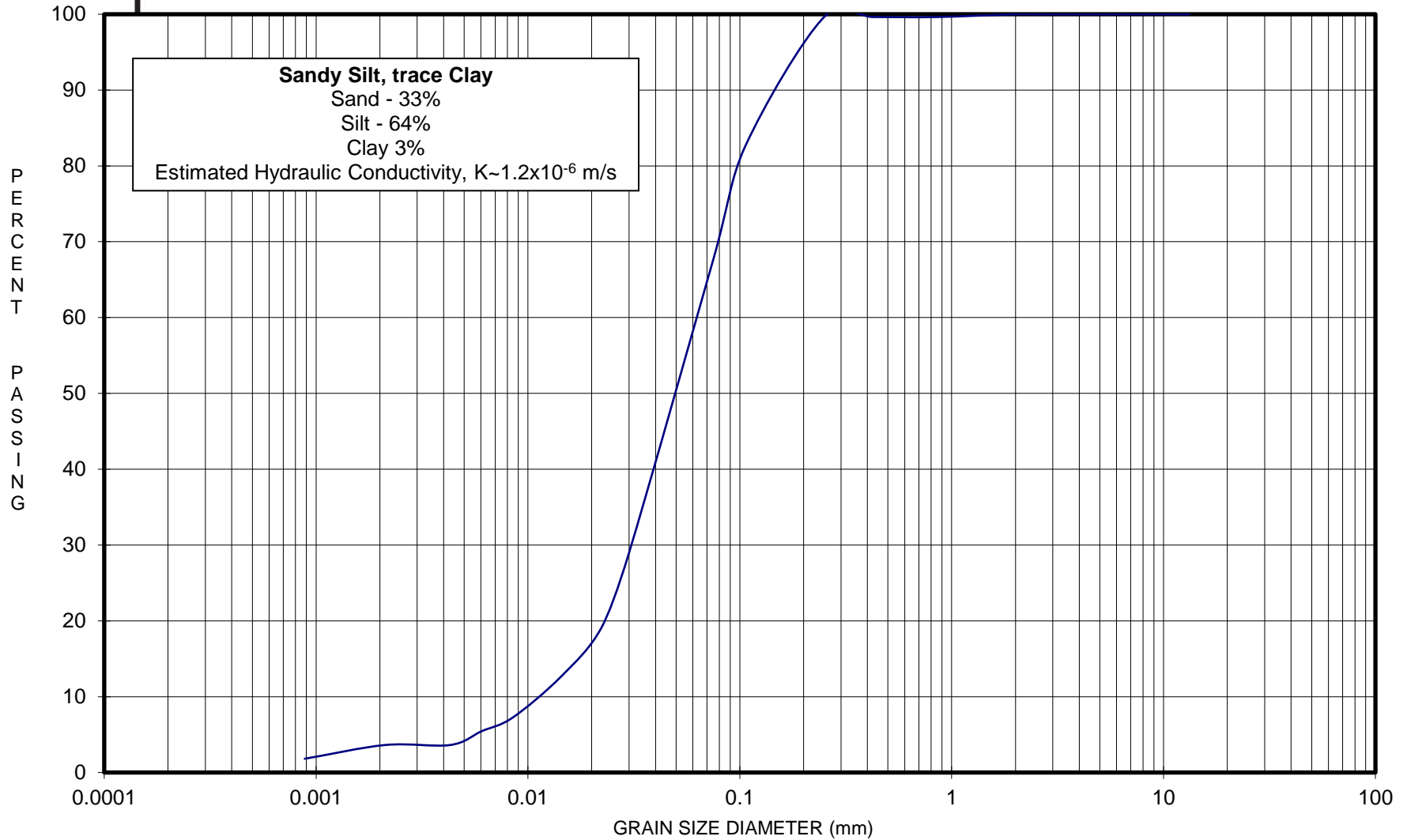
MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE
	SILT			SAND			GRAVEL		
MODIFIED M.I.T. CLASSIFICATION	Sample Description: Silty Clay Till (BH7 S8, 7.6 to 8.1 m depth)					735 Southdale Rd W, London Project: KCH00257251-A0			Figure 3



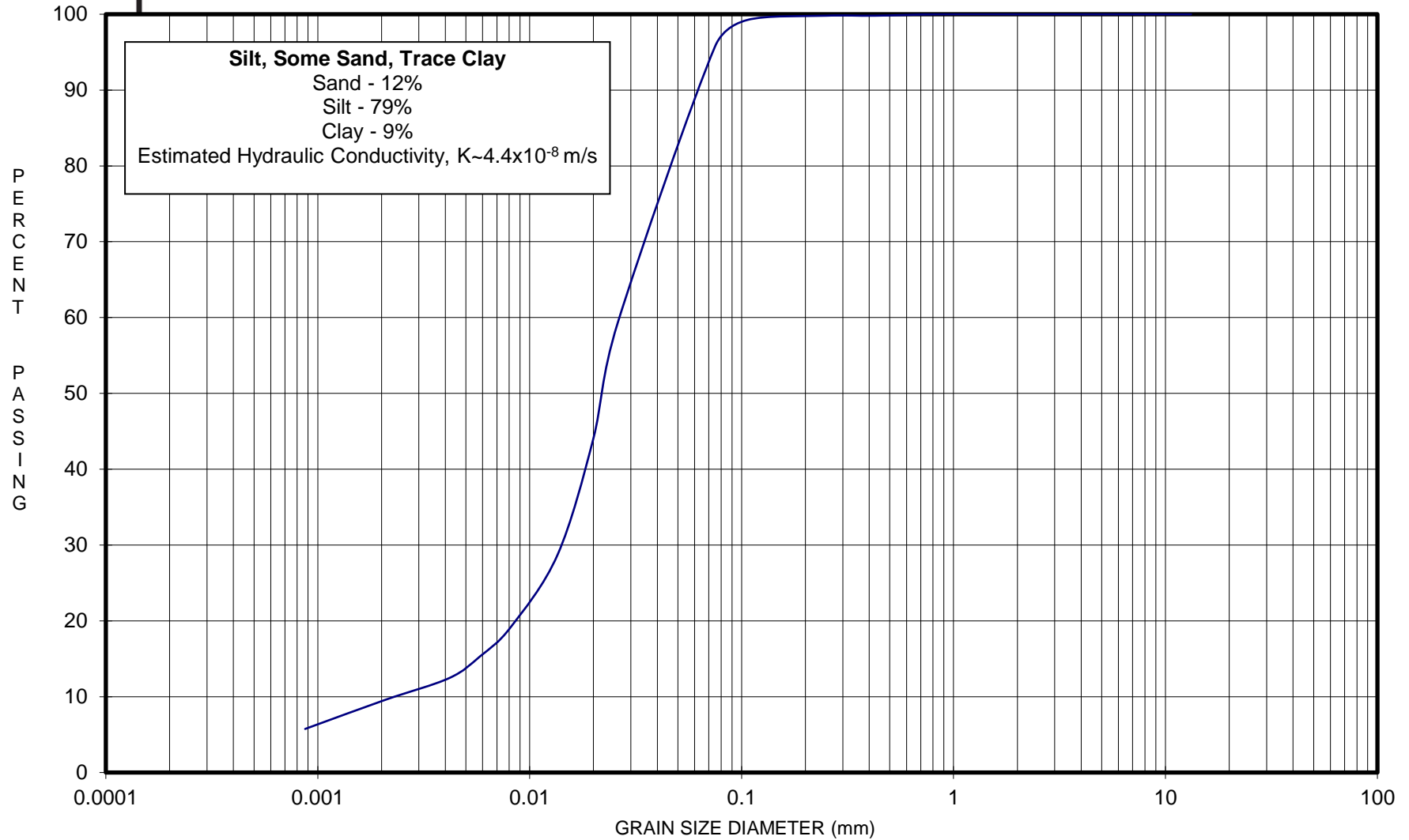
MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE
	SILT			SAND			GRAVEL		
MODIFIED M.I.T. CLASSIFICATION	Sample Description: BH2/MW S9 - 10.7 m bgs					Project: LON-00016262-HG		Figure 1	



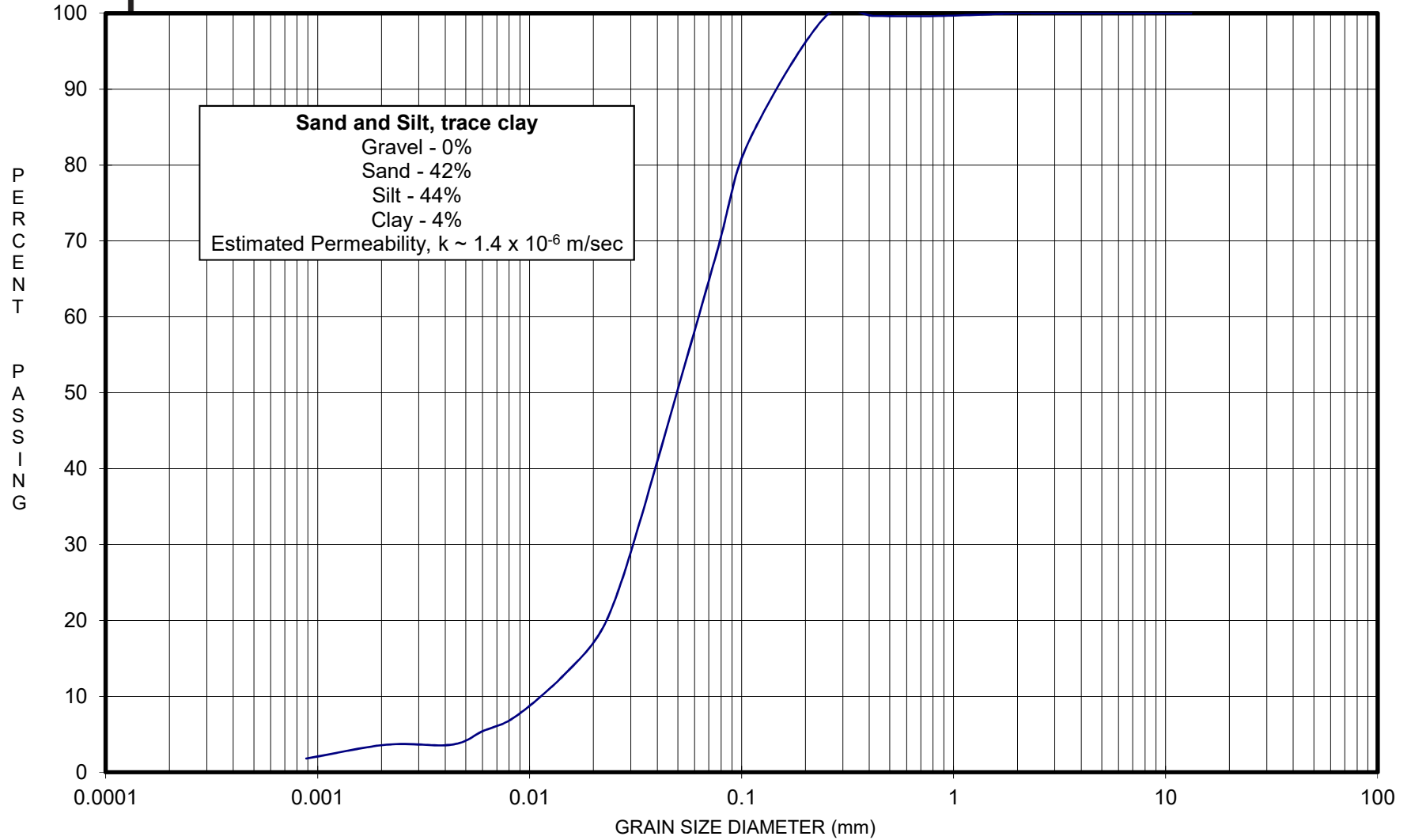
MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE
	SILT			SAND			GRAVEL		
MODIFIED M.I.T. CLASSIFICATION									
Sample Description: BH7/MW S8 - Depth 9.1 m bgs						Project: LON-00016262-HG		Figure 2	



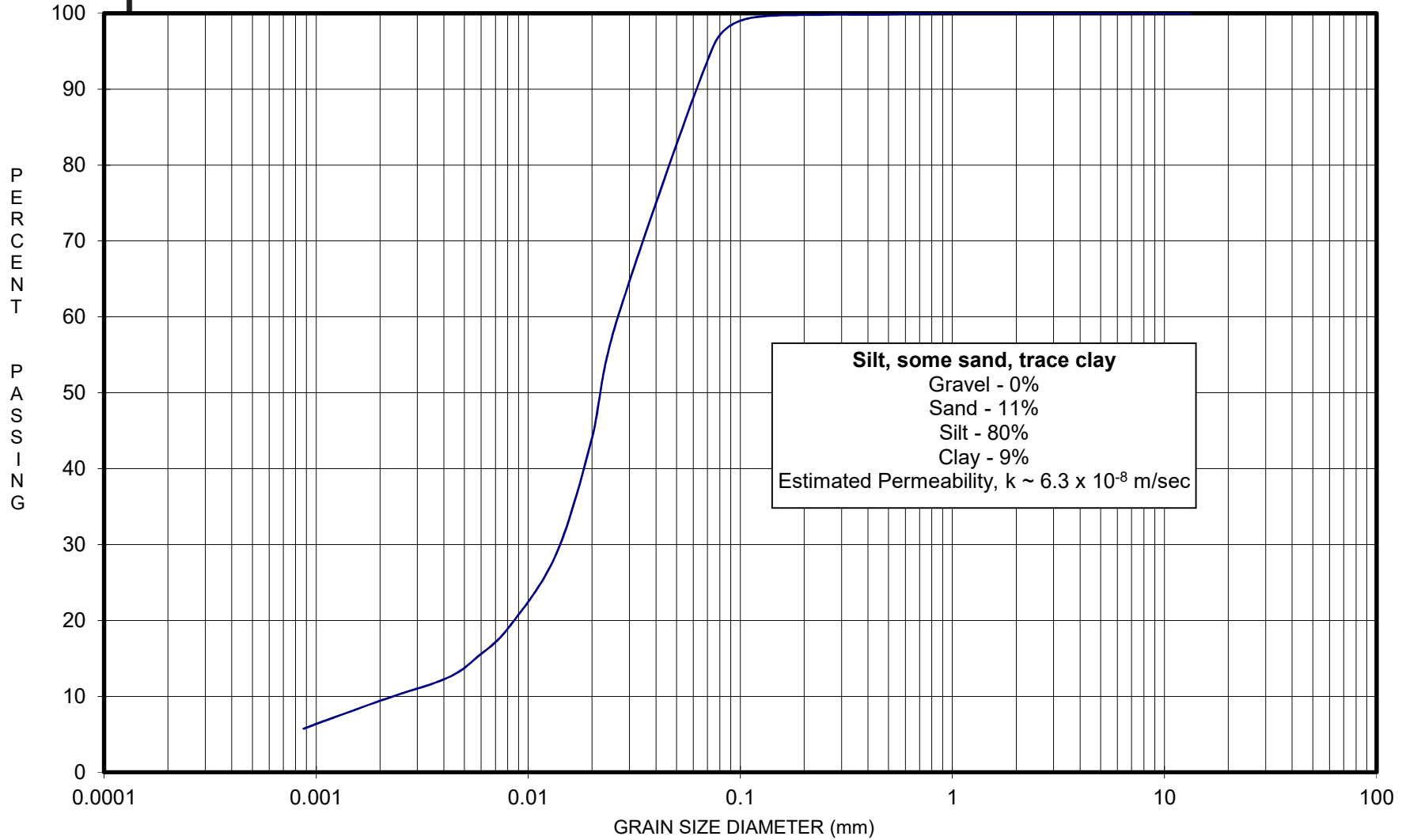
MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			
MODIFIED M.I.T. CLASSIFICATION	Sample Description: Sand and Silt (BH2/MW S9 (10.7 - 11.1 m bgs))						Talbot Village Phase 7 Project: LON-00016262-GE			Figure 1



MECHANICAL GRAIN SIZE ANALYSIS

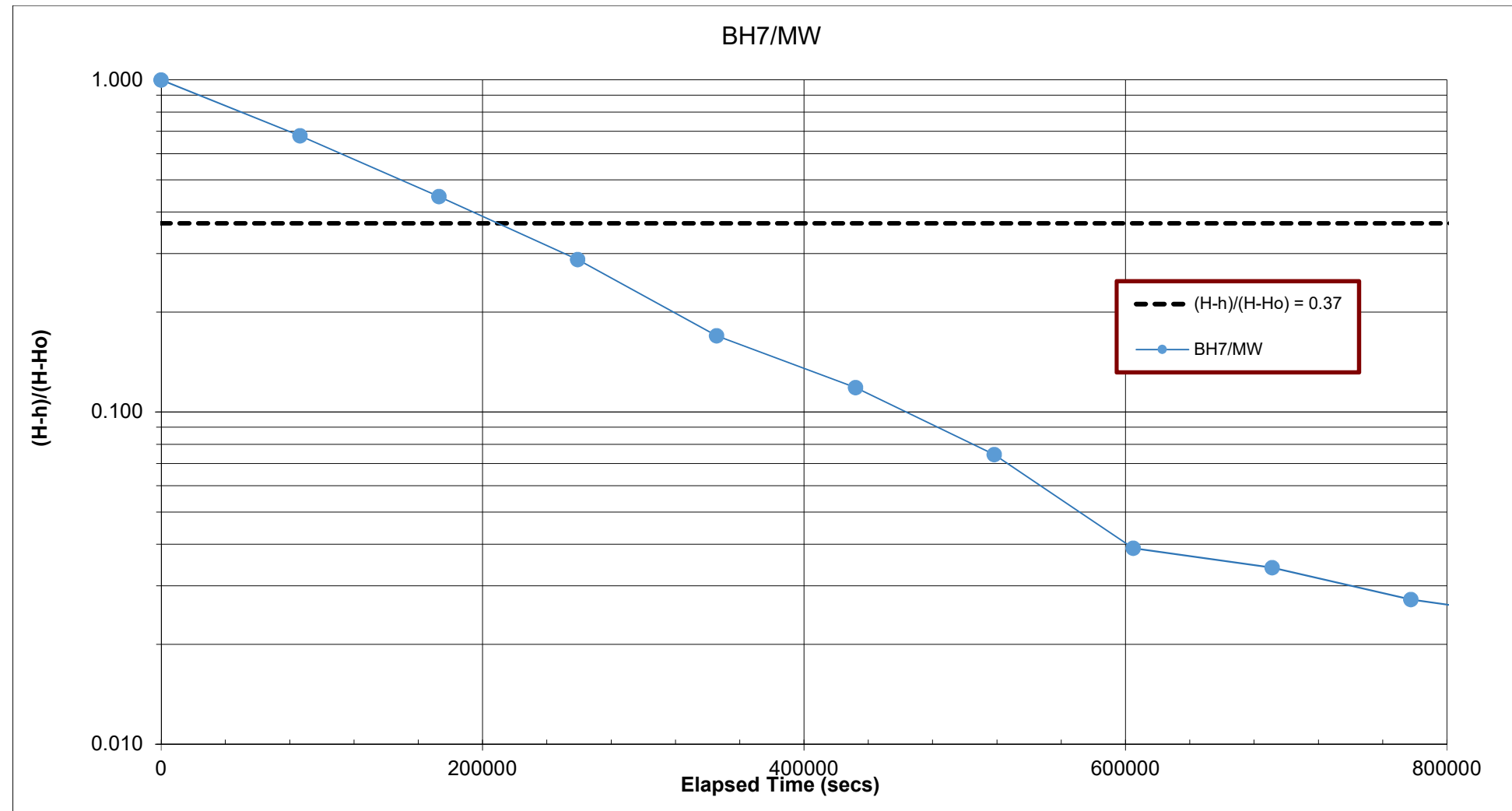


CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE
	SILT			SAND			GRAVEL		
MODIFIED M.I.T. CLASSIFICATION	Sample Description: Silt (BH7/MW S8, 9.1 - 9.6 m bgs)					Talbot Village Phase 7 Project: LON-00016262-GE			Figure 3

Appendix E – Single Well Response Tests

Recovery Testing - Hvorslev Method (1951)

Project Number KCH-00257251-A0
 Date of Test 27-Apr-20
 Completed by MB

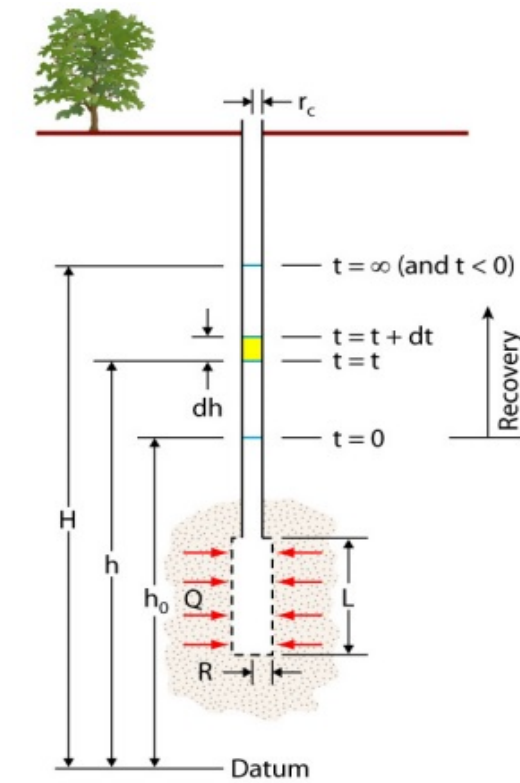


Initial Water Level 3.07 m bgs
 Maximum Drawdown 6.66 m

r (m) = 0.0254
 L (m) = 3.05
 R (m) = 0.1048
 T_0 (sec) = 205,000

K (m/s) = 1.7E-09

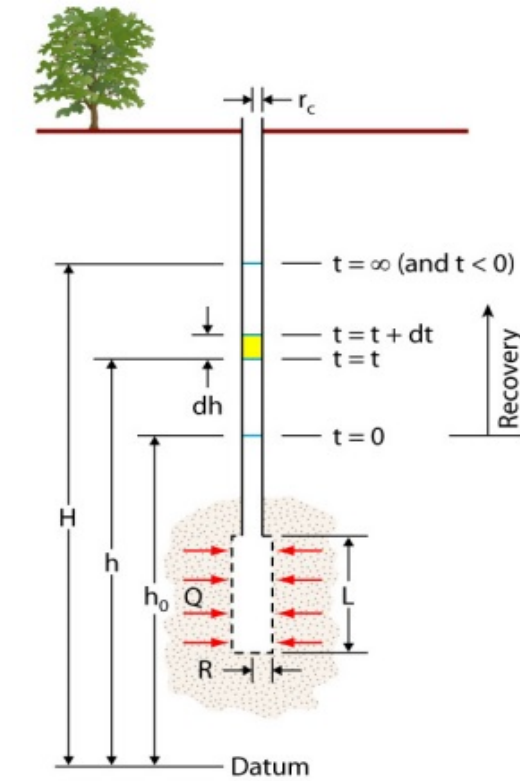
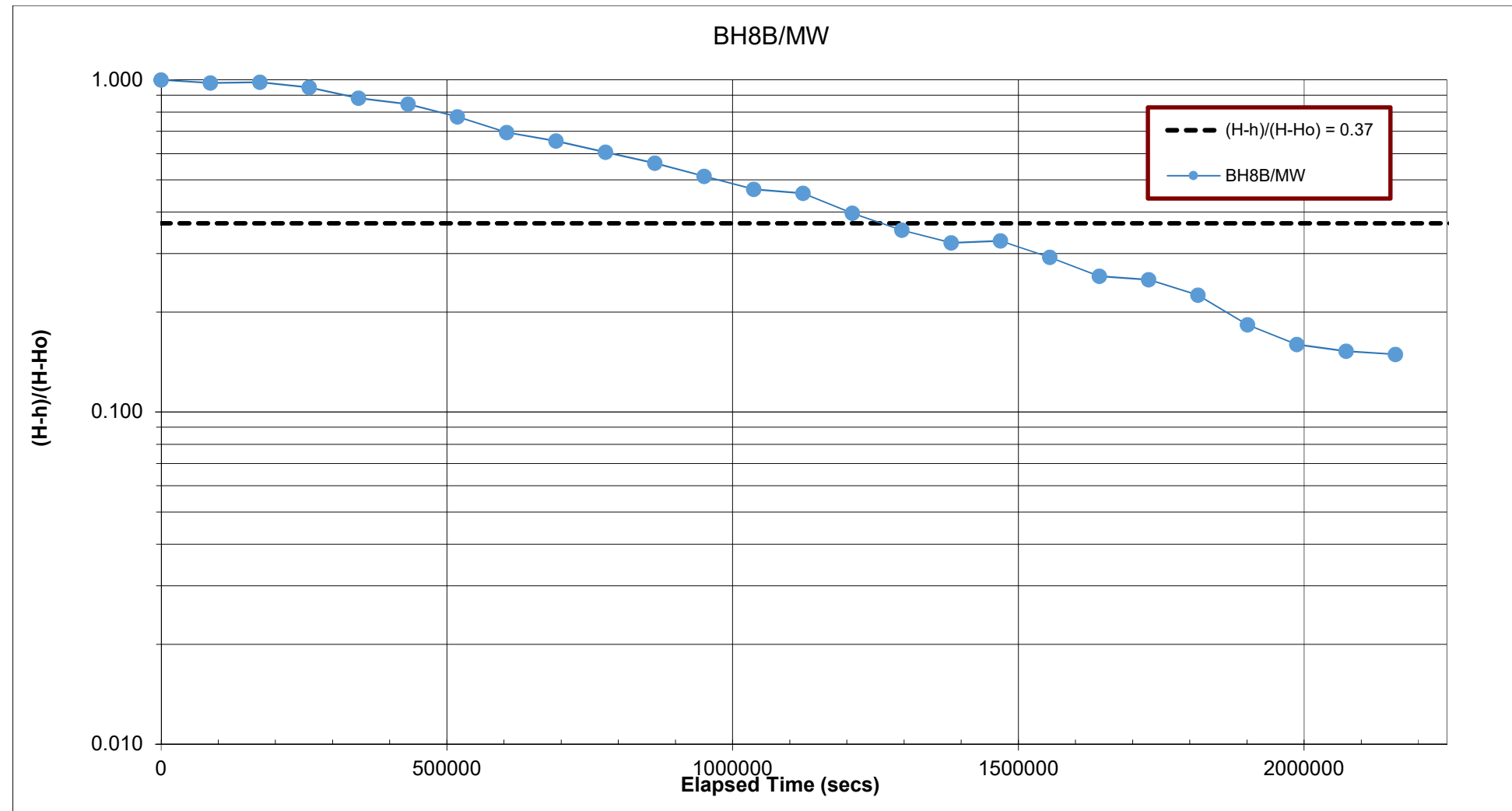
Note:
 1 - T_0 is determined from plots where $(H-h)/(H-H_0) = 0.37$



K = Hydraulic Conductivity
r = radius of well casing
R = Radius of well screen or filter pack
L = Length of the well screen (in Slug Test) or the length of submerged portion of the well screen (in Rising Head)
T₀ = time for water level to rise or fall to 37% of the initial change

Recovery Testing - Hvorslev Method (1951)

Project Number KCH-00257251-A0
 Date of Test 27-Apr-20
 Completed by MB



Initial Water Level 0.97 m bgs
 Maximum Drawdown 3.66 m
 Total Depth 5.03 m bgs

r (m) = 0.0254
 L (m) = 1.53
 R (m) = 0.1048
 T_0 (sec) = 1,252,800
 K (m/s) = 4.5E-10

K = Hydraulic Conductivity
r = radius of well casing
R = Radius of well screen or filter pack
L = Length of the well screen (in Slug Test) or the length of submerged portion of the well screen (in Rising Head)
T₀ = time for water level to rise or fall to 37% of the initial change

Note:
 1 - T_0 is determined from plots where $(H-h)/(H-H_0) = 0.37$

Appendix F – MECP Water Well Record Summary

TABLE F1 - MECP Water Well Record Summary

Well ID	Well Type	Date Completed	Depth (m)	Water Use	Water Status	Screened/Bottom Lithology	Water Found at Depth (m)	Static Water Level (m)
4104496	Overburden	13-Aug-68	70.7	Domestic	Water Supply	Sand	70.7	43.0
4104620	Overburden	17-Feb-69	7.6	Abandoned	---	Clay	---	---
4105170	Overburden	4-Sep-70	41.5	Domestic	Water Supply	Sand	39.0	35.4
7251801	Overburden	11-Aug-15	6.1	Monitoring	Test Hole	Clayey Silt	---	---
7312747	Overburden	31-May-18	15.2	Monitoring	Test Hole	Sand	---	---
7312748	Overburden	31-May-18	12.2	Monitoring	Test Hole	Sandy Silt	10.1	9.1
7312749	Overburden	31-May-18	13.7	Monitoring	Test Hole	Sand	7.0	---
7312750	Overburden	31-May-18	15.2	Monitoring	Test Hole	Sand	---	---
7312751	Overburden	31-May-18	8.4	Monitoring	Test Hole	Silty Sand	7.9	---

Appendix G – Water Levels and Hydrographs

KCH-00257251

735 Southdale Road West, London, Ontario

Groundwater Level Monitoring

Water Elevation Monitoring

Well ID	BH3/MW	BH7/MW	BH8A/MW	BH8B/MW	BH2/MW (16262)	BH6/MW (16262)	BH7/MW (16262)	BH9/MW (16262)	BH11/MW (16262)
Ground Surface Elevation (masl)	281.85	277.96	278.15	277.88	274.51	277.29	274.81	279.19	277.82
Top of Pipe Elevation (masl)	282.64	278.83	279.09	279.06	275.27	277.99	275.47	280.25	278.70
<i>Groundwater Elevation</i>									
29-Nov-19	Dry	271.58	Dry	Dry	-	-	-	-	-
13-Dec-19	Dry	276.36	Dry	273.62	-	-	-	Dry	-
28-Jan-20	280.00	276.92	271.58	276.04	266.47	-	-	Dry	-
17-Feb-20	Dry	276.67	272.30	276.87	266.55	-	-	Dry	-
14-Mar-20	279.11	277.03	273.14	277.22	266.56	-	-	Dry	-
27-Apr-20	Dry	276.67	274.15	277.38	266.60	-	-	Dry	-
23-May-20	279.04	276.89	271.93	277.00	266.66	270.50	267.91	Dry	Dry
10-Jun-20	Dry	276.24	273.99	277.22	266.61	270.74	267.01	Dry	Dry
11-Jul-20	Dry	275.74	273.79	276.83	266.52	270.31	266.72	Dry	Dry
26-Aug-20	Dry	275.45	273.51	276.03	266.40	269.99	266.55	Dry	Dry
17-Sep-20	Dry	275.74	273.31	275.78	266.39	269.91	267.21	Dry	Dry
28-Oct-20	Dry	275.59	272.82	275.06	266.43	269.80	267.23	Dry	Dry
14-Nov-20	Dry	275.72	272.54	274.61	266.47	269.66	267.37	Dry	Dry
17-Dec-20	Dry	276.80	272.86	276.43	266.43	269.54	268.02	Dry	Dry

Water Level Monitoring

Well ID	BH3/MW	BH7/MW	BH8A/MW	BH8B/MW	BH2/MW (16262)	BH6/MW (16262)	BH7/MW (16262)	BH9/MW (16262)	BH11/MW (16262)
Ground Surface Elevation (masl)	281.85	277.96	278.15	277.88	274.51	277.29	274.81	279.19	277.82
Top of Pipe Elevation (masl)	282.64	278.83	279.09	279.06	275.27	277.99	275.47	280.25	278.70
<i>Groundwater Level (mbgs)</i>									
29-Nov-19	Dry	6.38	Dry	Dry	-	-	-	-	-
13-Dec-19	Dry	1.60	Dry	4.26	-	-	-	Dry	-
28-Jan-20	1.85	1.04	6.57	1.84	8.04	-	-	Dry	-
17-Feb-20	Dry	1.29	5.85	1.01	7.96	-	-	Dry	-
14-Mar-20	2.74	0.93	5.01	0.66	7.95	-	-	Dry	-
27-Apr-20	Dry	1.29	4.00	0.50	7.91	-	-	Dry	-
23-May-20	2.81	1.07	6.21	0.88	7.85	6.80	6.90	Dry	Dry
10-Jun-20	Dry	1.72	4.16	0.66	7.90	6.56	7.80	Dry	Dry
11-Jul-20	Dry	2.22	4.36	1.05	8.00	6.99	8.09	Dry	Dry
26-Aug-20	Dry	2.51	4.64	1.85	8.12	7.31	8.26	Dry	Dry
17-Sep-20	Dry	2.22	4.84	2.10	8.13	7.39	7.60	Dry	Dry
28-Oct-20	Dry	2.37	5.33	2.82	8.09	7.50	7.58	Dry	Dry
14-Nov-20	Dry	2.24	5.61	3.27	8.05	7.64	7.44	Dry	Dry
17-Dec-20	Dry	1.16	5.29	1.45	8.09	7.76	6.79	Dry	Dry

Notes:

- indicates not measured

KCH-00257251

735 Southdale Road West, London, Ontario

Surface Water Level Monitoring

Water Elevation Monitoring

Station ID	P1	P2	SG1	SG2	P3
Ground Surface Elevation (masl)	277.51	273.35	277.53	273.35	278.73
	278.78	274.58	---	---	279.69
<i>Groundwater Elevation</i>					
13-Dec-19	Installed	Installed	278.03	273.94	-
28-Jan-20	Frozen	Frozen	Frozen	274.05	-
17-Feb-20	Frozen	Frozen	Frozen	Frozen	Installed
14-Mar-20	278.27	274.00	278.45	274.09	279.21
27-Apr-20	278.24	273.98	278.42	274.03	279.14
23-May-20	278.24	273.97	278.43	274.02	279.07
10-Jun-20	278.09	273.94	278.30	273.96	278.67
11-Jul-20	277.77	273.79	277.93	274.05	Dry
26-Aug-20	277.43	273.83	Dry	273.95	Dry
17-Sep-20	277.28	273.92	Dry	274.01	Dry
28-Oct-20	277.16	273.87	Dry	273.96	Dry
14-Nov-20	277.15	273.80	Dry	273.98	Dry
17-Dec-20	277.75	273.77	278.10	NM	Frozen

Water Level Monitoring

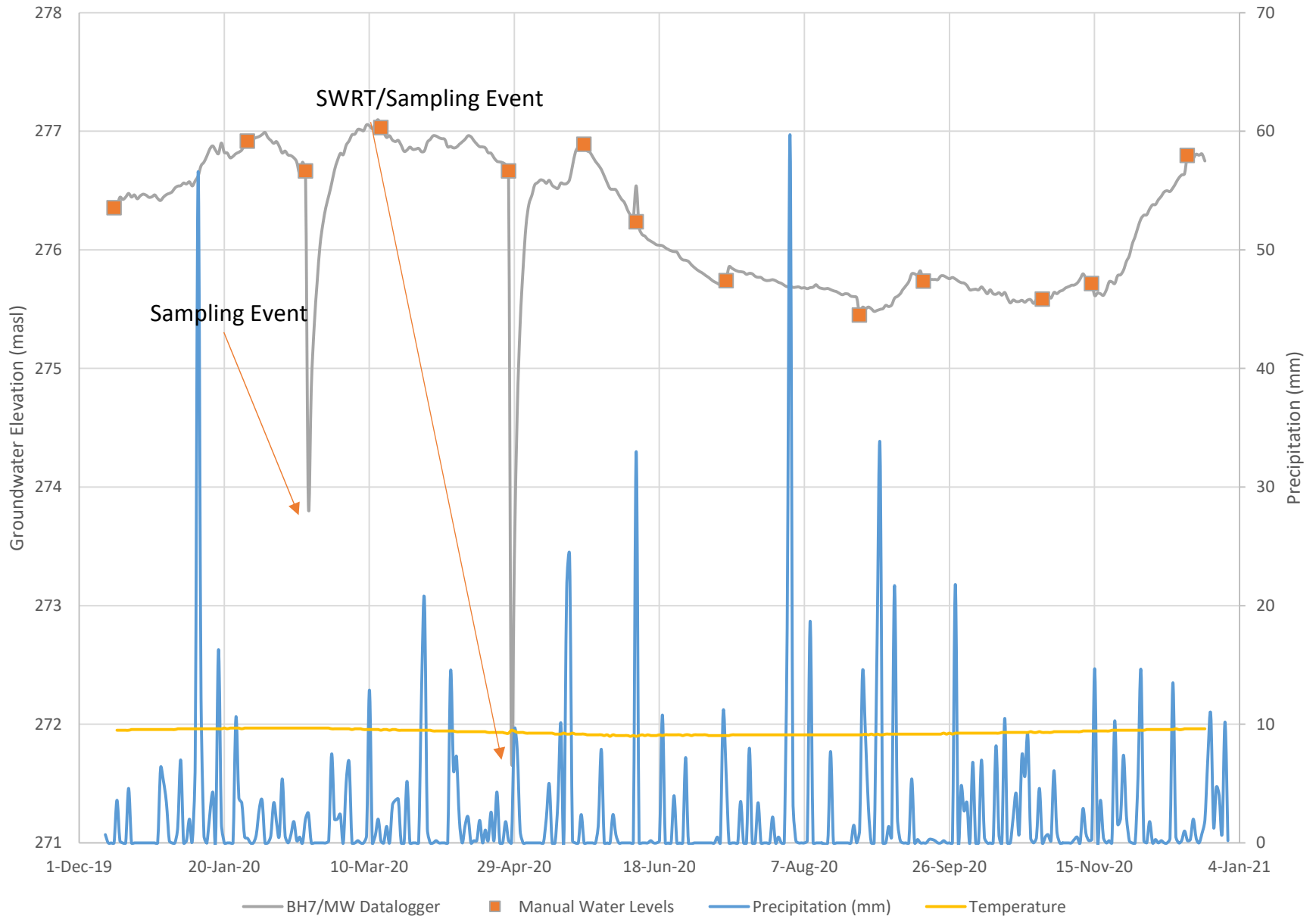
Well ID	P1	P2	SG1	SG2	P3
Ground Surface Elevation (masl)	277.51	273.35	277.53	273.35	278.73
Top of Pipe Elevation (masl)	278.78	274.58	---	---	279.69
<i>Groundwater Level (mbgs)</i>					
13-Dec-19	Installed	Installed	-0.51	-0.59	-
28-Jan-20	Frozen	Frozen	Frozen	-0.69	-
17-Feb-20	Frozen	Frozen	Frozen	Frozen	Installed
14-Mar-20	-0.77	-0.64	-0.92	-0.73	-0.48
27-Apr-20	-0.74	-0.63	-0.89	-0.68	-0.41
23-May-20	-0.74	-0.61	-0.90	-0.66	-0.34
10-Jun-20	-0.59	-0.59	-0.77	-0.61	0.06
11-Jul-20	-0.27	-0.44	-0.40	-0.69	Dry
26-Aug-20	0.07	-0.48	Dry	-0.60	Dry
17-Sep-20	0.22	-0.57	Dry	-0.66	Dry
28-Oct-20	0.34	-0.52	Dry	-0.61	Dry
14-Nov-20	0.35	-0.45	Dry	-0.63	Dry
17-Dec-20	-0.25	-0.42	-0.57	-	Frozen

Notes:

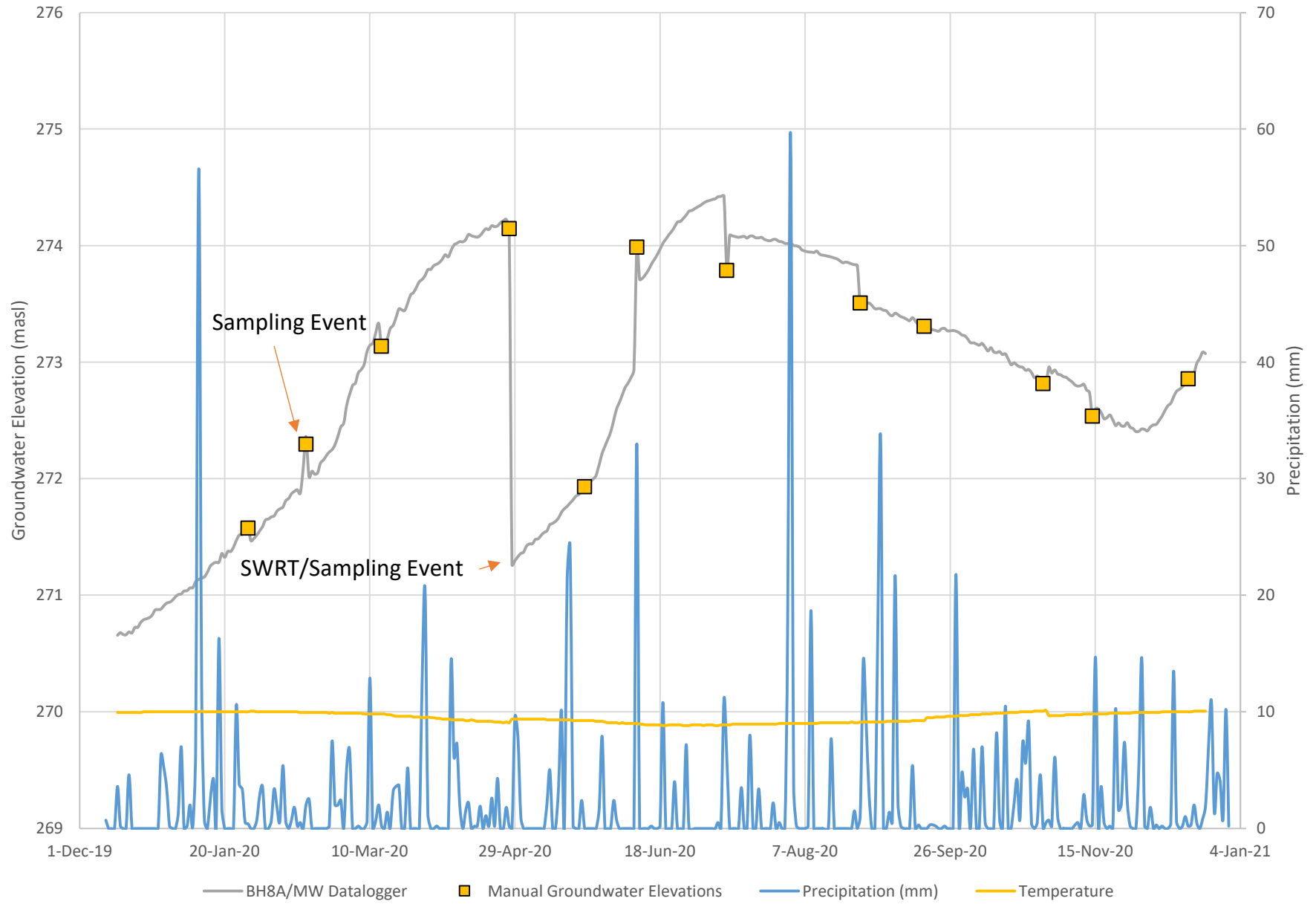
- indicates not measured

Negative values indicate water level above ground surface

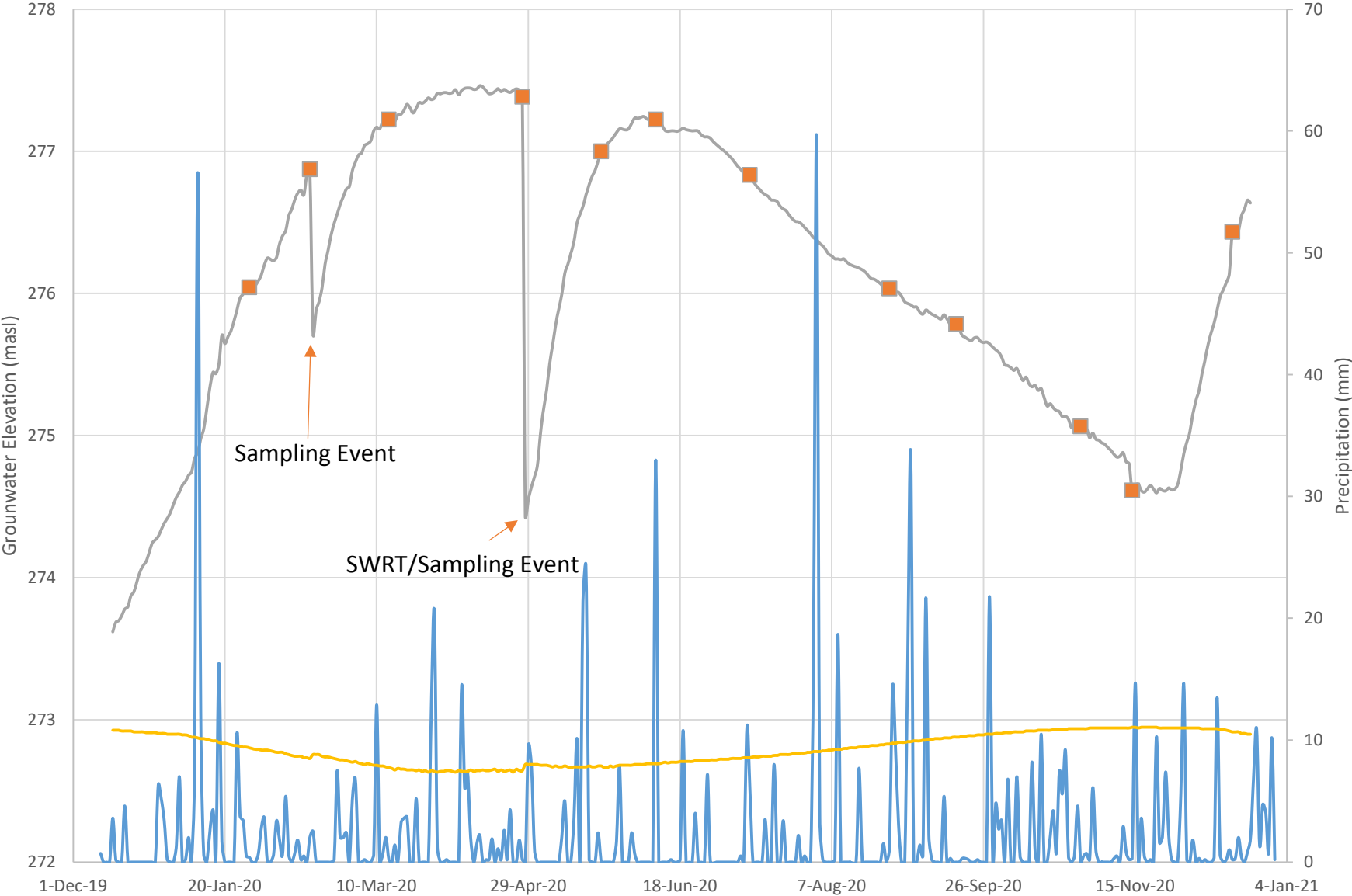
BH7/MW Groundwater Elevations



BH8/MW-A (Deep) Groundwater Elevations

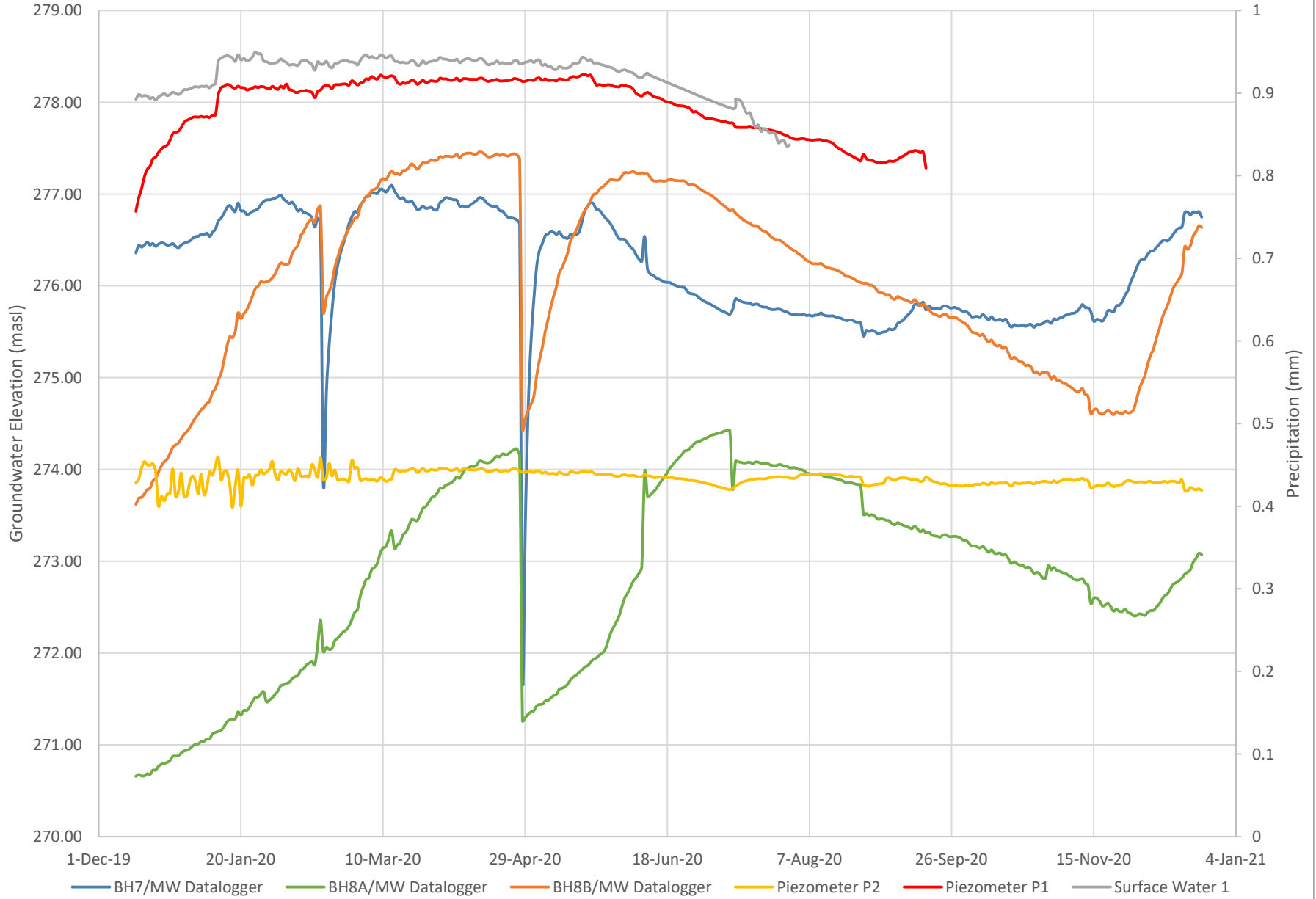


BH8/MW-B (Shallow) Groundwater Elevations

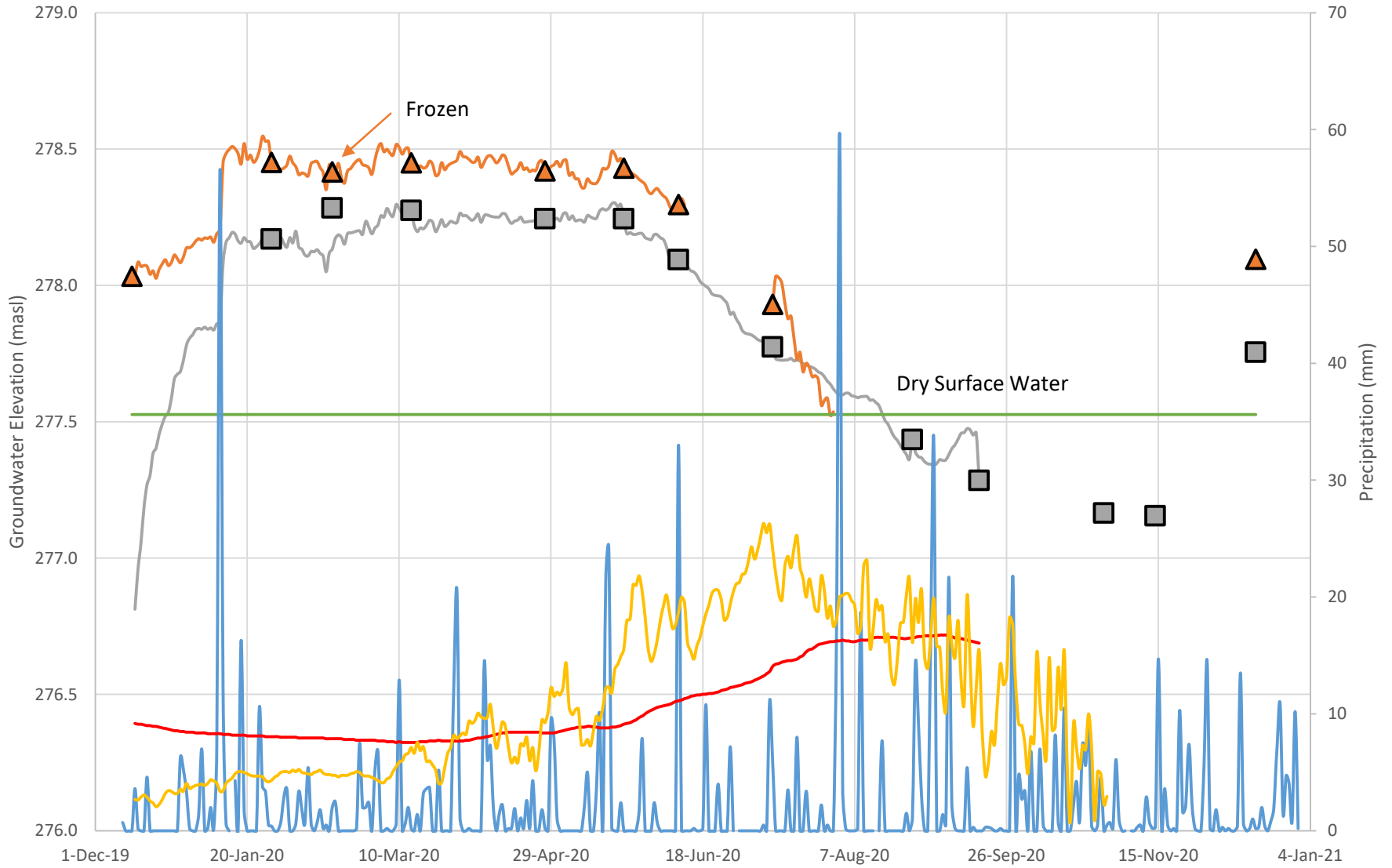


— BH8B/MW Datalogger ■ Manual Groundwater Elevations — Precipitation (mm) — Temperature

All Wells

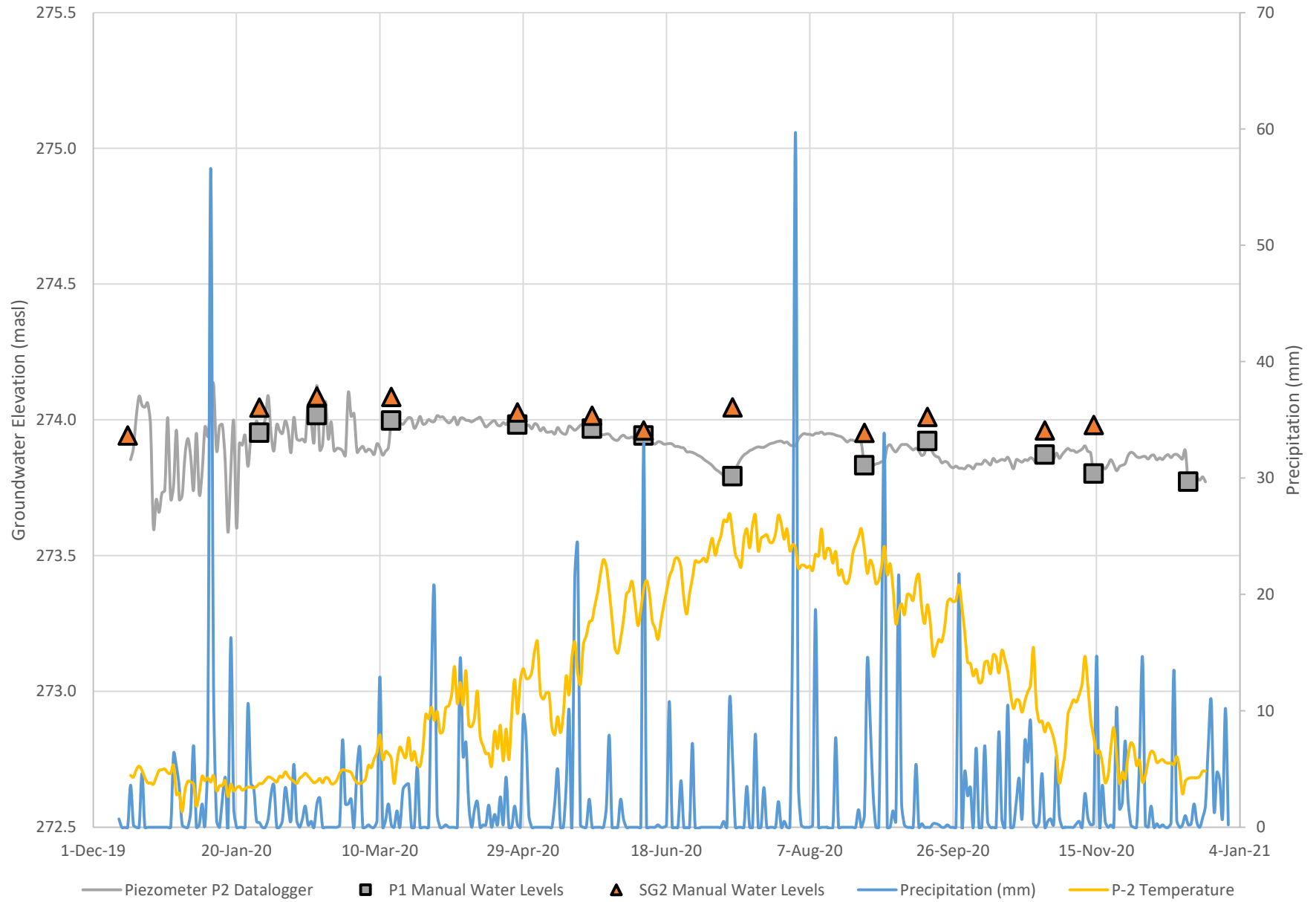


Station 1 (PSW)



- Piezometer P1 Datalogger — Surface Water SG1 Datalogger ■ P1 Manual Water Levels ▲ SG1 Manual Water Levels
- SG1 Ground Surface — Precipitation (mm) — P-1 Temperature — SG1 Temperature

Station 2 (Unevaluated Wetland)



Appendix H – Water Quality Data

CRITERIA	ODWQS	Units	17-Feb-20	17-Feb-20	17-Feb-20	27-Apr-20	27-Apr-20	27-Apr-20
			BH7/MW	BH8/MW-A	BH8/MW-B	BH7/MW	BH8/MW-A	BH8/MW-B
Calculated Parameters								
Anion Sum	NV	me/L	9.09	13.1	13.1	9.02	12.5	13.6
Bicarb. Alkalinity (calc. as CaCO3)	NV	mg/L	400	280	340	400	300	360
Calculated TDS	NV	mg/L	460	750	730	480	730	770
Carb. Alkalinity (calc. as CaCO3)	NV	mg/L	2.8	1.5	1.8	3.5	2.3	2.6
Cation Sum	NV	me/L	9.02	13.2	13.1	10.1	13.9	14.9
Hardness (CaCO3)	NV	mg/L	400	610	620	450	640	680
Ion Balance (% Difference)	NV	%	0.380	0.510	0.150	5.69	5.58	4.53
Langelier Index (@ 20C)	NV	N/A	0.961	0.823	0.937	1.10	1.03	1.14
Langelier Index (@ 4C)	NV	N/A	0.713	0.577	0.690	0.854	0.780	0.890
Saturation pH (@ 20C)	NV	N/A	6.91	6.92	6.82	6.87	6.89	6.76
Saturation pH (@4C)	NV	N/A	7.16	7.17	7.07	7.12	7.14	7.00
Inorganics								
Total Ammonia-N	NV	mg/L	<0.050	0.066	<0.050	<0.050	<0.050	<0.050
Conductivity	NV	umho/cm	800	1200	1200	810	1100	1200
Dissolved Organic Carbon (DOC)	NV	mg/L	3.4	2.4	2.5	1.9	1.3	1.5
Orthophosphate (P)	NV	mg/L	<0.010	0.010	0.015	<0.010	<0.010	0.011
pH	NV	pH	7.87	7.75	7.76	7.97	7.92	7.89
Dissolved Sulphate (SO4)	NV	mg/L	38	310	210	34	270	200
Alkalinity (Total as CaCO3)	NV	mg/L	410	280	340	410	300	360
Dissolved Chloride (Cl-)	NV	mg/L	6.5	29	67	6.4	30	74
Nitrite (N)	1	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate (N)	10	mg/L	<0.10	0.13	<0.10	<0.10	0.12	<0.10
Nitrate + Nitrite (N)	NV	mg/L	<0.10	0.13	<0.10	<0.10	0.12	<0.10
Metals								
Dissolved Aluminum (Al)	NV	ug/L	<5.0	6.7	<5.0	11	9.3	5.7
Dissolved Antimony (Sb)	6	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Arsenic (As)	10	ug/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dissolved Barium (Ba)	1000	ug/L	170	160	150	180	110	130
Dissolved Beryllium (Be)	NV	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Boron (B)	5000	ug/L	81	84	49	89	89	53
Dissolved Cadmium (Cd)	5	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	NV	ug/L	87000	140000	140000	97000	140000	160000
Dissolved Chromium (Cr)	50	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Cobalt (Co)	NV	ug/L	0.56	<0.50	<0.50	1.9	<0.50	<0.50
Dissolved Copper (Cu)	NV	ug/L	1.2	1.1	1.3	1.3	<1.0	<1.0
Dissolved Iron (Fe)	NV	ug/L	<100	<100	<100	<100	<100	<100
Dissolved Lead (Pb)	10	ug/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Dissolved Magnesium (Mg)	NV	ug/L	44000	66000	62000	51000	71000	70000
Dissolved Manganese (Mn)	NV	ug/L	420	93	140	680	45	150
Dissolved Molybdenum (Mo)	NV	ug/L	2.2	3.1	5.3	2.4	4.2	2.5
Dissolved Nickel (Ni)	NV	ug/L	2.5	3.6	2.9	5.3	3.4	2.7
Dissolved Phosphorous (P)	NV	ug/L	<100	<100	<100	<100	<100	<100
Dissolved Potassium (K)	NV	ug/L	4400	5200	4300	4400	5200	4500
Dissolved Selenium (Se)	50	ug/L	<2.0	3.6	<2.0	<2.0	<2.0	<2.0
Dissolved Silicon (Si)	NV	ug/L	7900	5500	6800	8500	6100	7500
Dissolved Silver (Ag)	NV	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dissolved Sodium (Na)	NV	ug/L	21000	19000	15000	22000	23000	25000
Dissolved Strontium (Sr)	NV	ug/L	1200	1400	820	1200	1400	770
Dissolved Thallium (Tl)	NV	ug/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dissolved Titanium (Ti)	NV	ug/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Dissolved Uranium (U)	20	ug/L	5.1	10	9.9	4.3	8.5	8.5
Dissolved Vanadium (V)	NV	ug/L	<0.50	<0.50	0.67	1	<0.50	<0.50
Dissolved Zinc (Zn)	NV	ug/L	35	9.3	39	<5.0	<5.0	<5.0

Notes:

Results compared to Reg. 153 Table 1 Site Condition Standards and Ontario Drinking Water Quality Standards (ODWQS)

NV indicates 'No value'

N/A indicates 'Not Applicable'

Exceeds ODWQS

CRITERIA	PWQO	Units	17-Feb-20	17-Feb-20	27-Apr-20	27-Apr-20
			Station 1	Station 2	Station 1	Station 2
Calculated Parameters						
Bicarb. Alkalinity (calc. as CaCO3)	NV	mg/L	300	200	310	100
Calculated TDS	NV	mg/L	460	650	460	520
Carb. Alkalinity (calc. as CaCO3)	NV	mg/L	1.0	1.3	4.7	8.2
Hardness (CaCO3)	NV	mg/L	380	280	390	130
Langelier Index (@ 20C)	NV	N/A	0.668	0.588	1.34	1.03
Langelier Index (@ 4C)	NV	N/A	0.420	0.341	1.09	0.780
Saturation pH (@ 20C)	NV	N/A	6.89	7.24	6.86	7.92
Saturation pH (@4C)	NV	N/A	7.14	7.49	7.11	8.16
Inorganics						
Total Ammonia-N	NV	mg/L	0.067	<0.050	<0.050	<0.050
Conductivity	NV	umho/cm	820	1300	850	1100
Total Organic Carbon (TOC)	NV	mg/L	14	6.7	13	10
Orthophosphate (P)	NV	mg/L	<0.010	<0.010	0.032	<0.010
pH	6.5 - 8.5	pH	7.56	7.83	8.20	8.94
Total Phosphorus	0.01	mg/L	0.041	0.028	0.11	0.062
Dissolved Sulphate (SO4)	NV	mg/L	21	14	2.8	8.6
Turbidity	NV	NTU	1.4	1.7	1.7	3.8
Alkalinity (Total as CaCO3)	NV	mg/L	310	210	320	110
Dissolved Chloride (Cl-)	NV	mg/L	71	240	87	240
Nitrite (N)	NV	mg/L	<0.010	<0.010	<0.010	<0.010
Nitrate (N)	NV	mg/L	0.12	2.00	<0.10	<0.10
Metals						
Dissolved Calcium (Ca)	NV	mg/L	-	-	130	33
Dissolved Magnesium (Mg)	NV	mg/L	-	-	19	10
Dissolved Potassium (K)	NV	mg/L	-	-	2	<1
Dissolved Sodium (Na)	NV	mg/L	-	-	33	170
Total Aluminum (Al)	75	ug/L	38	52	89	120
Total Antimony (Sb)	20	ug/L	<0.50	<0.50	<0.50	<0.50
Total Arsenic (As)	100	ug/L	<1.0	<1.0	<1.0	<1.0
Total Barium (Ba)	NV	ug/L	36	27	34	22
Total Beryllium (Be)	1100	ug/L	<0.50	<0.50	<0.50	<0.50
Total Boron (B)	200	ug/L	16	<10	16	15
Total Cadmium (Cd)	0.5	ug/L	<0.10	<0.10	<0.10	<0.10
Total Calcium (Ca)	NV	ug/L	120000	84000	120000	32000
Total Chromium (Cr)	8.9	ug/L	<5.0	<5.0	<5.0	<5.0
Total Cobalt (Co)	0.9	ug/L	<0.50	<0.50	<0.50	<0.50
Total Copper (Cu)	5	ug/L	2.2	3.5	1.4	2.0
Total Iron (Fe)	300	ug/L	<100	170	140	720
Total Lead (Pb)	5	ug/L	<0.50	<0.50	<0.50	<0.50
Total Magnesium (Mg)	NV	ug/L	17000	14000	20000	11000
Total Manganese (Mn)	NV	ug/L	100	100	21	50
Total Molybdenum (Mo)	40	ug/L	<0.50	<0.50	<0.50	0.65
Total Nickel (Ni)	25	ug/L	<1.0	<1.0	<1.0	<1.0
Total Potassium (K)	NV	ug/L	2800	2200	2000	810
Total Selenium (Se)	100	ug/L	<2.0	<2.0	<2.0	<2.0
Total Silicon (Si)	NV	ug/L	3800	1600	2500	210
Total Silver (Ag)	0.1	ug/L	<0.10	<0.10	<0.10	<0.10
Total Sodium (Na)	NV	ug/L	27000	160000	30000	160000
Total Strontium (Sr)	NV	ug/L	200	200	220	110
Total Thallium (Tl)	0.3	ug/L	<0.050	<0.050	<0.050	<0.050
Total Titanium (Ti)	NV	ug/L	<5.0	<5.0	6.9	5.9
Total Vanadium (V)	6	ug/L	0.61	<0.50	0.69	0.99
Total Zinc (Zn)	20	ug/L	18	60	<5.0	<5.0
Dissolved Aluminum (Al)	NV	ug/L	8.7	<5.0	<5.0	19
Dissolved Antimony (Sb)	NV	ug/L	<0.50	<0.50	<0.50	<0.50
Dissolved Arsenic (As)	NV	ug/L	<1.0	<1.0	<1.0	<1.0
Dissolved Barium (Ba)	NV	ug/L	36	28	33	20
Dissolved Beryllium (Be)	NV	ug/L	<0.50	<0.50	<0.50	<0.50
Dissolved Bismuth (Bi)	NV	ug/L	<1.0	<1.0	<1.0	<1.0
Dissolved Boron (B)	NV	ug/L	25	20	14	14
Dissolved Cadmium (Cd)	NV	ug/L	<0.10	<0.10	<0.10	<0.10
Dissolved Calcium (Ca)	NV	ug/L	120000	88000	120000	32000
Dissolved Chromium (Cr)	NV	ug/L	<5.0	<5.0	<5.0	<5.0
Dissolved Cobalt (Co)	NV	ug/L	<0.50	<0.50	<0.50	<0.50
Dissolved Copper (Cu)	NV	ug/L	2.3	2.6	<1.0	1.2
Dissolved Iron (Fe)	NV	ug/L	<100	<100	<100	170
Dissolved Lead (Pb)	NV	ug/L	<0.50	<0.50	<0.50	<0.50
Dissolved Lithium (Li)	NV	ug/L	<5.0	<5.0	<5.0	<5.0
Dissolved Magnesium (Mg)	NV	ug/L	19000	15000	20000	11000
Dissolved Manganese (Mn)	NV	ug/L	110	100	12	8.3
Dissolved Molybdenum (Mo)	NV	ug/L	<0.50	<0.50	<0.50	<0.50
Dissolved Nickel (Ni)	NV	ug/L	<1.0	<1.0	<1.0	<1.0
Dissolved Phosphorus (P)	NV	ug/L	<100	<100	<100	<100
Dissolved Potassium (K)	NV	ug/L	2900	2200	1900	790
Dissolved Selenium (Se)	NV	ug/L	<2.0	<2.0	<2.0	<2.0
Dissolved Silicon (Si)	NV	ug/L	4200	1800	2400	73
Dissolved Silver (Ag)	NV	ug/L	<0.10	<0.10	<0.10	<0.10
Dissolved Sodium (Na)	NV	ug/L	29000	160000	31000	160000
Dissolved Strontium (Sr)	NV	ug/L	210	210	210	110
Dissolved Tellurium (Te)	NV	ug/L	<1.0	<1.0	<1.0	<1.0
Dissolved Thallium (Tl)	NV	ug/L	<0.050	<0.050	<0.050	<0.050
Dissolved Tin (Sn)	NV	ug/L	<1.0	<1.0	<1.0	<1.0
Dissolved Titanium (Ti)	NV	ug/L	<5.0	<5.0	<5.0	<5.0
Dissolved Tungsten (W)	NV	ug/L	<1.0	<1.0	<1.0	<1.0
Dissolved Uranium (U)	NV	ug/L	1.2	0.98	2.5	0.71
Dissolved Vanadium (V)	NV	ug/L	<0.50	<0.50	<0.50	<0.50
Dissolved Zinc (Zn)	NV	ug/L	21	96	<5.0	<5.0
Dissolved Zirconium (Zr)	NV	ug/L	<1.0	<1.0	<1.0	<1.0

Notes:

Results compared to Reg. 153 Table 1 Site Condition Standards and Ontario Provincial Water Quality Objectives (PWQO)

NV indicates 'No value'

N/A indicates 'Not Applicable'

Exceeds PWQO

Appendix I – Water Balance Assessment

Appendix I: Monthly Water Balance

TABLE I-1: PRE-DEVELOPMENT WATER BALANCE CALCULATIONS

Drainage Areas A and B	Impervious	Pervious	Total Area	Soil Type	Soil Group	Water Holding Capacity (mm)	Infiltration Factor	T _{rain} (°C)	T _{snow} (°C)	Meltmax (%/100)												
	Area (m ²)	Area (m ²)	(m ²)								Totals											
Drainage Area A	708	21892	38500	Clay to Silt	C	250	0.45	3.3	-10.0	0.92												
Drainage Area B	189	15711		Clay to Silt	C	250	0.4															
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals									
Average Temperature (°C)	-5.6	-4.5	-0.1	6.8	13.1	18.3	20.8	19.7	15.5	9.2	3.4	-2.6										
Total Precipitation (mm/month)	74.2	65.5	71.5	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	87.5	1011.5									
Precipitation as rain (mm/month)	24.5	27.1	53.2	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	48.7										
Precipitation as snow (mm/month)	49.7	38.4	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.8										
Potential Snow Melt (mm/month)	20.9	32.8	49.1	26.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9										
Actual Snow Melt (mm/month)	20.9	32.8	49.1	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9										
Snow Storage (mm/month)	47.7	53.4	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.9										
Drainage Area A (Pervious)																						
Estimated Actual Evapotranspiration (mm/month)	8.9	10.8	20.3	38.4	70.3	102.6	116.3	91.4	56.3	30.5	16.0	10.0	571.8									
Surplus (mm/month)	36.5	49.1	82.0	67.6	19.5	-10.9	-33.6	-8.5	46.7	50.8	82.0	58.6	439.7									
Estimated Runoff (mm/month)	36.5	49.1	63.5	37.2	10.7	0.0	0.0	0.0	25.7	27.9	45.1	58.6	354.3									
Estimated Infiltration (mm/month)	0.0	0.0	18.4	30.4	8.8	0.0	0.0	0.0	21.0	22.9	36.9	0.0	138.4									
Estimated Actual Evapotranspiration (m ³ /month)	195	236	444	841	1539	2246	2546	2001	1233	668	350	219	12518									
Estimated Runoff (m ³ /month)	800	1074	1391	814	235	0	0	0	562	612	987	1282	7756									
Estimated Infiltration (m ³ /month)	0	0	404	666	192	0	0	0	460	500	808	0	3030									
Drainage Area A (Impervious)																						
Initial Actual Evapotranspiration (mm/month)	8.2	10.8	18.4	19.1	16.2	16.5	14.9	14.9	18.5	14.6	17.6	12.3	182.1									
Initial Runoff (Surplus) (mm/month)	37.2	49.1	83.9	86.9	73.6	75.2	67.8	68.0	84.5	66.7	80.4	56.2	829.4									
Estimated Infiltration (mm/month)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0									
Estimated Actual Evapotranspiration (m ³ /month)	6	8	13	14	11	12	11	11	13	10	12	9	129									
Estimated Runoff (m ³ /month)	26	35	59	62	52	53	48	48	60	47	57	40	587									
Estimated Infiltration (m ³ /month)	0	0	0	0	0	0	0	0	0	0	0	0	0									
Drainage Area A TOTALS																						
Estimated Actual Evapotranspiration (m ³ /month)	201	244	457	854	1550	2258	2557	2011	1246	678	363	228	12647									
Estimated Runoff (m ³ /month)	826	1109	1450	875	287	53	48	48	622	659	1044	1322	8343									
Estimated Infiltration (m ³ /month)	0	0	404	666	192	0	0	0	460	500	808	0	3030									
Drainage Area B (Pervious)																						
Estimated Actual Evapotranspiration (mm/month)	8.9	10.8	20.3	38.4	70.3	102.6	116.3	91.4	56.3	30.5	16.0	10.0	571.8									
Surplus (mm/month)	36.5	49.1	82.0	67.6	19.5	-10.9	-33.6	-8.5	46.7	50.8	82.0	58.6	439.7									
Estimated Runoff (mm/month)	36.5	49.1	65.6	40.5	11.7	0.0	0.0	0.0	28.0	30.5	49.2	58.6	369.7									
Estimated Infiltration (mm/month)	0.0	0.0	16.4	27.0	7.8	0.0	0.0	0.0	18.7	20.3	32.8	0.0	123.0									
Estimated Actual Evapotranspiration (m ³ /month)	140	170	319	603	1104	1612	1827	1436	885	479	251	157	8984									
Estimated Runoff (m ³ /month)	574	771	1030	637	184	0	0	0	440	479	773	920	5808									
Estimated Infiltration (m ³ /month)	0	0	258	425	123	0	0	0	293	319	515	0	1933									
Drainage Area B (Impervious)																						
Initial Actual Evapotranspiration (mm/month)	8.2	10.8	18.4	19.1	16.2	16.5	14.9	14.9	18.5	14.6	17.6	12.3	182.1									
Initial Runoff (Surplus) (mm/month)	37.2	49.1	83.9	86.9	73.6	75.2	67.8	68.0	84.5	66.7	80.4	56.2	829.4									
Estimated Infiltration (mm/month)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0									
Estimated Actual Evapotranspiration (m ³ /month)	2	2	3	4	3	3	3	3	4	3	3	2	34									
Estimated Runoff (m ³ /month)	7	9	16	16	14	14	13	13	16	13	15	11	157									
Estimated Infiltration (m ³ /month)	0	0	0	0	0	0	0	0	0	0	0	0	0									
Drainage Area B TOTALS																						
Estimated Actual Evapotranspiration (m ³ /month)	141	172	322	607	1108	1615	1830	1439	888	482	255	159	9018									
Estimated Runoff (m ³ /month)	581	780	1046	653	198	14	13	13	456	491	788	931	5965									
Estimated Infiltration (m ³ /month)	0	0	258	425	123	0	0	0	293	319	515	0	1933									

Appendix I: Monthly Water Balance



TABLE I-2: POST-DEVELOPMENT WATER BALANCE CALCULATIONS - AREA A

Drainage Area A	Impervious Area (m ²)	Pervious Area (m ²)	Total Area (m ²)	Soil Type	Soil Group	Water Holding Capacity (mm)	Infiltration Factor	T _{rain} (°C)	T _{snow} (°C)	Meltmax (%/100)			Totals
Landscaped Areas - Grass and Open Space	-	4500		Clay to Silt	C	125	0.45	3.3	-10.0	0.92			
Landscaped Area - Runoff Directed toward Wetland	-	5400											
Impervious - Rooftops, Surface Parking, Roads, Sidewalks, Patios	10900		22,600										
Secondary Piped Rooftop Control (calculated on next spreadsheet)	1800												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
Average Temperature (°C)	-5.6	-4.5	-0.1	6.8	13.1	18.3	20.8	19.7	15.5	9.2	3.4	-2.6	
Total Precipitation (mm/month)	74.2	65.5	71.5	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	87.5	1011.5
Precipitation as rain (mm/month)	24.5	27.1	53.2	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	48.7	
Precipitation as snow (mm/month)	49.7	38.4	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.8	
Potential Snow Melt (mm/month)	20.9	32.8	49.1	26.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	
Actual Snow Melt (mm/month)	20.9	32.8	49.1	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	
Snow Storage (mm/month)	47.7	53.4	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.9	
DEVELOPMENT AREA - LANDSCAPED OPEN SPACE AND GRASS													
Estimated Evapotranspiration (mm/month)	8.9	10.8	20.3	38.4	70.3	102.6	114.9	89.7	56.3	30.5	16	10	568.7
Surplus (mm/month)	36.5	49.1	82.0	67.6	19.5	-10.9	-32.2	-6.8	46.7	50.8	82.0	58.6	442.8
Estimated Runoff (mm/month)	36.5	49.1	63.5	37.2	10.7	0.0	0.0	0.0	25.7	27.9	45.1	58.6	354.3
Estimated Infiltration (mm/month)	0.0	0.0	18.4	30.4	8.8	0.0	0.0	0.0	21.0	22.9	36.9	0.0	138.4
Estimated Actual Evapotranspiration (m ³ /month)	40	49	91	173	316	462	517	404	253	137	72	45	2559
Estimated Runoff (m ³ /month)	164	221	286	167	48	0	0	0	116	126	203	263	1594
Estimated Infiltration (m ³ /month)	0	0	83	137	39	0	0	0	95	103	166	0	623
DEVELOPMENT AREA - LANDSCAPED RUNOFF DIRECTED TO WETLAND													
Estimated Evapotranspiration (mm/month)	8.9	10.8	20.3	38.4	70.3	102.6	114.9	89.7	56.3	30.5	16	10	568.7
Surplus (mm/month)	36.5	49.1	82.0	67.6	19.5	-10.9	-32.2	-6.8	46.7	50.8	82.0	58.6	442.8
Estimated Runoff (mm/month)	36.5	49.1	63.5	37.2	10.7	0.0	0.0	0.0	25.7	27.9	45.1	58.6	354.3
Estimated Infiltration (mm/month)	0.0	0.0	18.4	30.4	8.8	0.0	0.0	0.0	21.0	22.9	36.9	0.0	138.4
Estimated Initial Evapotranspiration (m ³ /month)	48	58	110	207	380	554	620	484	304	165	86	54	3071
Estimated Runoff (m ³ /month) - To Wetland	197	265	343	201	58	0	0	0	139	151	244	316	1913
Estimated Infiltration (m ³ /month)	0	0	100	164	47	0	0	0	113	123	199	0	747
Estimated Evapotranspiration of Runoff to Wetland (m ³ /month)	30	40	51	30	9	0	0	0	21	23	37	47	287
Estimated Infiltration of Runoff to Wetland (m ³ /month)	168	225	292	171	49	0	0	0	118	128	207	269	1626
DEVELOPMENT AREA - IMPERVIOUS COVER													
Initial Actual Evaporation (mm/month)	8.2	10.8	18.4	19.1	16.2	16.5	14.9	14.9	18.5	14.6	17.6	12.3	182.1
Initial Runoff (Surplus) (mm/month)	37.2	49.1	83.9	86.9	73.6	75.2	67.8	68.0	84.5	66.7	80.4	56.2	829.4
Estimated Infiltration (mm/month)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Estimated Actual Evapotranspiration (m ³ /month)	89	117	201	208	176	180	162	163	202	160	192	135	1985
Estimated Runoff (m ³ /month)	406	535	914	947	803	820	739	741	921	727	876	613	9041
Estimated Infiltration (m ³ /month)	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS - DRAINAGE AREA A													
Estimated Actual Evapotranspiration (m ³ /month)	207	264	453	618	881	1196	1300	1051	780	484	387	281	7902
Estimated Runoff (m ³ /month)	570	756	1200	1115	851	820	739	741	1036	852	1079	876	10635
Estimated Infiltration (m ³ /month)	168	225	375	307	89	0	0	0	212	231	373	269	2249

Appendix I: Monthly Water Balance



TABLE I-3: POST-DEVELOPMENT WATER BALANCE CALCULATIONS - AREA B

Drainage Area B	Impervious Area (m ²)	Pervious Area (m ²)	Total Area (m ²)	Soil Type	Soil Group	Water Holding Capacity (mm)	Infiltration Factor	T _{rain} (°C)	T _{snow} (°C)	Meltmax (%/100)			
Landscaped Areas - Grass and Open Space	-	6100	15,900	Clay to Silt	C	125	0.45	3.3	-10.0	0.92			
Impervious - Rooftops, Surface Parking, Roads, Sidewalks, Patios	9800												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals
Average Temperature (°C)	-5.6	-4.5	-0.1	6.8	13.1	18.3	20.8	19.7	15.5	9.2	3.4	-2.6	
Total Precipitation (mm/month)	74.2	65.5	71.5	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	87.5	1011.5
Precipitation as rain (mm/month)	24.5	27.1	53.2	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	48.7	
Precipitation as snow (mm/month)	49.7	38.4	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.8	
Potential Snow Melt (mm/month)	20.9	32.8	49.1	26.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	
Actual Snow Melt (mm/month)	20.9	32.8	49.1	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	
Snow Storage (mm/month)	47.7	53.4	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.9	
DEVELOPMENT AREA - LANDSCAPED OPEN SPACE AND GRASS													
Estimated Evapotranspiration (mm/month)	8.9	10.8	20.3	38.4	70.3	102.6	114.9	89.7	56.3	30.5	16	10	568.7
Surplus (mm/month)	36.5	49.1	82.0	67.6	19.5	-10.9	-32.2	-6.8	46.7	50.8	82.0	58.6	442.8
Estimated Runoff (mm/month)	36.5	49.1	63.5	37.2	10.7	0.0	0.0	0.0	25.7	27.9	45.1	58.6	354.3
Estimated Infiltration (mm/month)	0.0	0.0	18.4	30.4	8.8	0.0	0.0	0.0	21.0	22.9	36.9	0.0	138.4
Estimated Actual Evapotranspiration (m ³ /month)	54	66	124	234	429	626	701	547	343	186	98	61	3469
Estimated Runoff (m ³ /month)	223	299	388	227	65	0	0	0	157	170	275	357	2161
Estimated Infiltration (m ³ /month)	0	0	113	186	54	0	0	0	128	139	225	0	844
DEVELOPMENT AREA - IMPERVIOUS COVER													
Initial Actual Evaporation (mm/month)	8.2	10.8	18.4	19.1	16.2	16.5	14.9	14.9	18.5	14.6	17.6	12.3	182.1
Initial Runoff (Surplus) (mm/month)	37.2	49.1	83.9	86.9	73.6	75.2	67.8	68.0	84.5	66.7	80.4	56.2	829.4
Estimated Infiltration (mm/month)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Estimated Actual Evapotranspiration (m ³ /month)	80	106	180	187	158	162	146	146	182	143	173	121	1784
Estimated Runoff (m ³ /month)	365	481	822	852	722	737	665	666	828	653	788	551	8128
Estimated Infiltration (m ³ /month)	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS - DRAINAGE AREA B													
Estimated Actual Evapotranspiration (m ³ /month)	134	171	304	421	587	788	847	693	525	329	270	182	5253
Estimated Runoff (m ³ /month)	588	780	1210	1078	787	737	665	666	984	824	1063	908	10290
Estimated Infiltration (m ³ /month)	0	0	113	186	54	0	0	0	128	139	225	0	844

Appendix I: Monthly Water Balance



TABLE I-4: POST-DEVELOPMENT SECONDARY INFILTRATION CALCULATIONS

Building A and Sidewalk Contribution Areas	Impervious Area (m ²)	Pervious Area (m ²)	Total Area (m ²)	Soil Type	Soil Group	Water Holding Capacity (mm)		Infiltration Factor	T _{rain} (°C)	T _{snow} (°C)	Meltmax (%/100)			
Secondary Piped Rooftop Control (Bld A)	1800	-	1800	Clay to Silt	C	125		0.45	3.3	-10.0	0.92			
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals	
Average Temperature (°C)	-5.6	-4.5	-0.1	6.8	13.1	18.3	20.8	19.7	15.5	9.2	3.4	-2.6		
Total Precipitation (mm/month)	74.2	65.5	71.5	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	87.5	1011.5	
Precipitation as rain (mm/month)	24.5	27.1	53.2	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	48.7		
Precipitation as snow (mm/month)	49.7	38.4	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.8		
Potential Snow Melt (mm/month)	20.9	32.8	49.1	26.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9		
Actual Snow Melt (mm/month)	20.9	32.8	49.1	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9		
Snow Storage (mm/month)	47.7	53.4	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.9		
Total Precipitation + Actual Snow Melt (mm/month)	45.4	59.9	102.3	106.0	89.8	91.7	82.7	82.9	103.0	81.3	98.0	68.6		
IMPERVIOUS AREA - BUILDING A ROOFTOP AND SIDEWALKS														
Initial Actual Evaporation (mm/month)	8.2	10.8	18.4	19.1	16.2	16.5	14.9	14.9	18.5	14.6	17.6	12.3	182.1	
Initial Runoff (Surplus) (mm/month)	37.2	49.1	83.9	86.9	73.6	75.2	67.8	68.0	84.5	66.7	80.4	56.2	829.4	
Estimated Infiltration (mm/month)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Estimated Actual Evaporation (m ³ /month) (at rooftop)	15	19	33	34	29	30	27	27	33	26	32	22	328	
Estimated Runoff (m ³ /month)	67	88	151	156	133	135	122	122	152	120	145	101	1493	
Estimated Infiltration (m ³ /month)	0	0	0	0	0	0	0	0	0	0	0	0	0	
Estimated Evapotranspiration of Runoff to wetland (m3/month)	10	13	23	23	20	20	18	18	23	18	22	15	224	
Estimated Infiltration of Runoff to wetland (m3/month)	57	75	128	133	113	115	104	104	129	102	123	86	1269	
Total Annual Precipitation Volume on Building A Roof and Sidewalks (m³)	1821							otal Annual Evapotranspiration / Evaporation(m3)	552					
								Total Annual Runoff (m3)	1269	** Volume directed to wetland				
								Total Annual Infiltration (m3)	0					
									1821	Total				
			OR					otal Annual Evapotranspiration / Evaporation(m3)	328					
								Total Annual Runoff (m3)	1493	** Volume directed to wetland				
								Total Annual Infiltration (m3)	1269					

TABLE I-5: SUMMARY CALCULATIONS

DRAINAGE AREA A**Scenario 1 - Contribution from Landscaped Areas (0.54 ha) but NOT rooftops**

	Pre-Development	Post-Development	Difference	% Difference
Estimated Runoff (m ³ /year)	8,343	10,635	2292	127%
Estimated Infiltration (m ³ /year)	3,030	2,249	-781	74%

Scenario 1 provides post-development infiltration volumes for the contribution of the landscaped areas surrounding Building A (0.54 ha). This added landscaped area is estimated to provide 74% of the existing conditions infiltration volumes to the wetland area.

Scenario 2 - WITH Secondary Infiltration (0.18 Ha rooftop contribution)

	Pre-Development	Post-Development	Additional Secondary Infiltration	Total Infiltration with LID	Difference	% Difference
Estimated Infiltration (m ³ /year)	3,030	2,249	1269	3518	488	116%

The added volumes provided from the rooftop areas of Building A, 12 story building area only (0.18 ha), will result in the post-development infiltration volumes reaching 116% of existing conditions.

DRAINAGE AREA B**Summary - No Secondary Infiltration**

	Pre-Development	Post-Development	Difference	% Difference
Estimated Runoff (m ³ /year)	5,965	10,290	4325	173%
Estimated Infiltration (m ³ /year)	1,933	844	-1089	44%

The post-development infiltration calculations suggest 44% of infiltration will be achieved in the post-development environment within Drainage Area B.

**TABLE I-6: WATER BALANCE ASSUMPTIONS**

1. AET occurs year round. Although the average temperature is below 0°C in the winter months, fluctuation above and below the freezing temperature of water occurs. The Thornthwaite model used assumes $T_{rain} = 3.3^{\circ}C$ and $T_{snow} = -10.0^{\circ}C$. When the average monthly temperature falls between these values, the monthly precipitation as rain and snow is derived by assuming a linear interpolation between these values, consistent with the methodology used in the accepted USGS reference material (McCabe, G.J., and Markstrom, S.L., 2007, A monthly water-balance model driven by a graphical use interface: U.S. Geological Survey Open-File report 2007-1088, 6 p.). Values of AET were taken from the Thornthwaite model and are considered to be representative of actual site conditions.
2. Monthly surplus is calculated by summing the precipitation as rain and actual snow melt, less estimated evapotranspiration.
3. Negative surplus values can be achieved during the summer months as water storage in the vadose zone of the soil is subject to evapotranspiration and depleted.
4. Infiltration is assumed not to occur between December and February as frost is typically present throughout those months.
5. Infiltration in March (Average temperature of $-0.1^{\circ}C$), is assumed to occur during half of the month.
6. No net infiltration or runoff occur in the summer as the rainfall accumulation is stored on site and infiltration was not assigned a negative value. See Assumption 3.
7. Evapotranspiration in impervious areas is the sum of precipitation as rain and snow melt multiplied by a factor of 0.18.

LIMITATIONS AND USE OF REPORT

BASIS OF REPORT

This report (“Report”) is based on site conditions known or inferred by the geotechnical investigation undertaken as of the date of the Report. Should changes occur which potentially impact the geotechnical condition of the site, or if construction is implemented more than one year following the date of the Report, the recommendations of EXP may require re-evaluation.

The Report is provided solely for the guidance of design engineers and on the assumption that the design will be in accordance with applicable codes and standards. Any changes in the design features which potentially impact the geotechnical analyses or issues concerning the geotechnical aspects of applicable codes and standards will necessitate a review of the design by EXP. Additional field work and reporting may also be required.

Where applicable, recommended field services are the minimum necessary to ascertain that construction is being carried out in general conformity with building code guidelines, generally accepted practices and EXP’s recommendations. Any reduction in the level of services recommended will result in EXP providing qualified opinions regarding the adequacy of the work. EXP can assist design professionals or contractors retained by the Client to review applicable plans, drawings, and specifications as they relate to the Report or to conduct field reviews during construction.

Contractors contemplating work on the site are responsible for conducting an independent investigation and interpretation of the test pit results contained in the Report. The number of test pits necessary to determine the localized underground conditions as they impact construction costs, techniques, sequencing, equipment and scheduling may be greater than those carried out for the purpose of the Report.

Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates are based on investigations performed in accordance with the standard of care set out below and require the exercise of judgment. As a result, even comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations or building envelope descriptions involve an inherent risk that some conditions will not be detected. All documents or records summarizing investigations are based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated. Some conditions are subject to change over time. The Report presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, these should be disclosed to EXP to allow for additional or special investigations to be undertaken not otherwise within the scope of investigation conducted for the purpose of the Report.

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38 Exeter Road, London

**Scoped Environmental Impact
Study**

Prepared for:

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To be submitted to the City of London

Project No. 2803
October 2022



NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Executive Summary

Natural Resource Solutions Inc. (NRSI) was retained by private landowner Dr. Raj Khanuja to complete a Scoped Environmental Impact Study (EIS) and Tree Preservation Plan for a proposed retail development at 38 Exeter Road, London Ontario. The subject property is approximately 0.42ha in size and located northwest of the intersection of Exeter Road and Wonderland Road South.

A Record of Pre-Application Consultation provided by the City of London outlines the requirement for a Scoped EIS to address Species at Risk concerns, specifically Butternut, as well as a Tree Preservation Plan.

Natural heritage information was collected and reviewed to identify key natural heritage features, habitats and species that are reported from, or have the potential to occur within the study area. An Ecological Land Classification (ELC), tree inventory, bat habitat assessment, and a spring vegetation survey were conducted to characterize the subject property.

No Butternuts were documented on the subject property. Candidate Significant Wildlife Habitat was assumed present within the agricultural lands adjacent to the subject property, however no significant habitat or features were identified on the subject property.

The potential impacts of the proposed development include; vegetation removal, sedimentation and erosion, injury to trees, and impacts to wildlife and vegetation communities. The recommended mitigation strategies to address these potential impacts will ensure that there are no significant negative ecological impacts. These strategies include the following proposed conditions of approval, to be considered during the next design stage:

- An updated Tree Preservation Plan once the design and grading for the proposed development has been finalized;
- The installation and maintenance of heavy-duty combined sediment and erosion control fence and Tree Protection Fencing, supervised by a Certified Arborist, including immediate removal once construction activities have concluded; and
- Tree removal should occur with consideration to the protection and general timing windows for migratory birds and species at risk bats (April 1- September 30).


38 Exeter Road, London

Scoped Environmental Impact Study

Project Team

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Report submitted on October 14, 2022



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- Appendix IV Significant Wildlife Habitat (SWH) Screening Tables
- Appendix V Vascular Flora and Wildlife Species Lists
- Appendix VI Tree Preservation Plan
- Appendix VII Net Effects Impact Table

1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by private landowner, Dr. Raj Khanuja, in March 2022 to complete a Scoped Environmental Impact Study (EIS) and Tree Preservation Plan in support of a proposed re-zoning and retail development at 38 Exeter Road, London Ontario, henceforth referred to as the “subject property”.

The subject property is approximately 0.42ha in size and located northwest of the intersection of Exeter Road and Wonderland Road South. The subject property is currently vacant and undeveloped, and contains treed areas and is adjacent to retail areas and agricultural lands (Map 1). The degraded treed area on the subject property contains primarily Black Walnut (*Juglans nigra*) with sporadic Eastern Cottonwood (*Populus deltoides*) in the upper canopy, and a number of invasive species in the understory, including Tatarian Honeysuckle (*Lonicera tararica*), Garlic Mustard (*Alliaria petiolate*) and Virginia Creeper (*Parthenocissus vitacea*). According to the London Plan Natural Heritage mapping (City of London 2019), the subject property does not contain any Natural Heritage System features, nor is the area regulated by the Upper Thames River Conservation Authority (UTRCA).

In response to the Proposal Summary submitted by the Dr. Raj Khanuja in December 2021, the City of London provided a Record of Pre-Application Consultation which outlined that the subject property is located in a Holding Restricted Service Commercial Zone which does not permit the proposed retail development; and therefore, re-zoning is required. The Record of Pre-Application Consultation also outlines the requirement for a Scoped EIS “to address Species at Risk (SAR) concerns for potential Butternut (*Juglans cinerea*) present in [the] Black Walnut stand” as well as a Tree Preservation Plan to allow for any proposed tree removals (Appendix I).

This report contains the detailed findings of the Scoped EIS including the characterization of existing natural features based on the results of a background review and original field surveys. The detailed characterization was used to inform an analysis of the significance and sensitivity of natural features, the identification of any natural feature constraints in association with land use policy designations, and the assessment of potential impacts and mitigation measures associated with details of the proposed development. This report has been developed in accordance with the *Environmental Impact Study (EIS) Requirements* (City of London 2021)

and the *London Plan* (City of London 2019), and meets the Accessibility for Ontarians with Disabilities Web Content Accessibility Guidelines (AODA WCAG 2.0 AA).

1.1 Project Scope

This EIS was scoped according to discussions with City of London and UTRCA staff during the Pre-Application Consultation meeting on January 4th 2022, and following correspondence with City of London Environmental Planner, Monica Wu. An Environmental Study Scoping Checklist Report was submitted to City and UTRCA staff on March 14th, 2022 (Appendix II). The checklist identified that a wildlife habitat assessment, visual Butternut search, bat habitat assessment, botanical inventory, vegetation community classification (ELC), and tree inventory would be required. No further additions or edits were identified following this submission.

1.1.1 Study Area

For the purposes of this report, term “study area” refers to the subject property, and lands surrounding the subject property, to include adjacent lands (120 m). Additionally, the study area review includes data from the Natural Heritage Information Centre (1x1 km squares) natural heritage background data and the areas covered by the wildlife atlases (10x10 km squares).

1.2 Policy Context

Natural features identified during background review and field investigations were evaluated against relevant policies, legislation, and planning studies (Table 1) to help inform suitable land-use concepts, guide the layout of development, and identify areas to be protected.

Table 1. Relevant Policies, Legislation and Planning Studies.

Policy/Legislation	Description	Project Relevance
Provincial Policy Statement (OMMAH 2020)	<ul style="list-style-type: none"> Issued under the authority of Section 3 of the Planning Act and came into effect on May 1, 2020, replacing the 2014 PPS (OMMAH 2014). One of the key goals of the PPS is to “[provide] for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment.” Section 2.1 of the PPS – Natural Heritage establishes clear direction on the adoption of an ecosystem approach and the protection of 	<ul style="list-style-type: none"> Based on the background review, pre-construction monitoring reports and SAR/SCC screening, several natural features afforded consideration within the PPS have the potential to occur in the study area, including: <ul style="list-style-type: none"> Significant Wildlife Habitats, and Habitat for endangered and threatened species.

Policy/Legislation	Description	Project Relevance
	<p>resources that have been identified as 'significant'. This section also identifies that natural features are to be protected for the long term.</p> <ul style="list-style-type: none"> Section 2.1.5 of the PPS identifies that development and site alteration shall not be permitted within the area outlined in sub-sections a) – f) <i>“unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.”</i> The Natural Heritage Reference Manual (OMNR 2010) and the Significant Wildlife Habitat Technical Guide (OMNR 2000) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS. 	
<p>Endangered Species Act (Government of Ontario 2007)</p>	<ul style="list-style-type: none"> The original ESA, written in 1971, underwent a year-long review which resulted in a number of changes which came into force in 2007. The ESA prohibits killing, harming, harassing, or capturing Endangered or Threatened and protects their habitats from damage and destruction. 	<ul style="list-style-type: none"> Based on information available through background documents and field surveys, including the SAR/SCC screening, several SAR were identified as potentially having suitable habitat within the subject property, including: <ul style="list-style-type: none"> Butternut (<i>Juglans cinerea</i>); Eastern Small-footed Myotis (<i>Myotis leibii</i>); Northern Myotis (<i>Myotis septentrionalis</i>); and Monarch (<i>Danaus plexippus</i>)
<p>Migratory Birds Convention Act (Canadian Wildlife Service (CWS) 2017)</p>	<ul style="list-style-type: none"> The MBCA protects migratory game birds, insectivorous birds, and several other migratory non-game birds from persecution in the form of harassment. The schedule of on-site work must consider MBCA windows, with timing of breeding bird season typically occurring between April 1 and August 31, however, this is a guideline, since the MBCA applies to nesting bird species. “Incidental take” is considered illegal, with the exception of a permit obtained by the Canadian Wildlife Service (CWS). 	<ul style="list-style-type: none"> The timing of construction activities, especially vegetation clearing and site grading must have consideration for the MBCA timing windows.

Policy/Legislation	Description	Project Relevance
<p>Fish and Wildlife Conservation Act (Government of Ontario 2019)</p>	<ul style="list-style-type: none"> The FWCA provides protection for certain bird species, not protected under the MBCA (e.g., raptors), as well as furbearing mammals and their dens or habitual dwellings, aside from the Red Fox (<i>Vulpes vulpes</i>) and Striped Skunk (<i>Mephitis mephitis</i>). 	<ul style="list-style-type: none"> The timing of construction activities, especially vegetation clearing and site grading must have consideration for bird nesting and den sites for furbearing mammals.
<p>The Canadian Fisheries Act (Government of Canada 1985)</p>	<p>Last amended in August 2019, the federal <i>Fisheries Act</i> provides for the protection of fish and fish habitat. Fish are protected through two core prohibitions: Section 34.4(1) prohibits the death of fish by means other than fishing, and Section 35(1) prohibits the harmful alteration, disruption, or destruction (HADD) of fish habitat (Government of Canada 2019). Fish habitat is defined as “spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes”.</p>	<ul style="list-style-type: none"> A watercourse is present within the study area, situated in an agricultural field east of the subject property. No Species at Risk fish or fish habitat has been identified within the subject property.
<p>UTRCA Ontario Regulation 157/06 (Government of Ontario 2013)</p>	<ul style="list-style-type: none"> Regulation issued under <i>Conservation Authorities Act</i>, R.S.O. 1990. Through this regulation, the Upper Thames River Conservation Authority (UTRCA) has the responsibility to regulate activities in natural and hazardous areas (i.e. areas in and near rivers, streams, floodplains, wetlands, and slopes). Section 2(1) outlines the regulated natural features within which development is prohibited The Environmental Planning Policy Manual (UTRCA 2017) outlines policies designed to protect natural heritage features and systems from the potentially negative impacts of development and site alteration. 	<ul style="list-style-type: none"> The subject property is not regulated by the UTRCA. A watercourse has been identified to occur within the study area, situated in an agricultural field east of the subject property. The feature is regulated by the UTRCA.
<p>London Plan (City of London 2021)</p>	<ul style="list-style-type: none"> The London Plan was adopted by Council and the Province in 2016 and last consolidated in May, 2021. This official plan outlines current policies for the protection of natural features within the City of London which represent a constraint for development. 	<ul style="list-style-type: none"> Map 1 – <i>Place Types</i> indicates that the subject property is located within a Shopping Area Place Type. Map 5 – <i>Natural Heritage</i> indicates that the subject property does not contain any Natural Heritage System features. A watercourse is present in the study area, within an agricultural field east of Wonderland Road.

Policy/Legislation	Description	Project Relevance
	<ul style="list-style-type: none"> • The <i>Environmental Policies</i> section of the London Plan denotes components of the Natural Heritage System. Natural heritage features and areas such as fish habitat and habitat of endangered species and threatened species are included as part of the Green Space Place Type. • Features such as unevaluated wetlands, unevaluated vegetation patches, valleylands, and potential environmentally significant areas are included in the Environmental Review Place Type. 	<ul style="list-style-type: none"> • Map 6 – <i>Hazards and Natural Resources</i> indicates that the subject property is located on a Highly Vulnerable Aquifer and Significant Groundwater Recharge Area. • Site alteration is not permitted in Habitats of Endangered and Threatened species, which must be identified in the EIS. The subject property may provide suitable habitat for Endangered or Threatened species.
<p>City of London Tree Preservation By-law C.P.-1555-252 (City of London 2016)</p>	<ul style="list-style-type: none"> • Regulates harm or destruction of trees within the Urban Growth Boundary. • Outlines Tree Protection Areas. • Amended by C.P.—1555(b) – 29 on December 21, 2021. • Trees described as Distinctive or located within a Tree Protection Area are protected by this by-law. 	<ul style="list-style-type: none"> • The subject property occurs within the Urban Growth Boundary. • A tree inventory and Tree Preservation Plan must be completed to identify ownership of trees growing along property lines, identify Tree Protection Areas, evaluate significance of vegetation features, and inform tree retention and protection for the development.

2.0 Physical Environment

2.1 Soil, Terrain and Drainage

The study area is in a transition area between the physiographic regions known as Mount Elgin Ridges and Ekfrid Clay Plain (Chapman & Putnam, 1984). The soil profile is characterized by clay-silt till. It is underlain by limestone of the Dundee formation (Atkinson, Davies Inc. 2009). A tributary of Dingman Creek runs north to south, approximately 300 metres west of the subject property.

The subject property lies within the Upper Thames River watershed, which falls under the jurisdiction of the UTRCA. The Upper Thames watershed is 3,420 km² and contains 28 sub-watersheds (UTRCA 2017). The subject property is located within the Dingman Sub-Watershed.

3.0 Natural Environment

3.1 Background Information

3.1.1 Collection and Review of Background Information

Existing natural heritage information was collected and reviewed to identify key natural heritage features, habitats and species that are reported from, or have the potential to occur within the study area. The following background information sources were reviewed to provide an accurate understanding of the physical and biological attributes within the study area:

- The London Plan (City of London 2021);
- Middlesex County Natural Heritage Study (Upper Thames River Conservation Authority (UTRCA) 2014);
- Natural Heritage Information Centre (NHIC) (Ministry of Natural Resources and Forestry (MNR) 2022);
- Natural Heritage Reference Manual (MNR 2010);
- Significant Wildlife Habitat Technical Guide (OMNR 2000);
- Significant Wildlife Habitat Criteria Schedules For Ecoregion 7E (OMNR 2015);
- Significant Wildlife Habitat Support Tool (MNR 2014b);
- Ministry of Natural Resources and Forestry (MNR) Aylmer District;
- Ministry of Environment, Conservation and Parks (MECP) Species at Risk;
- Government of Canada Species at Risk Act (SARA) Registry;
- Ontario Breeding Bird Atlas (OBBA, Bird Studies Canada (BSC) et al. 2006);
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2019);
- Mammal Atlas of Ontario (Dobbyn 1994);
- Ontario Butterfly Atlas Online (Macnaughton et al. 2020); and
- Ontario Odonata Atlas Database (OOAD 2022).

Species lists were compiled to provide information on species reported from within the vicinity of the study area based on data available from the wildlife atlases listed above. These atlases provide data based on 10x10 km survey squares. Information on species from the survey squares that overlap with the study area (17MH75) were compiled. These initial species lists were used to guide the scope and type of wildlife field surveys required.

3.1.2 Significant Species Screening

Based on the compiled species lists for the study area, a screening exercise was completed to assess the potential for reported Species at Risk (SAR) and Species of Conservation Concern (SCC) to occur in the study area. This involved cross-referencing the preferred habitat for reported SAR and SCC (MNR 2000, Oldham and Brinker 2009, Eakins 2017, Reznicek et al. 2011) against habitats known to occur in the study area. This exercise was completed to ensure that the potential presence of all SAR and SCC within the study area was adequately assessed in this study.

Species at Risk are those listed on the SAR in Ontario List (SARO) (MECP 2021). These include species identified by the Committee on the Status of Species at Risk in Ontario (COSSARO) as provincially Endangered, Threatened, or Special Concern. Species listed by COSSARO as Endangered or Threatened are protected by the *Endangered Species Act, 2007* (ESA), which includes protection of their habitat, and are referred to as regulated SAR. Species listed as Special Concern are included in the definition of SCC, which includes the following:

- Species designated provincially as Special Concern;
- Species that have been assigned a conservation status (S-Rank) of S1 to S3 or SH by the NHIC; and
- Species that are designated federally as Threatened or Endangered by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC), but not provincially by COSSARO. If these species are listed under the Species at Risk Act (SARA) under Schedule 1 they are protected by the federal Act but not provincially by the ESA.

Based on the initial species lists, a total of 12 SAR and 8 SCC, were identified as having records from within the vicinity of the study area. Full SAR/SCC screening results are provided in Appendix III.

3.1.3 Significant Wildlife Habitat Screening

A screening exercise was completed to assess the presence of Significant Wildlife Habitat (SWH) within the study area. SWH is protected under the Ontario Provincial Policy Statement (PPS) (OMMAH 2020) and is described in the MNR Significant Wildlife Habitat Technical Guide (SWHTG) (MNR 2000) as being comprised of four major categories of habitat:

- Seasonal concentration areas;
- Specialized wildlife habitat and rare vegetation communities;
- Habitats of species of conservation concern; and
- Wildlife movement corridors.

Specific criteria defining wildlife habitat significance for Ecoregion 7E are described in the SWHTG Addendum (MNR 2015). Individual SWH types within these four broad categories were assessed as either not present, candidate, or confirmed for the study area based on a comparison of significance criteria against information obtained from relevant background documents.

Based on the preliminary background review, one SWH type was identified as candidate within the greater study area and are discussed further in Section 4. Full SWH screening results are provided in Appendix IV.

3.2 Field Methods

The type and scope of study methods was determined in consultation with the City of London and UTRCA and is detailed in the Environmental Study Scoping Checklist, which is appended to this report (Appendix II).

Field Surveys

Field surveys were undertaken within the study area to characterize natural features and identify significant and sensitive natural heritage features and species that have potential to be adversely affected by the proposed development. A total of one field visit was completed on May 4th, 2022. A variety of field surveys were undertaken, which are described in detail below and summarized in Table 2. Surveys conducted were undertaken in accordance with provincial and local guidance documents as indicated below.

Table 2. Field Survey Summary.

Survey	Protocol	Dates (2022)
Ecological Land Classification	Ecological Land Classification for Southern Ontario (Lee et al. 1998)	May 4
Vegetation Inventory	Systematic area searches	May 4
Tree Inventory	City of London Tree Preservation By-law (2021)	May 4
Bat Habitat Assessment	Survey Protocol for Species at Risk Bats in Treed Habitats (MECP 2022)	May 4

3.2.1 Vegetation Surveys

A vegetation community delineation was completed using aerial photography and thorough investigations in the field conducted on May 4th, 2022. The standard Ecological Land Classification (ELC) System for southern Ontario was applied (Lee et al. 1998). Details of vegetation communities were recorded including species composition, dominance and uncommon species or features.

All observed species of vascular flora within the subject property were recorded during each visit conducted in conjunction with vegetation community delineations.

3.2.2 Tree Inventory

An inventory of all trees with the potential to be impacted by the proposed works was completed on May 4th, 2022 by NRSI staff. Trees $\geq 10\text{cm}$ in Diameter at Breast Height (DBH) were assessed by a Certified Arborist. The location of trees inventoried was surveyed using an SXBlue II GNSS GPS unit, capable of sub-meter accuracy. A complete list of the trees that were assessed and their overall health and potential for structural failure is included in the Tree Preservation Plan (Appendix VI).

The following information was recorded for each tree:

- Species,
- Numeric identifier,
- Number of stems,
- DBH (centimetres),
- Approximate crown radius (metres),
- General health (excellent, good, fair, poor, very poor, dead),
- Potential for structural failure (improbable, possible, probable, imminent),
- Tree location (on-site/off-site/boundary), and
- General comments (i.e. disease, aesthetic quality, development constraints, sensitivity to development).

3.2.3 General Wildlife

All observations of birds, mammals, herpetofauna and insects were documented on all field visits. This included actual direct observations of individuals, as well as signs of wildlife presence (i.e. tracks, scats, dens, nests etc.).

3.2.4 Significant Wildlife Habitat Assessment and SAR Habitat

SWH types and SAR habitats identified as potentially occurring within the study area (i.e. Candidate) during the background review were further assessed for their presence in the field during all surveys.

3.3 Results and Discussion

3.3.1 Vegetation Communities

A summary of ELC communities identified within and adjacent to the subject property is provided in Table 3 and shown on Map 2.

Table 3. Ecological Land Classification Community Descriptions.

ELC Code	Community Type	Community Description
CUW1	Mineral Cultural Woodland Ecosite	The subject property is classified entirely as mineral cultural woodland. A small portion of paved driveway abuts the northeastern edge of the property. The canopy and sub-canopy are dominated by young to mid-aged Black Walnut (<i>Juglans nigra</i>), with lesser amounts of Eastern Cottonwood (<i>Populus deltoides</i>). In the understory, shrubs and vines such as Black Raspberry (<i>Rubus occidentalis</i>), invasive Tatarian Honeysuckle (<i>Lonicera tararica</i>), and Virginia Creeper (<i>Parthenocissus vitacea</i>) are found. The herbaceous groundcover is dominated by common disturbed meadow species including Tall Goldenrod (<i>Solidago altissima</i>), Smooth Brome (<i>Bromus inermis</i>), and Kentucky Bluegrass (<i>Poa pratensis</i>). Common Reed (<i>Phragmites australis</i>) can be found bordering the community adjacent to the roadside.

3.3.2 Vascular Flora

A total of 24 plant species were observed by NRSI biologists within the subject property during vegetation inventories. A complete list of all observed species and species reported from the vicinity of the study area is provided in Appendix V.

Based on available background information, one SCC plant species has been reported in the vicinity of the study area, the Green Dragon (*Arisaema dracontium*), however no suitable habitat for this species occurs on the subject property. Appendix III provides a summary of significant species reported from the vicinity of the study area, including their current status ranks and preferred habitats. NRSI conducted a thorough review of the area for Butternut trees and saplings however we did not observe any provincially or federally significant species within the subject property during the 2022 field season.

3.3.3 Tree Inventory

In total, 52 trees were inventoried, comprising three species: Black Walnut (*Juglans nigra*), Eastern Cottonwood (*Populus deltoides*), and Crack Willow (*Salix euxina*). Of the trees inventoried and assessed, 51 (98.1%) are native species and one (1.9%) Crack Willow is non-native. The Tree Preservation Plan can be found in Appendix VI.

3.3.4 Wildlife

Birds

A total of 91 bird species are reported from the study area or vicinity based on the OBBA and NHIC database (BSC et al. 2009, MNRF 2019a). The data documented by the OBBA includes those species that have been observed in the area (10x10 km range), are known to nest in the area, and/or have exhibited some evidence of breeding in the area. A complete list of species reported from the vicinity of the study area is provided in Appendix V.

Based on available background information, five bird SAR and three bird SCC have been reported in the vicinity of the study area (BSC et al. 2009, MNRF 2019a). The subject property was not observed to provide suitable habitat for any of these species. Appendix III provides a summary of significant species reported from the vicinity of the study area, including their current status ranks and preferred habitats.

Herpetofauna

A total of 26 herpetofauna species are reported from the study area or vicinity based on the ORAA and NHIC database (Ontario Nature 2019, MNRF 2019a). A complete list of all observed species and species reported from the vicinity of the study area is provided in Appendix V.

Based on available background information, four herpetofauna SAR and two herpetofauna SCC are reported from the vicinity of the study area (Ontario Nature 2019, MNRF 2019a). Appendix III provides a summary of significant species reported from the vicinity of the study area, including their current status ranks and preferred habitats. No regionally, provincially or federally significant species were observed within the subject property during 2022 field surveys. No suitable habitat for breeding amphibians or suitable features for reptile hibernation were identified on the subject property. Due to the isolated nature of the subject property, in general herpetofauna habitat is limited.

Mammals

A total of 43 mammal species are reported from the study area or vicinity based on the Mammal Atlas of Ontario and NHIC database (Dobbyn 1994, MNRF 2019a). A complete list of all observed species and species reported from the vicinity of the study area is provided in Appendix V.

Based on available background information, three mammal SAR and one mammal SCC are reported from the vicinity of the study area (Dobbyn 1994, MNRF 2019a). Appendix III provides a summary of significant species reported from the vicinity of the study area, including their

current status ranks and preferred habitats. No regionally, provincially, or federally significant species were observed within the subject property during 2022 field surveys.

Candidate habitat for SAR bats was identified during the SWH screening and therefore a bat habitat assessment was conducted on the subject property. Results of the assessment can be found in Section 4.2.

Butterflies

A total of 40 butterfly species are reported from the study area or vicinity based on the Ontario Butterfly Atlas and NHIC database (MacNaughton et al. 2019, MNRF 2019a). A complete list of all observed species and species reported from the vicinity of the study area is provided in Appendix V.

Based on available background information, one species of Nymphalidae SCC is reported from the vicinity of the study area (MacNaughton et al. 2019, MNRF 2019a). Appendix III provides a summary of significant species reported from the vicinity of the study area, including their current status ranks and preferred habitats. No regionally, provincially or federally significant species were observed within the subject property during 2022 field surveys.

Odonates

A total of 34 odonate species are reported from the study area or vicinity based on the Ontario Odonate Atlas and NHIC database (MNRF 2019b, MNRF 2019a). A complete list of all observed species and species reported from the vicinity of the study area is provided in Appendix V.

Based on available background information, no SAR or SCC species are reported from the vicinity of the study area and there is limited habitat for Odonates in general present. No regionally, provincially or federally significant species were observed within the subject property during 2022 field surveys.

4.0 Evaluation of Significance

An analysis of the significance and sensitivity of existing natural features within the subject property was completed in order to identify those features and habitats that are sensitive to disturbance. This analysis is based on the rarity or significance of features and/or associated functions/processes and/or current policies, legislation, or planning related studies. Such features and functions identified as sensitive to disturbance are further identified as 'constraints' to development, prohibiting or constraining aspects of any proposed development around or within them. The analysis is also used to identify 'opportunity' areas that have been previously disturbed or contain no natural features where potential for habitat rehabilitation or enhancement exists. These areas allow for possible development that would have less of a direct impact in comparison to areas with natural features and potential wildlife habitat. Results of this analysis are provided in the following sections to inform the development plan.

4.1 Significant Wildlife Habitat

Based on the results of a comprehensive background review and field studies, one SWH type remains as candidate within the larger study area.

Candidate: Waterfowl Stopover and Staging Area

Agricultural fields within the greater study area likely flood with sheet water in the spring, providing important invertebrate foraging habitat for migrating waterfowl. This candidate SWH is located well outside the area of potential impact and will not be negatively affected by the proposed construction.

4.2 Habitat of Endangered and Threatened Species

Based on the results of a comprehensive background review, suitable habitat for the SAR species Butternut (*Juglans cinerea*) had been identified within the subject property as well as candidate habitats for species at risk bats.

The site visits determined that no Butternuts or suitable Butternut habitat is present within the subject property.

A bat habitat assessment was conducted during the site visit to the subject property. The results of the assessment show that there is no suitable roosting habitat for Northern Myotis (*Myotis septentrionalis*) and Eastern Small-footed Myotis (*Myotis leibii*) within the subject property.

4.3 Summary of Natural Feature Constraints

Table 4. Summary of Natural Feature Constraints.

Natural Feature Constraint	Regulatory and Permitting Considerations	Project Considerations
Significant and Unevaluated Wetlands	<ul style="list-style-type: none"> • Provincial Policy Statement (OMMAH 2020) • Environmental Planning Policy Manual (UTRCA 2006) • UTRCA Ont. Reg. 150/06 • The London Plan (City of London 2019) 	<ul style="list-style-type: none"> • No Significant or Unevaluated Wetlands are present within the subject property or subject area.
Watercourse and Fish Habitat	<ul style="list-style-type: none"> • Provincial Policy Statement (OMMAH 2020) • Environmental Planning Policy Manual (UTRCA 2006) • UTRCA Ont. Reg. 157/06 • Federal Fisheries Act (1985) • The London Plan (City of London 2019) • County of Middlesex Official Plan (Middlesex County 2006) 	<ul style="list-style-type: none"> • No watercourses or fish habitats are present within the subject property or subject area.
Habitat for Threatened and Endangered Species	<ul style="list-style-type: none"> • Endangered Species Act, 2007 • Species at Risk Act • Provincial Policy Statement (OMMAH 2020) • Environmental Planning Policy Manual (UTRCA 2006) • The London Plan (City of London 2019) 	<ul style="list-style-type: none"> • No SAR habitat for SAR were identified within the subject property.
Significant Wildlife Habitat	<ul style="list-style-type: none"> • Provincial Policy Statement (OMMAH 2020) • Environmental Planning Policy Manual (UTRCA 2006) • The London Plan (City of London 2019) 	<ul style="list-style-type: none"> • No Significant Wildlife Habitat are present within the subject property. • Candidate Waterfowl Stopover and Staging Area Habitat has been identified within the agricultural fields within the study area, however habitat will not be negatively affected by the proposed construction.
Potential Naturalization Areas	<ul style="list-style-type: none"> • The London Plan (City of London 2019) 	<ul style="list-style-type: none"> • No Potential Naturalization Areas identified by the London Plan (2019) are present in the study area.
Significant Valleylands	<ul style="list-style-type: none"> • Provincial Policy Statement (OMMAH 2020) • Environmental Planning Policy Manual (UTRCA 2006) • The London Plan (City of London 2019) 	<ul style="list-style-type: none"> • No Significant Valleylands are present within the subject property or subject area.

Unevaluated Vegetation Patch	<ul style="list-style-type: none">• The London Plan (City of London 2019)	<ul style="list-style-type: none">• No Unevaluated Vegetation Patches are present within the subject property or subject area.
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5.0 Impact & Net Effects Assessment

The potential impacts are determined by comparing the characteristics of the existing natural features and their functions to typical residential and construction processes. Where a development proposal overlaps or is adjacent to natural features, impacts may arise.

The following is a description of the types of impacts that have been assessed.

- **Existing** impacts are discussed in relation to impacts from previous or existing land uses or activities that have affected the natural heritage features of the study area.
- **Direct** impacts are discussed in relation to the natural features and wildlife on the subject property associated with disruption or displacement caused by any potential future 'footprint' of an undertaking.
- **Indirect** impacts are discussed in relation to changes in site conditions such as drainage and water quantity/quality on the subject property and adjacent communities.

5.1 Proposed Development

The proponent is proposing to construct a commercial development comprising of two retail buildings (Map 2). The subject property includes compacted soil and is surrounded by paved parking lots and city streets. There are no natural features in proximity to the subject property that would be negatively impacted due to the proposed construction activities.

5.2 Existing Impacts

There are no natural features within close proximity to the study area that would be negatively impacted by the proposed construction. However, the subject property currently contains a number of invasive species, including Tararian Honeysuckle, and Garlic Mustard (*Alliaria petiolate*), and has been degraded by urban pollution such as garbage and road salt.

Mitigation, Protection & Compensation

The proposed development would require the removal of vegetation within the subject property, including the invasive species. Removing the invasive species from the property will stop their spread into surrounding area and into the greater surrounding natural features outside of the study area. Native, non-invasive plant species should be used in any future landscaping plans for the proposed development.

5.3 Direct Impacts

As there are no wetlands, woodlands, aquatic areas, or wildlife habitats within close proximity to the study area that would be negatively impacted by the proposed construction, the direct impacts would only include the vegetation and tree removal on the subject property.

5.3.1 Vegetation and Tree Removal

The removal of isolated trees, as well as minor injury to tree limbs or their root systems from machinery and construction activities (e.g., grading, excavation, etc.) will occur. A Tree Preservation Plan (TPP) has been requested by the City of London and proposed in the approved Terms of References for the subject property (Appendix I). The TPP must be compliant with Section 12 of the *Design Specifications & Requirements Manual, Tree Planting and Protection Guidelines* (City of London 2018). When determining which trees are to be retained, both tree quality and development constraints should be considered.

The development proposes to remove some of the existing vegetation on the property. This vegetation removal has the potential to impact urban wildlife that may occur on the property.

Mitigation, Protection & Compensation

A TPP has been developed for this property and can be found in Appendix VI. TPZs will be established along the eastern boundary to protect boundary and off-property trees in accordance with the design specifications (City of London 2018), to minimize grading and construction damage. TPF will be erected prior to any construction activity and be placed along the limits of the TPZ. The TPF is to be inspected by a Certified Arborist or Registered Professional Forester prior to the commencement of work. These barriers are to be maintained throughout the construction period to ensure the protection of retained trees and their root systems, and trees will be inspected post-construction for damage.

The Canadian Wildlife Service (CWS) recommends that no vegetation clearing occurs during peak breeding season for migratory birds, between April 1 and August 31 (CWS 2017). Removal of trees and meadow vegetation should occur outside of the active breeding season. Any planting plans should be designed to incorporate species that provide forage and nectaring opportunities for wildlife. This mitigation will ensure no net effect.

5.3.2 Erosion and Sedimentation

During construction, areas of bare soil may be exposed that have the potential to erode during precipitation events and impact adjacent features. In the event of a heavy rain or snow melt event, sediment laden runoff can enter adjacent features by way of overland flow. In order to protect these off-site features from potential impacts due to sediment, an ESC plan should be developed and implemented prior to any construction activities on site, including any vegetation removal and clearing.

Mitigation, Protection & Compensation

Heavy-duty filter fabric ESC fencing should be installed along the limit of disturbance prior to any form of development or site alteration, including any vegetation removals and clearing and grubbing. The heavy-duty ESC fencing should be combined with TPF where possible. The heavy-duty ESC is to be maintained in good working order by the developer and/or their representative for the entire construction phase, and be removed once all development is complete and exposed soils are stabilized to the satisfaction of the Contract Administrator and/or Environmental Monitor. Any exposed soils and steep slopes within the subject property will require special care to avoid erosion and sedimentation, and should be seeded immediately following grading activities. This mitigation will ensure no net effect.

5.4 Indirect Impacts

There will be no indirect impacts to the subject property as there are no natural features within close proximity to the study area that would be negatively impacted by the proposed construction.

6.0 Environmental Management Recommendations

6.1 Planning and Design Stage

- Incorporate the proposed tree removal compensation plantings into a Landscape or Planting Plan that also identifies restoration areas. This plan should propose the use of native species suitable to the subject property and surrounding area, whose selection has been informed by the natural inventory work completed on the property;
- An updated Tree Preservation Plan should be completed if changes are proposed to the grading and site plan.

6.2 Construction Stage

- A combined sediment and erosion control fence (i.e. silt fence) and Tree Protection Fencing (TPF) is recommended to be situated adjacent to the limit of disturbance. The installation and location of the TPF is to be inspected by a Certified Arborist before any construction activities begin, and maintained by the developer during the entire construction period. Any minimal damage (i.e. damage to limbs or roots) to trees to be retained during construction must be pruned using proper arboricultural techniques. Should any of the trees intended to be retained be seriously damaged or die as a result of construction activities, consultation with the City will be required. More information regarding TPF can be found in the Tree Preservation Plan (Appendix VI);
- Tree removal should be restricted to outside the peak breeding season window for migratory birds (April 1- August 31);

6.3 Post- Construction Stage

- TPF and additional ESC fencing should be removed upon completion of construction activities. A Certified Arborist should be on site to monitor the removal of the TPF and inspect retained trees and their rooting area. Possible remediation work may be needed if retained trees or root zones are damaged.

7.0 Conclusions

Natural Resource Solutions Inc. (NRSI) was retained by private landowner Dr. Raj Khanuja to complete a Scoped Environmental Impact Study (EIS) and Tree Preservation Plan in support of a proposed retail development at 38 Exeter Road in London, Ontario (Map 1).

The subject property is approximately 0.42ha in size and is located northwest of the intersection of Exeter Road and Wonderland Road South. The property contains treed areas and sits adjacent to retail areas and agricultural lands.

No confirmed Species at Risk, Species of Concern, or SWH were found on the subject property. Mitigation and protection measures recommended in Section 7 (Environmental Management Recommendations) of this report should be considered necessary to minimize the impact of the development on the ecological features and functions of the subject area. As demonstrated in the Net Effects Assessment (Appendix VII), assuming the recommend avoidance, mitigation and compensation measures are implemented properly, no negative impacts on the natural features or on their ecological functions should occur on the subject property.

At this stage of the proposed project all intent and requirements of the environmental policies of the City of London Plan, Provincial Policy Statement and other relevant legislation have been met (see Table 1).

8.0 References

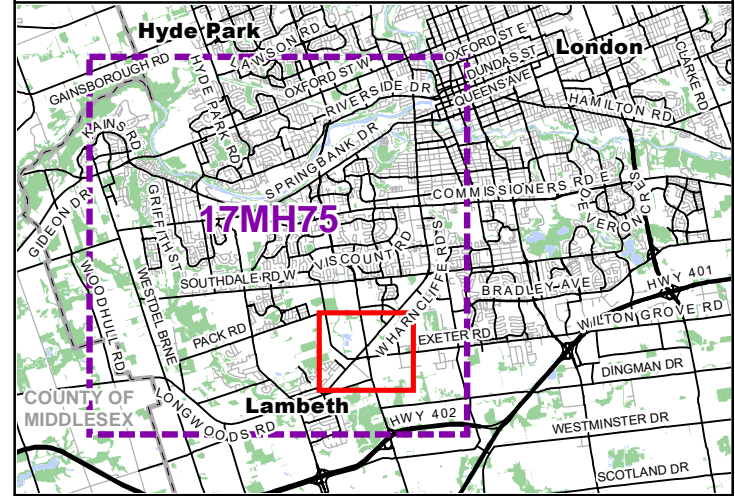
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Maps

38 Exeter Road

Study Area and Natural Features



- Legend**
- Study Area (200m)
 - Subject Property
 - Utility Line
 - Primary Road
 - Secondary Road
 - Permanent Watercourse
 - Intermittent Watercourse
 - Wooded Area
 - Natural Heritage Information Centre (NHIC) 1x1km
 - Ontario Breeding Bird Atlas (OBBA) 10x10km*
 - Aquatic Resource Area (ARA)**
 - ARA Survey Point
 - ARA Watercourse Segment

*Entire map extent encompassed by OBBA square 17MH75



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Project: 2803 Date: March 15, 2022	NAD83 - UTM Zone 17 Size: 11x17" 1:8,000
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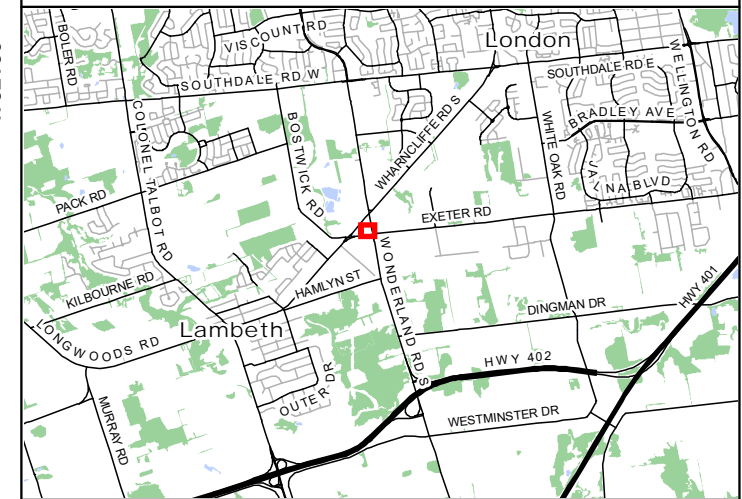
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38 Exeter Rd, London Vegetation Communities & Preliminary Site Plan



Legend

-  Subject Property
-  Proposed Site Plan
-  Ecological Land Classification (ELC)
(CUW1) Mineral Cultural Woodland Ecosite



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4752100

4752050

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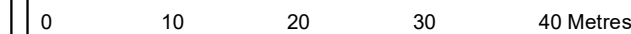
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Project: 2803 Date: October 11, 2022	NAD83 - UTM Zone 17 Size: 11x17" 1:600
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Appendix I

Record of Pre-Application Consultation and Terms of Reference

The following appendix contains documents that are difficult to make screen reader accessible. Please contact Madison Postma at mpostma@nrsi.on.ca for further description or details of these documents at any time.

The first document is a Record of Pre-Application Consultation from the City of London which outlines the various requirements needed to proceed with the proposed retail development. This document states the request for a Scoped EIS due to possible SAR and SWH on the subject property.

The second document is the Terms of References for the Scoped EIS, prepared by Jeremy Bannon at Natural Resource Solutions Inc. on March 18th 2022. The Terms of Reference discusses the project overview including relevant policies and legislation, background information, a description of terrestrial field surveys, and reporting needed to complete the Scoped EIS for the proposed development.



RECORD OF PRE-APPLICATION CONSULTATION

The following form is to be completed and signed off at/following the Pre-application Consultation Meeting (PACM).

Date: January 4, 2022

TO: Raj Khanuja

FROM: Monica Wu

RE: 38 Exeter Road

PLANNING APPLICATION TEAM: Monica Wu, Planner II (mwu@london.ca); Amanda Lockwood, Urban Designer (alockwood@london.ca); Sonia Wise, Site Development Planner (swise@london.ca); Paul Di Losa, Senior Engineering Technologist (pdilos@london.ca); Laura Dent, Heritage Planner (ldent@london.ca); Lisa McNiven, Landscape Architect (lmcniven@london.ca); Craig Smith, Senior Planner, Parks Planning & Design (crsmith@london.ca); Shane Butnari, Ecologist (sbutnari@london.ca)

City staff reviewed your Proposal Summary submitted December 7, 2021 at an Internal Review Meeting on December 23, 2021. The following form summarizes a preliminary list of issues to be considered during the processing of your application. We have also identified the initial material submissions (Studies, Reports, Background or Information) that must be submitted along with the completed application form, required fees and this Record of Pre-Application Consultation Form before your application will be accepted as complete for opening and processing.

PROPOSED DEVELOPMENT:

- London Plan Place Type: Shopping Area
- 1989 Official Plan: Enterprise Corridor
- Current Zone: Holding Restricted Service Commercial (h-17*RSC1/RSC4)
- Requested Zone: None requested (applicant to specify)
- Proposed Development: Two retail/commercial buildings

POLICY/REGULATORY FRAMEWORK OVERVIEW:

- The site is located in the Shopping Area Place Type in the London Plan and is designated Enterprise Corridor in the 1989 Official Plan
 - A broad range of commercial, residential, office, entertainment, service, institutional and educational uses are contemplated at this location
 - Mixed-use buildings are encouraged
- The site is located in the Wonderland Road Community Enterprise Corridor in the Southwest Area Secondary Plan (SWAP)
 - Development shall be planned on the basis that future intensification in the form of mixed-use developments or reformatted commercial development will occur (SWAP, 20.5.6.1 (i); 20.5.6.1(v)(a))
 - Mixed-use developments are encouraged (SWAP, 20.5.6.1(ii))
 - Grid pattern of development is encouraged through the provision and dedication of local roads and/or rights-of-way aligned perpendicular to Wonderland Road South (SWAP, 20.5.6.1(i); 20.5.6.1(iii))
 - Please refer to Section 20.5.6.1 in the SWAP for additional policies pertaining to the Wonderland Road Community Enterprise Corridor
- The site is zoned Holding Restricted Service Commercial (h-17*RSC1/RSC4).
 - The RSC Zone variation permits trade service and moderate intensity commercial uses

- The proposed uses are not permitted at this location and a re-zoning is required
- The h-17 holding provision requires full municipal sanitary sewer and water services to be available prior to its removal

MAJOR ISSUES:

- Applicant to confirm proposed zone
 - Special provision to permit reduced parking is required (required: 1 space per 15m²)
 - Additional special provisions may be identified through the Site Plan Pre-Consultation process
- Proponent is encouraged to consider acquiring lands to the north and west to maximize future development potential
- The proposed development is encouraged to orient buildings towards Exeter and Wonderland Road South to establish a pedestrian- and transit-oriented built street edge
 - Proponent is encouraged to consider reconfiguring the site to along a small amount of parking between the buildings to provide both pedestrians and drivers with convenient access to the unit entrances and ensure the functional front doors are located close to the streets – see Urban Design comments below for future details
- Right-of-way dedication of 24.0 m from the centre line of Exeter Road and Wonderland Road South is required
 - Additional 6.0 m setback is required from the easterly and southerly lot lines – to be confirmed during Site Plan Pre-Consultation

Site Plan:

- Add landscape islands to the parking area in the hatched area and to enclose the parking row at the north end of each aisle
- Provide buffer from parking spaces to property boundaries, or confirm easements for shared use if integrating access or function with neighbouring properties
- Confirm easements for shared access for drive aisles from Wonderland to the north of the site
- Show dimensions of proposed north-south access that exits to Exeter Road and confirm if any easements are required for joint use for neighbouring properties
- Identify and confirm any perimeter fencing type proposed
- Provide pedestrian connections from the parking area to the buildings
- Identify and label snow storage areas
- Identify and label fire route(s) if required
- Identify any changes to the use of property to north due to site changes at 38 Exeter Road (appears to have current garbage storage along property boundary)
- Consider locating garbage storage within building
- Proposal seems to meet the definition for shopping centre which would have a parking rate of 1/15sqm for all uses, if there are at least 4 or more individual business establishments. Parking would be required at 66 spaces for 990sqm of GFA.
- Accessible and bicycle parking would need to be updated accordingly
- If the concept changes significantly, please circulate to Site Plan for revised comments

Urban Design:

- This site is within the Wonderland Road Community Enterprise Corridor of the Southwest Area Secondary Plan [SWAP].
 - Consider developing the site with a more intense, mixed-use development including commercial at grade and residential above, in line with the vision of the Wonderland corridor.
 - Development will be encouraged in a “main street” format where buildings are oriented to a public street with direct pedestrian connections to the city sidewalk [SWAP 20.5.6.1].

- The frontage of the building facing Wonderland Road South and Exeter Road should be lined with small scale stores and have multiple entrances [SWAP 20.5.6.1].
 - Front facades and doors to the majority of units should be provided along the public street frontages, or in close, direct proximity. Consider reconfiguring the site to allow a small amount of parking between the buildings to provide both pedestrians and drivers with convenient access to the unit entrances and ensure the functional front doors are located close to the streets.
- This site is adjacent to 17 and 31 Exeter Road which is anticipated to be a gateway to the Southwest Area of the London and the Wonderland Road Community Enterprise Corridor. This site should be cohesive with the anticipated use of those properties, including buildings that are focused to the street with parking areas located predominantly in side or rear yards. Emphasis shall be placed on architectural quality and urban design to create an urban main street character. The development should provide for a walkable urban main street experience on a pedestrian scale. Buildings along Exeter and Wonderland Road should be street oriented, with the public right-of-way designed to support pedestrian activity and street-oriented retail or other active uses. Boulevards may include wider sidewalks and outdoor patio areas, and hard and soft surface landscaping treatments including street trees and furniture [SWAP 20.5.6.5].
- Ensure all parking rows have a parking island with sufficient room for two trees.
- Provide full elevations with materials and dimensions labelled. Further urban design comments may be provided after receipt of these elevations.
- This application is to be reviewed by the Urban Design Peer Review Panel (UDPRP), and as such, an Urban Design Brief will be required. UDPRP meetings take place on the third Wednesday of every month, once an Urban Design Brief is submitted as part of a complete application the application will be scheduled for an upcoming meeting and the assigned planner as well as the applicant's agent will be notified. If you have any questions relating to the UDPRP or the Urban Design Briefs please contact Wyatt Rotteau at 519.661.CITY (2489) x7545 or by email at wrotteau@london.ca.

Ecology/Landscaping:

- A scoped Environmental Impact Study (EIS) will be required as part of a complete application submission to address Species at Risk (SAR) concerns for potential Butternut present in Black Walnut stand
- A scoping meeting shall be held between the proponent and a City Ecologist to review and confirm the study scope. A site visit may be requested in support of application review.
- The proponent and/or their consultant is required to complete the Environmental Impact Study Issues Scoping Checklist as a draft for submission to the City in advance of the scoping meeting. Once all comments regarding the draft Checklist have been received and finalized the City of London will send written approval (e-mail or letter).
 - No disturbance arising from demolition, construction, or any other activity shall take place on the property prior to Development Services receiving and approving the EIS to ensure that all technical requirements have been satisfied.
 - It is an offence under Section 10(1) of the *Endangered Species Act* to 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.
 - Avoid tree removal within the active bat roosting period (April 30 – September 1) to reduce potential interactions with Endangered bat species, to avoid contravention of the *Endangered Species Act*.
 - Avoid vegetation removal within the active breeding bird period (April 1 – August 1) to avoid disturbing nesting birds and contravening the *Migratory Bird Convention Act*.
- A Tree Preservation Plan is required as part of a complete application to:

- establish the ownership of trees growing along property lines, including the identification of boundary trees that are protected by the province's Forestry Act 1998, c. 18, Sched. I, s. 21.
- Identify rare or endangered species that are protected by the province's Endangered Species Act, 2007, S.O., C.6
- Identify canopy spread of existing trees, tree symbols to reflect canopy extents
- Identify Tree Protection Areas
- Identify City Owned trees and shrubs that require consent to injure or remove
- Detail tree removals, tree retention, tree fence alignment and construction mitigation measures
- evaluation of the impact of the proposed development upon the existing vegetation
- opinion of the significance of the vegetation
- The Tree Preservation Plan and tree protection measures must include:
 - inventory of existing vegetation-species, size, location, health, age, rare or threatened species. Include trees $\geq 10\text{cm}$ dbh and shrubs 1.5m high

Archaeological/Heritage:

- An Archaeological Assessment Stage 1-2 – entire property is required as part of a complete application submission.
 - If an archaeological assessment has already been completed and received a compliance letter from the Ministry, the compliance letter along with the assessment report may be submitted for review to ensure they meet municipal requirements.
- The proponent shall retain a consultant archaeologist, licensed by the Ministry of Heritage, Sport, Tourism, and Culture Industries under the provisions of the *Ontario Heritage Act* (R.S.O. 1990 as amended) to carry out a minimum of a Stage 1-2 archaeological assessment and follow through on recommendations to mitigate, through preservation or resource removal and documentation, adverse impacts to any significant archaeological resources found (Stages 3-4).
- The archaeological assessment must be completed in accordance with the most current Standards and Guidelines for Consulting Archaeologists, Ministry of Tourism, Culture and Sport.
- All archaeological assessment reports will to be submitted to the City of London once the Ministry of Heritage, Sport, Tourism and Culture Industries has accepted them into the Public Registry; both a hard copy and PDF format of archaeological reports should be submitted to Current Development.
 - No soil disturbance arising from demolition, construction, or any other activity shall take place on the property prior to Current Development receiving the Ministry of Heritage, Sport, Tourism, and Culture Industries compliance letter indicating that all archaeological licensing and technical review requirements have been satisfied.
 - It is an offence under Section 48 and 69 of the *Ontario Heritage Act* for any party other than a consultant archaeologist to make alterations to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from an archaeological site.
 - Should previously undocumented (i.e. unknown or deeply buried) archaeological resources be discovered, they may be a new archaeological site and therefore be subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act*. Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48(1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

- If human remains/or a grave site is discovered, the proponent or person discovering the human remains and/or grave site must cease alteration of the site immediately. The *Funerals, Burials and Cremation Services Act* requires that any person discovering human remains must immediately notify the police or coroner and the Registrar of Burial Sites, War Graves, Abandoned Cemeteries and Cemetery Closures, Ontario Ministry of Government and Consumer Services.

Parks:

- Parkland dedication is required in the form of cash in lieu, pursuant to By-law CP-9 and will be finalized at the time of site plan approval.

Transportation:

- A Transportation Impact Assessment (TIA) will be required as part of a complete application submission.
 - The TIA will evaluate the impact the development will have on the transportation infrastructure in the area and provide recommendations for any mitigation measures.
 - The TIA will need to be scoped with City staff prior to undertaking and be undertaken in general conformance with the City's TIA guidelines.
- Right-of-way dedication of 24.0 m from the centre line be required along Exeter Rd.
- Right-of-way dedication of 24.0 m from the centre line be required along Wonderland Rd South.
- 6.0m x 6.0m daylight triangle required at the intersection corner.
- Detailed comments regarding access design and location will be made through the site plan process.

Water

- Water is available for the subject site via the municipal 300mm watermain on Exeter Road.

Wastewater

- The municipal sanitary sewer available is the 450mm diameter sewer on Exeter Rd. There is a 150mm diameter PDC stubbed at property line.

Stormwater

- As per attached accepted Storm Drainage Area Plan Drawing No (15311), the site at C=0.70 is tributary to the existing 600mm diameter storm sewer on Exeter Rd. The applicant should be aware that any future changes to the C-value will require the applicant to demonstrate sufficient capacity in this pipe and downstream systems to service the proposed development as well as provide on-site SWM controls. On-site SWM controls design should include, but not be limited to required storage volume calculations, flow restrictor sizing, bioswales, etc.
- As per as-constructed Drawing No (29249), the City cannot confirm a storm PDC exists to service the property. The consultant would be required to provide for a storm PDC to service the site.
- The proposed land use of a commercial will trigger(s) the application of design requirements of Permanent Private Storm System (PPS) as approved by Council resolution on January 18, 2010. A standalone Operation and Maintenance manual document for the proposed SWM system is to be included as part of the system design and submitted to the City for review.
- The number of proposed/existing parking spaces exceeds 29, the owner shall be required to have a consulting Professional Engineer confirming how the water quality will be addressed to the standards of the Ministry of the Environment, Conservation and Parks (MECP) with a minimum of 80% TSS removal to the satisfaction of the City Engineer. Applicable options could include, but not be limited to the use of oil/grit separators or any LID filtration/infiltration devices.
- Based on the Dingman Subwatershed study, the runoff control hierarchy for the 25mm event is to be achieved for sites within the Subwatershed. The consulting engineer is to ensure that any proposed option of LID solutions are to be in

compliance with the LID Screening Tools Section 6.5.2.2 Stormwater Management of the Design Specifications & Requirements Manual.

- Any proposed LID solutions should be supported by a Geotechnical Report and/or hydrogeological investigations prepared with focus on the type of soil, its infiltration rate, hydraulic conductivity (under field saturated conditions), and seasonal high ground water elevation. The report(s) should include geotechnical and hydrogeological recommendations of any preferred/suitable LID solution. All LID proposals are to be in accordance with Section 6 Stormwater Management of the Design Specifications & Requirements manual.
- As per 9.4.1 of The Design Specifications & Requirements Manual (DSRM), all multi-family, commercial and institutional block drainage is to be self-contained. The owner is required to provide a lot grading plan for stormwater flows and major overland flows on site and ensure that stormwater flows are self-contained on site, up to the 100 year event and safely convey the 250 year storm event.
- The Owner shall allow for conveyance of overland flows from external drainage areas that naturally drain by topography through the subject lands
- Stormwater run-off from the subject lands shall not cause any adverse effects to adjacent or downstream lands.
- An erosion/sediment control plan that will identify all erosion and sediment control measures for the subject site and that will be in accordance with City of London and MECP standards and requirements, all to the specification and satisfaction of the City Engineer. This plan is to include measures to be used during all phases of construction. These measures shall be identified in the Storm/Drainage Servicing Report.
- All applicants and their consultants shall ensure compliance with the City of London, Design Specifications and Requirements Manual, Ministry of the Environment, Conservation & Parks (MECP) Guidelines and Recommendation, and the SWM criteria ,as well as, targets for the Dingman Creek Subwatershed.
- Additional SWM related comments will be provided upon future review of this site.

General comments for sites within Dingman Creek Subwatershed:

- The subject lands are located in the Dingman Subwatershed. The Owner shall provide a Storm/Drainage Servicing Report demonstrating compliance with the SWM criteria and environmental targets identified in the Dingman Subwatershed Study that may include but not be limited to, runoff volume control, quantity/quality control (80% TSS), erosion, stream morphology, etc.
- The Owner agrees to promote the implementation of SWM Best Management Practices (BMP's) within the plan, including Low Impact Development (LID) where possible, to the satisfaction of the City Engineer.
- The owner is required to provide a lot grading plan for stormwater flows and major overland flows on site and ensure that stormwater flows are self-contained on site, up to the 100 year event and safely conveys up to the 250 year storm event, all to be designed by a Professional Engineer for review.
- The Owner shall allow for conveyance of overland flows from external drainage areas that naturally drain by topography through the subject lands.
- Stormwater run-off from the subject lands shall not cause any adverse effects to adjacent or downstream lands.
- An erosion/sediment control plan that will identify all erosion and sediment control measures for the subject site shall be prepared to the specification and satisfaction of the City Engineer and shall be in accordance with City of London and MECP (formerly MOECC) standards and requirements. This plan is to include measures to be used during all phases of construction. These measures shall be identified in the Storm/Drainage Servicing Report.

Studies, Reports, Background or Information to be completed and submitted with the application form

- Zoning By-law Amendment application and fees
- Zoning Data Sheet
- Record of Site Plan Pre-Consultation
- Site Concept Plan, Floor Plans, Elevations & Renderings
- Planning Justification Report
- Urban Design Brief
- Stage 1 – 2 Archaeological Assessment – entire property
- Transportation Impact Assessment (TIA)
- Scoped Environmental Impact Study (EIS)
- Tree Preservation Plan
- Image for use on sign and webpage (in accordance with the Graphic Requirements contained in Schedule APP-3 of the application form)
- All background reports and drawings are required to meet the Accessibility for Ontarians with Disabilities Web Content Accessibility Guidelines (AODA WCAG 2.0 AA) regulations. See application form for more detail.
- Electronic copies of all supporting background information

PRE-APPLICATION CONSULTATION HAS OCCURRED

YES NO

PLANNER: Monica Wu

PROPONENT: _____

DATE: January 4, 2022

Disclaimer

The pre-application consultation process is intended to identify issues early in the process and to identify the reports, studies and information required to be submitted as part of a complete application. A complete application enables Council to make informed decisions within a reasonable period of time and ensures that the public and other stakeholders have access to the relevant information early in the process. While every effort has been made to identify information needs at this stage, additional issues and/or information needs may be identified through the application review process and may be requested at that time. Should a formal submission of an application not materialize within 9 months, a subsequent Pre-Application Consultation Meeting (PACM) will be required.

Council adopted The London Plan, the City's new Official Plan for the City, on June 23, 2016. It is not yet in force and effect, but should it come into force and effect before you submit your complete application, City staff may identify additional complete application requirements at the time of application submission in order to comply with The London Plan policies.

March 18, 2022

2803

Dr. Raj Khanuja
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c/o Paul Crocker
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Callon Dietz Inc.
41 Adelaide Street North, Unit 1
London, ON
N6B 3P4

**RE: 38 Exeter Road, London
Scoped Environmental Impact Study and Tree Preservation Plan - Terms of
Reference**

On behalf Natural Resource Solutions Inc. (NRSI), I am pleased to provide the following Terms of Reference (TOR) for an Environmental Impact Study (EIS) and Tree Preservation Plan (TPP) for a proposed retail development at 38 Exeter Road, London, Ontario.

The subject property is approximately 0.42ha in size and is located northwest of the intersection of Exeter Road and Wonderland Road South. The property contains treed areas and sits adjacent to retail areas and agricultural lands (Map 1). A Record of Pre-Application Consultation provided by the City of London outlines the requirement for a Scoped EIS “to address Species at Risk (SAR) concerns for potential Butternut present in [the] Black Walnut stand”, as well as a Tree Preservation Plan to allow for any proposed tree removal. The following Terms of Reference identifies the scope of the workplan for this undertaking.

Project Scoping

The proposed EIS and TPP will provide background information, methods and findings of field surveys, and a variety of impact analyses that rely on a pre-defined set of geographical terms. This section aims to clarify important terms that will be used throughout both reports.

The term *development area* refers to the location where construction will be required to facilitate the proposed development. This will include grading activities that may extend past the final developed footprint. This area is not yet finalized and will be determined through iterative, multidisciplinary reviews and discussions.

The term *subject property* refers to the legal lands owned by the proponent, which is outlined on all mapping. The term *study area* refers to the subject property and lands within 200m, as well as any connected natural features. The 200m radius that is included in the study area has been selected based on several policy definitions that must be considered during the development of an EIS. Primarily, these are:

- The definition of “adjacent lands” provided in the Natural Heritage Reference Manual (Ministry of Natural Resources and Forestry (MNRF) 2010), which requires the assessment of potential impacts on all relevant ecological receivers and wildlife habitat for any development within 120m; and

- The inclusion of potential regulated habitat for several Species at Risk (SAR).

Finally, the study area is nested within a broader geographical area for which a variety of available background information sources was reviewed to inform this TOR. Legacy data was collected from several atlases, which is available in 10x10km grids (square 17MH75), as well as the Natural Heritage Information database, which is available in 1x1km grids (square 17MH7752; NDMNRF 2022).

The described subject property and study area are shown on Map 1.

Project Overview

NRSI has been retained by Dr. Raj Khanuja to complete a scoped EIS and TPP for the proposed development of two retail buildings within the subject property. The EIS will include an analysis of the proposed draft plan completed by other project team members.

This TOR outlines the steps required to complete the EIS and TPP for the proposed development, and consists of three phases:

1. Background information review;
2. Natural resource characterization, and;
3. EIS and TPP reporting.

Each of these components is described in separate sections within this letter.

1. Background Information Review

NRSI has reviewed the London Plan (City of London 2021) and other policies and legislation to inform this EIS. Detailed below are the relevant policy areas that will be considered during the development of the EIS.

Table 1. Relevant Policies and Legislation

Policy/Legislation	Description	Project Relevance
Provincial Policy Statement (OMMAH 2020)	<ul style="list-style-type: none"> • Issued under the authority of Section 3 of the Planning Act and came into effect on May 1, 2020, replacing the 2014 PPS (OMMAH 2014). • One of the key goals of the PPS is to “[provide] for appropriate development while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment.” • Section 2.1 of the PPS – Natural Heritage establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as ‘significant’. This section also identifies that natural features are to be protected for the long term. • Section 2.1.5 of the PPS identifies that development and site alteration shall 	<ul style="list-style-type: none"> • Based on the background review, pre-construction monitoring reports and SAR/SCC screening, several natural features afforded consideration within the PPS have the potential to occur in the study area, including: <ul style="list-style-type: none"> ○ Significant Wildlife Habitats, and ○ Habitat for endangered and threatened species.

Policy/Legislation	Description	Project Relevance
	<p>not be permitted within the area outlined in sub-sections a) – f) “<i>unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.</i>”</p> <ul style="list-style-type: none"> The Natural Heritage Reference Manual (OMNR 2010) and the Significant Wildlife Habitat Technical Guide (OMNR 2000) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS. 	
<p>Endangered Species Act (Government of Ontario 2007)</p>	<ul style="list-style-type: none"> The original ESA, written in 1971, underwent a year-long review which resulted in a number of changes which came into force in 2007. The ESA prohibits killing, harming, harassing, or capturing Endangered or Threatened and protects their habitats from damage and destruction. 	<ul style="list-style-type: none"> Based on information available through background documents and field surveys, including the SAR/SCC screening, several SAR were identified as potentially having suitable habitat within the subject property: <ul style="list-style-type: none"> Butternut (<i>Juglans cinerea</i>); Little Brown Myotis (<i>Myotis lucifungus</i>); Northern Myotis (<i>Myotis septentrionalis</i>); and Monarch (<i>Danaus plexippus</i>)
<p>Migratory Birds Convention Act (Canadian Wildlife Service (CWS) 2017)</p>	<ul style="list-style-type: none"> The MBCA protects migratory game birds, insectivorous birds, and several other migratory non-game birds from persecution in the form of harassment. The schedule of on-site work must consider MBCA windows, with timing of breeding bird season typically occurring between April 1 and August 31, however, this is a guideline, since the MBCA applies to nesting bird species. “Incidental take” is considered illegal, with the exception of a permit obtained by the Canadian Wildlife Service (CWS). 	<ul style="list-style-type: none"> The timing of construction activities, especially vegetation clearing and site grading must have consideration for the MBCA timing windows.
<p>Fish and Wildlife Conservation Act (Government of Ontario 2019)</p>	<ul style="list-style-type: none"> The FWCA provides protection for certain bird species, not protected under the MBCA (e.g., raptors), as well as furbearing mammals and their dens or habitual dwellings, aside from the Red Fox (<i>Vulpes vulpes</i>) and Striped Skunk (<i>Mephitis mephitis</i>). 	<ul style="list-style-type: none"> The timing of construction activities, especially vegetation clearing and site grading must have consideration for bird nesting and den sites for furbearing mammals.
<p>The Canadian Fisheries Act (Government of Canada 1985)</p>	<ul style="list-style-type: none"> Last amended in August 2019, the federal <i>Fisheries Act</i> provides for the protection of fish and fish habitat Fish are protected through two core prohibitions: Section 34.4(1) prohibits 	<ul style="list-style-type: none"> A watercourse is present within the study area, situated in an agricultural field east of the subject property. The need for project review by the Department of Fisheries and Oceans

Policy/Legislation	Description	Project Relevance
	<p>the death of fish by means other than fishing, and Section 35(1) prohibits the harmful alteration, disruption, or destruction (HADD) of fish habitat (Government of Canada 2019).</p> <ul style="list-style-type: none"> • Fish habitat is defined as “spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes”. 	<p>(DFO) Fish and Fish Habitat Protection Program (FFHPP) will be determined upon the completion of a proponent-led assessment of whether the proposed undertaking can meet all measures to protect fish and fish habitat (as outlined in the DFO’s online Projects Near Water guidelines).</p> <ul style="list-style-type: none"> • Should the proponent-led assessment indicate that impacts to fish and fish habitat may occur as a result of the proposed development, project review by the DFO will be necessary to determine if the proposed undertaking has the potential to contravene the Fisheries Act, and if an Authorization under the Act will be required. • No Species at Risk fish or fish habitat has been identified within the subject property.
<p>UTRCA Ontario Regulation 157/06 (Government of Ontario 2013)</p>	<ul style="list-style-type: none"> • Regulation issued under <i>Conservation Authorities Act</i>, R.S.O. 1990. • Through this regulation, the Upper Thames River Conservation Authority (UTRCA) has the responsibility to regulate activities in natural and hazardous areas (i.e. areas in and near rivers, streams, floodplains, wetlands, and slopes). Section 2(1) outlines the regulated natural features within which development is prohibited • The Environmental Planning Policy Manual (UTRCA 2017) outlines policies designed to protect natural heritage features and systems from the potentially negative impacts of development and site alteration. 	<ul style="list-style-type: none"> • The subject property is not regulated by the UTRCA. • A watercourse has been identified to occur within the study area, situated in an agricultural field east of the subject property. The feature is regulated by the UTRCA.
<p>London Plan (City of London 2021)</p>	<ul style="list-style-type: none"> • The London Plan was adopted by Council and the Province in 2016 and last consolidated in May, 2021. • This official plan outlines current policies for the protection of natural features within the City of London which represent a constraint for development. • The <i>Environmental Policies</i> section of the London Plan denotes components of the Natural Heritage System. Natural heritage features and areas such as fish habitat and habitat of endangered species and threatened species are included as part of the Green Space Place Type. 	<ul style="list-style-type: none"> • Map 1 – <i>Place Types</i> indicates that the subject property is located within a Shopping Area Place Type. • Map 5 – <i>Natural Heritage</i> indicates that the subject property does not contain any Natural Heritage System features. A watercourse is present in the study area, within an agricultural field east of Wonderland Road. • Map 6 – <i>Hazards and Natural Resources</i> indicates that the subject property is located on a Highly Vulnerable Aquifer and Significant Groundwater Recharge Area. • Site alteration is not permitted in Habitats of Endangered and Threatened species, which must be

Policy/Legislation	Description	Project Relevance
	<ul style="list-style-type: none"> Features such as unevaluated wetlands, unevaluated vegetation patches, valleylands, and potential environmentally significant areas are included in the Environmental Review Place Type. 	<p>identified in the EIS. The subject property may provide suitable habitat for Endangered or Threatened species.</p>
<p>City of London Tree Preservation By-law C.P.-1555-252 (City of London 2016)</p>	<ul style="list-style-type: none"> Regulates harm or destruction of trees within the Urban Growth Boundary. Outlines Tree Protection Areas. Amended by C.P.—1555(b) – 29 on December 21, 2021. Trees described as Distinctive or located within a Tree Protection Area are protected by this by-law. 	<ul style="list-style-type: none"> The subject property occurs within the Urban Growth Boundary. A tree inventory and Tree Preservation Plan must be completed to identify ownership of trees growing along property lines, identify Tree Protection Areas, evaluate significance of vegetation features, and inform tree retention and protection for the development.

Collection and Review of Background Information

NRSI has already completed the majority of this stage to inform this TOR. Existing background information has been collected for the 10x10km grid overlapping the subject property, as described above. Existing studies with natural environment components have been reviewed and are listed below. Background sources reviewed include the following:

- The London Plan (City of London 2021)
- Middlesex County Natural Heritage Study (Upper Thames River Conservation Authority (UTRCA) 2014)
- Natural Heritage Information Centre (NHIC) (Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF) 2022);
- Natural Heritage Reference Manual (MNRF 2010);
- Significant Wildlife Habitat Technical Guide (OMNR 2000);
- Significant Wildlife Habitat Criteria Schedules For Ecoregion 7E (OMNR 2015)
- Significant Wildlife Habitat Support Tool (MNRF 2014b);
- Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF) Aylmer District;
- Ministry of Environment, Conservation and Parks (MECP) Species at Risk;
- Government of Canada Species at Risk Act (SARA) Registry;
- Department of Fisheries and Oceans Aquatic Species at Risk mapping (DFO 2021)
- Ontario Breeding Bird Atlas (OBBA, Bird Studies Canada (BSC) et al. 2006);
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2019);
- Mammal Atlas of Ontario (Dobbyn 1994);
- Ontario Butterfly Atlas Online (Macnaughton et al. 2020); and
- Ontario Odonata Atlas Database (OOAD 2021).

Initial wildlife species lists for the study area were developed using these background sources. Based on available background information, a screening exercise was completed for potential Species at Risk (SAR), and Species of Conservation Concern (SCC) as well as potential Significant Wildlife Habitat (SWH) within the subject property and study area (see enclosed). The SAR and SCC screening exercise identified a preliminary list of species that may have suitable habitat within the subject property. These species, as well as the proposed surveys to properly assess their presence, is provided below.

- Northern Myotis (*Myotis septentrionalis*) – Bat habitat assessment;
- Eastern Small-footed Myotis (*Myotis leibii*) – Bat habitat assessment;
- Monarch (*Danaus plexippus*) – Vegetation surveys and wildlife observations; and
- Butternut (*Juglans cinerea*) – Tree inventory.

The SWH screening exercise identified a preliminary list of candidate SWH (OMNR 2000; MNRF 2015) that may be present on the subject property and in the study area, and which will be assessed through the proposed field program. A list of potential habitats within the study area, as well as the proposed surveys to properly assess their presence, is provided below.

- Waterfowl Stopover and Staging Area (Terrestrial) – Terrestrial habitat assessment and documentation;
- Reptile Hibernaculum – Terrestrial habitat assessments and documentation;
- Rare Vegetation Communities – Vegetation surveys;
- Terrestrial Crayfish Habitat - Terrestrial habitat assessments and documentation; and
- Special Concern and Rare Wildlife Species – Detailed by species listed above.

2. Natural Resource Characterization

This phase includes all field surveys, as well as a preliminary analysis of field survey data to inform the development plan, including setbacks, buffers, and natural heritage constraints.

Terrestrial Field Surveys

Vegetation Community Description and Mapping

Vegetation communities within the study area will be mapped and classified following the Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998). Details on the vegetation communities will be recorded, including species composition, dominance, uncommon species or features, surficial soil types, and evidence of human impact.

Spring Vegetation Inventory

A spring vegetation inventory will be conducted in tandem with ELC surveys to record all species of vascular flora within the subject property. The subject property will be systematically searched for plant species and any rare species will be documented and georeferenced, as access allows. Vascular flora species will be recorded by ELC polygon. Any SAR identified during the vegetation inventory will be recorded, and the location identified and mapped using handheld GPS unit.

Terrestrial Habitat Assessments and Documentation of Other Wildlife

NRSI biologists will assess wildlife habitats within the subject properties during all site visits. Any features that may be indicative of SWH or habitat for SAR will be documented in detail, photographed, and georeferenced. Observations of lepidoptera, odonata, herpetofauna, bumblebees, mammals, and all other wildlife will be recorded while on-site. In addition to direct observations, any evidence such as dens, tracks, and scat will also be documented.

Tree Inventory

NRSI arborists will complete an inventory of all trees ≥ 10 cm diameter at breast height (DBH) on the subject property and adjacent areas with the potential to be impacted by the proposed development, in accordance with the London Plan. Inventoried trees will be tagged and assessed by a Certified Arborist and/or Registered Professional Forester. Each tree within the subject property will be tagged with a pre-numbered aluminum forestry tag or given a unique map identifier, and the following information will be recorded for each individual assessed tree;

- Unique alpha-numeric identifier;
- Species;
- DBH (cm);
- Crown radius (metres);
- General health (excellent, good, fair, poor, very poor);
- Potential for structural failure (improbable, possible, probable, imminent);
- Location;
- Evidence of candidate bat habitat (e.g., exfoliating bark, cavities, leaf clusters);
- General comments (i.e., disease, aesthetic quality, development constraints, sensitivity to development);
- Management recommendations where appropriate (i.e., prune, relocate, remove, retain, etc.); and
- Rationale for any proposed action.

During the assessment of each individual tree, NRSI staff will record the location of the tree using a GPS unit capable of sub-meter mapping grade accuracy. A preliminary map of existing conditions will be developed to inform the proposed plans. The tree inventory will identify boundary and off-site trees and potential for their protection. This data will be used to inform maximum tree retention in the final site plan through iterative correspondence with the project team.

Bat Habitat Assessment

An inspection of trees within the subject property will be completed to determine the likelihood of suitable roosting habitat for bats. Cavity tree assessments and searching for leaf roosts will follow guidelines provided by the NDMNRF in the April 2017 document Survey Protocol for Species at Risk Bats in Treed Habitats (MNR 2017). The bat habitat assessments will be focused in areas of potential tree removals, to be determined in consultation with the project team. Based on the preliminary plans for the subject property, the bat cavity tree assessments will require extensive surveys to identify all suitable habitats within the trees on-site.

Natural Feature, Mitigation and Constraints Assessment

The results of the field surveys will be combined with the background information to provide a detailed summary of the existing natural features that occur within the subject property and study area. In addition to natural features, the report will identify existing and historic land uses on the property and known modifications to these features.

Buffers to any identified natural features or habitats on the property (e.g., hydrologic features) will be recommended and mapped as environmental constraints. All other aspects of natural feature significance or sensitivity identified through the field surveys will be incorporated into this assessment, and provided to the client to inform their plans.

3. Environmental Impact Study and Tree Protection Plan Reporting

Environmental Impact Study Report

Natural Feature Constraints Assessment

The natural feature assessment detailed above will form the existing conditions of the EIS, including survey results, delineated vegetation communities, and final SAR, SCC and SWH screenings. NRSI will use the reports prepared by the project team to summarize the assessments of surface water systems and hydrogeologic areas (including surface and groundwater conditions), geomorphic features, and natural hazards such as floodplains and erosion.

Impact Assessment, Mitigations, and Other Recommendations

An impact and net effects assessment will be completed based on the proposed site plan, in accordance with the London Plan (2021). This analysis will consider existing (e.g. previous or existing land uses), potential direct (e.g., habitat removal), and potential indirect (e.g., construction-related, hydrological) impacts on the existing natural features. Induced impacts that extend into the broader landscape fabric will also be considered. The impact analysis will be prepared based on details of the proposed development, where available. NRSI staff will incorporate and summarize the results of other relevant technical studies and plans to be completed by project team members.

The report will identify natural features proposed to be protected and those proposed to be removed. Recommendations will be provided to avoid, or otherwise minimize or mitigate adverse impacts to natural features associated with the proposed development. Where applicable, recommendations may be provided for construction- or post-construction monitoring, as well as ecological restoration, enhancement, or management.

Tree Preservation Plan (TPP)

Inventoried trees will be mapped and the location of each tree will be compared to the proposed site plan and grading plan to determine which trees can be retained, removed, or where feasible, relocated.

A Tree Preservation Plan will be developed in tandem with the final plans for this stage, with an effort to retain a maximum number of trees throughout the development. The plan will identify individual trees to be retained, removed or relocated, including their dripline, location and type of tree protection fencing, and location of information signs along the tree protection fencing. The plan will incorporate consideration of boundaries trees and compensation for any removed trees.

A Tree Protection Plan report will be prepared providing a summary of tree inventory results and recommendations for tree management, mitigation and compensation, if required.

Should you have any questions or comments regarding this letter, please do not hesitate to contact me.

Sincerely,
Natural Resource Solutions Inc.

A handwritten signature in black ink, appearing to read "Jeremy Bannon". The signature is fluid and cursive, with the first name "Jeremy" being more prominent than the last name "Bannon".

Jeremy Bannon, B.E.S.
Project Lead / Certified Arborist

Encl.

Map 1: Study Area and Natural Features
SAR and SCC Screening Tables
SWH Screening Tables

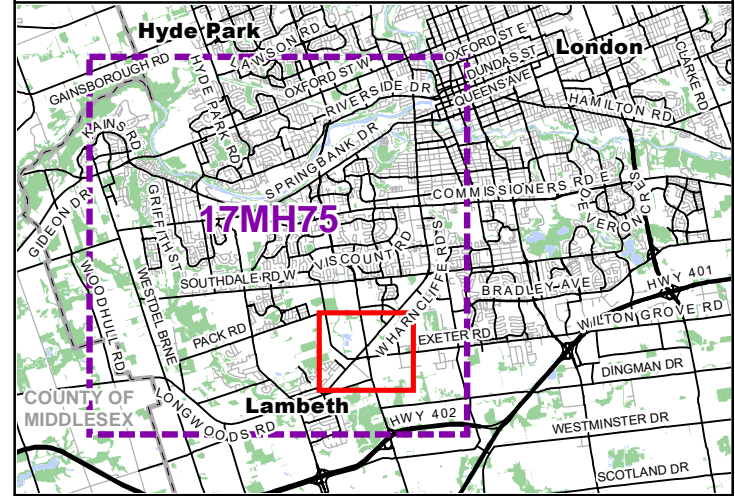
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38 Exeter Road

Study Area and Natural Features



- Legend**
- Study Area (200m)
 - Subject Property
 - Utility Line
 - Primary Road
 - Secondary Road
 - Permanent Watercourse
 - Intermittent Watercourse
 - Wooded Area
 - Natural Heritage Information Centre (NHIC) 1x1km
 - Ontario Breeding Bird Atlas (OBBA) 10x10km*
 - Aquatic Resource Area (ARA)**
 - ARA Survey Point
 - ARA Watercourse Segment

*Entire map extent encompassed by OBBA square 17MH75



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Project: 2803 Date: March 15, 2022	NAD83 - UTM Zone 17 Size: 11x17" 1:8,000
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0 100 200 300 400 500 Metres



Species at Risk and Species of Conservation Concern Screening Table

Scientific Name	Common Name	S-RANK ¹	SARO ¹	COSEWIC ²	SARA ²	SARA Schedule ²	Habitat Requirements	Suitable Habitats within Subject Property	Carried Forward to EIS?	Rationale
<i>Chaetura pelagica</i>	Chimney Swift	S3B	THR	T	T	Schedule 1	Commonly found in urban areas near buildings; nests in chimneys, hollow trees, and crevices of rock cliffs. Feeds over open water. ^{3,4}	No	No	Suitable chimneys, rock cliffs, and open water features are not present in the subject property or study area.
<i>Chordeiles minor</i>	Common Nighthawk	S4B	SC	SC	T	Schedule 1	Open ground; clearings in dense forests (including burns and logged areas); rock barrens; peat bogs; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs. ^{3,4}	No	Yes	Open, ploughed agricultural fields in the study area may provide suitable habitat for this species.
<i>Dolichonyx oryzivorus</i>	Bobolink	S4B	THR	T	T	Schedule 1	Large (>10 ha), open expansive grasslands, pastures, hayfields, meadows or fallow fields with dense ground cover. Occasionally nest in large (>50 ha) fields of winter wheat and rye in southwestern Ontario. ^{3,4}	No	Yes	The subject property does not contain the grasslands and fields required to support this species. The agricultural fields to the south and east of the subject property may provide ground cover of sufficient size for this species.
<i>Hirundo rustica</i>	Barn Swallow	S4B	THR	SC	T	Schedule 1	Farmlands, rural areas and other open or semi-open areas near body of water. Nests almost exclusively on human-made structures such as open barns, buildings, bridges and culverts. ^{3,4}	No	Yes	The subject property does not contain open landscapes or anthropogenic structures preferred by this species. Farmlands and buildings within the study area may provide suitable habitat for this species.
<i>Sturnella magna</i>	Eastern Meadowlark	S4B, S3N	THR	T	T	Schedule 1	Open pastures, hayfields, grasslands or grassy meadows with elevated singing perches (small trees, shrubs or fence posts). Also weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields or other open areas. Generally prefers larger tracts of habitat >10 ha, but will sometimes use smaller tracts. ^{3,4}	No	Yes	The subject property does not contain the large open fields required to support this species. The large agricultural features and roadside features in the study area may provide suitable habitat.
<i>Myotis leibii</i>	Eastern Small-footed Myotis	S2S3	END				Roosts in caves, mine shafts, crevices or buildings that are in or near woodland. Hibernates in cold dry caves or mines. Maternity colonies in caves or buildings. Hunts in forests. ^{3,4}	Yes	Yes	The forested feature within the subject property may contain suitable roosting and hunting habitat for this species.
<i>Myotis septentrionalis</i>	Northern Myotis	S3	END	E	E	Schedule 1	Roosts in houses and man-made structures but prefers hollow trees or under loose bark. Hibernates in mines or caves. Hunts within forest, below the canopy. ^{3,4}	Yes	Yes	The forested feature within the subject property may provide hunting habitat and/or contain trees with suitable features for roosting.
<i>Taxidea taxus jacksoni</i>	American Badger (Southwestern Ontario population)	S2	END	E	E	Schedule 1	Open grasslands, oak savannahs, sand barrens and farmland. ^{3,4}	No	Yes	The farmlands within the study area may provide suitable habitat for this species.
<i>Danaus plexippus</i>	Monarch	S2N, S4B	SC	END	SC	Schedule 1	Adults found in a diversity of habitats with a variety of wildflowers. Caterpillars are confined to meadows and open areas where milkweeds grow (larval food plants). ³	Yes	Yes	The natural features on the subject property may provide suitable habitat for the larval food plants of this species.
<i>Juglans cinerea</i>	Butternut	S2?	END	E	E	Schedule 1	Stream banks and swamps, as well as upland beech-maple, oak-hickory, and mixed hardwood stands. ²³	Yes	Yes	The forested feature within the subject property may provide suitable upland habitat to support this species.

Significant Wildlife Habitat Assessment Tables

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Terrestrial)					
<u>Rationale:</u> Habitat important to migrating waterfowl	American Black Duck Northern Pintail Gadwall Blue-winged Teal Green-winged Teal American Wigeon Northern Shoveler Tundra Swan	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites. - Fields with seasonal flooding and waste grain in the Long Point, Rondeau, Lake. St. Clair, Grand Bend and Pt. Pelee areas may be important to Tundra Swans.	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} <u>Information Sources</u> • 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 (CAs) • 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 ^j or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependant on local site conditions and adjacent land use is the significant wildlife habitat ^{cxlviii} . • 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). • SWHMIST ^{cxlix} Index #7 provides development effects and mitigation measures.	The agricultural fields in the study area may flood with sheet water in the spring. Site visits completed in the spring of 2022 will confirm the presence of flooded fields. Candidate SWH. Not present in the subject property.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Aquatic)					
<p><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</p>	<p>Canada Goose Cackling Goose Snow Goose Green-winged Teal American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Blue-winged Teal Hooded Merganser Common Merganser Red-breasted Merganser Lesser Scaup Greater Scaup Common Goldeneye Bufflehead Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Canvasback Redhead Ruddy Duck Brant White-winged Scoter Black Scoter</p>	<p>MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7</p>	<p>• 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).</p> <p><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</p>	<p>Studies carried out and verified presence of: • Aggregations of 100¹ or more of listed species for 7 days¹, 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). • SWHMIST^{cxlix} Index #7 provides development effects and mitigation measures.</p>	<p>The study area does not contain water bodies or suitable watercourses with abundant food supply.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Shorebird Migratory Stopover Area					
<p><u>Rationale:</u> High quality shorebird stopover habitat is extremely rare and typically has a long history of use</p>	<p>Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin</p>	<p>BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5</p>	<p>Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats.</p> <p>Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 Center (NHIC) Shorebird Migratory Concentration Area 	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of 3 or more of listed species and > 1000¹ 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 >100¹ 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^{cxviii} • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi} • SWHMIST^{cdix} Index #8 provides development effects and mitigation measures. 	<p>The study area does not contain aquatic features with shoreline habitat to support migratory shorebirds.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹		Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹		Defining Criteria ¹	Assessment Details
Wildlife Habitat: Raptor Wintering Area						
<p><u>Rationale:</u> Sites used by multiple species, a high number of individuals and used annually are most significant</p>	<p>Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl</p> <p><u>Special Concern:</u> Short-eared Owl Bald Eagle</p>	<p><u>Hawks/Owls:</u> Combination of ELC Community Series; need to have present one Community Series from each land class.</p> <p>Forest: FOD, FOM, FOC</p> <p>Upland: CUM, CUT, CUS, CUW</p> <p><u>Bald Eagle:</u> Forest Community Series: FOD, FOM, FOC, SWD, SWM, or SWC, on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).</p>	<p>The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors.</p> <p>Raptor wintering (hawk/owl) sites need to be > 20ha^{cxlviii, cxlix} with a combination of forest and upland^{xxvi, xvii, xviii, xix, xx, xxi}.</p> <p>Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands^{cxlix}</p> <p>Field area of the habitat is to be wind swept with limited snow depth or accumulation.</p> <p>Eagle sites have open water and large trees and snags available for roosting^{cxlix}</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • OMNRF Districts • Natural clubs • Natural Heritage Information Centre (NHIC) Raptor Winter Concentration Area • Data from Bird Studies Canada • Reports and other information available from CAs • Results of Christmas Bird Counts 	<p>Studies confirm the use of these habitats by:</p> <ul style="list-style-type: none"> • One or more Short-eared Owls, or, One of more Bald Eagles or; at least 10 individuals and two listed hawk/owl species • To be significant a site must be used regularly (3 in 5 years)^{cxlix} for a minimum of 20 days by the above number of birds^l. • 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} • SWHMIST^{cxlix} Index #10 and #11 provides development effects and mitigation measures. 	<p>The subject property and study area do not contain woodland and upland communities >15ha to support raptor wintering.</p> <p>Not present.</p>	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Bat Hibernacula					
<p><u>Rationale:</u> Bat hibernacula, are rare habitats in all Ontario landscapes.</p>	<p>Big Brown Bat Eastern Pipistrelle/Tri-colored Bat</p>	<p>Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)</p>	<p>Hibernacula may be found in caves, mine shafts, underground foundations and Karsts.</p> <p>Active mine sites should not be considered</p> <p>The locations of bat hibernacula are relatively poorly known.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • All sites with confirmed hibernating bats are SWH¹. • The area includes 200m radius around the entrance of the hibernaculum^{cxlviii, ccvii, i} for the 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^{ccv} "Bats and Bat Habitats: Guidelines for Wind Power Projects"^{ccv} • SWHMIST^{cxlix} Index #1 provides development effects and mitigation measures. 	<p>The study area does not contain caves, mine shafts, underground foundations, or karsts that would support bat hibernacula.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Bat Maternity Colonies					
<p><u>Rationale:</u> Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.</p>	<p>Big Brown Bat Silver-haired Bat</p>	<p>Maternity colonies considered SWH are found in forested Ecosites.</p> <p>All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM</p>	<p>Maternity colonies can be found in tree cavities, vegetation and often in building ^{sxxii, xxv, xxvi, xxvii, xxxi} (buildings are not considered to be SWH).</p> <ul style="list-style-type: none"> • Maternity roosts are not found in caves and mines in Ontario^{xxii}. • Maternity colonies located in Mature deciduous or mixed forest stands^{ccix, cck} 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}. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • OMNRF for possible locations and contact for local experts • University Biology Departments with bat experts 	<p>Maternity Colonies with confirmed use by:</p> <ul style="list-style-type: none"> • >10 Big Brown Batsⁱ • >5 Adult Female Silver-haired Batsⁱ • The area of the habitat includes the entire woodland or the forest stand ELC Ecosite containing the maternity coloniesⁱ. • 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. 	<p>The treed features in the study area are not mature enough to support bat maternity colonies.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹		Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹		Defining Criteria ¹	Assessment Details
Wildlife Habitat: Turtle Wintering Area						
<p>Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.</p>	<p>Midland Painted Turtle</p> <p><u>Special Concern:</u> Northern Map Turtle Snapping Turtle</p>	<p>Snapping and Midland Painted Turtles: ELC Community Classes: SW, MA, OA and SA ELC Community Series: FEO and BOO</p> <p>Northern Map Turtle: Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.</p>	<ul style="list-style-type: none"> For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen^{cxix, cx, cxi, cxviii}. Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH <p><u>Information Sources</u></p> <ul style="list-style-type: none"> EIS studies carried out by Conservation Authorities Field naturalists clubs OMNRF Ecologist or Biologist Natural Heritage Information Centre (NHIC) 	<ul style="list-style-type: none"> Presence of 5 over-wintering Midland Painted Turtles is significantⁱ. One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significantⁱ. 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. – Apr)^{cvi}. Congregation of turtles is more common where wintering areas are limited and therefore significant^{cxix, cx, cxi, cxii}. SWHMIST^{cxlix} Index #28 provides development effects and mitigation measures for turtle wintering habitat. 	<p>The study area does not contain natural, permanent bodies with suitable depth and substrates for turtle wintering.</p> <p>Not present.</p>	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Reptile Hibernaculum					
<p><u>Rationale:</u> Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant</p>	<p><u>Snakes:</u> Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake</p> <p><u>Special Concern:</u> Milksnake Eastern Ribbonsnake</p>	<p>For all snakes, habitat may be found in any ecosite in southern Ontario other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats.</p> <p>Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator. The existence of rock piles or slopes, stone fences, and crumbling foundations assist in identifying candidate SWH.</p>	<p>For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line^{xiv, i, ii, iii, cxii}. 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.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 CAs • Local naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • Natural Heritage Information Centre (NHIC) 	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of snake hibernacula used by a minimum of five individuals of a snake sp., or, individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp., or, individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct)ⁱ. • Note: If there are Special Concern Species present, then site is SWH • Note: 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 feature in which the hibernacula is located plus a 30m buffer is the SWHⁱ. • SWHMIST^{cxix} Index #13 provides development effects and mitigation measures for snake hibernacula. 	<p>The subject property and study area may provide suitable subterranean hibernaculum sites.</p> <p>Candidate SWH.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹		Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹		Defining Criteria ¹	Assessment Details
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)						
<p><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.</p>	<p>Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)</p>	<p>Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns</p> <p>Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1</p>	<ul style="list-style-type: none"> Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Reports and other information available from CAs Ontario Breeding Bird Atlas^{ccv}. Bird Studies Canada: Nature Counts http://www.birdscanada.org/birdmon/ Field Naturalist clubs 	<p>Studies confirming:</p> <ul style="list-style-type: none"> Presence of 1 or more nesting sites with 8^{cxlvix} or 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^{ccvii}. 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. 	<p>The study area does not contain exposed soil banks, suitable structures, or the steep topography required to support these species.</p> <p>Not present.</p>	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)					
<p><u>Rationale:</u> Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.</p>	<p>Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron</p>	<p>SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1</p>	<p>• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 CAs • MNRF District Offices • Field naturalist clubs 	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of 2 or more active nests of Great Blue Heron or other list species. • The habitat extends from the 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 colonies must 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^{cdix} Index #5 provides development effects and mitigation measures. 	<p>The study area does not contain water bodies, islands, or peninsulas required to support colonially-nesting bird breeding habitat.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Coloniality - Nesting Bird Breeding Habitat (Ground)					
<p><u>Rationale:</u> Colonies are important to local bird population, typically sites are only known colony in area and are used annually.</p>	<p>Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird</p>	<p>Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map).</p> <p>Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird)</p> <p>MAM1 – 6 MAS1 – 3 CUM CUT CUS</p>	<ul style="list-style-type: none"> Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy 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. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Ontario Breeding Bird Atlas^{ccv}, rare/colonial species records. Canadian Wildlife Service Reports and other information available from CAs Natural Heritage Information Centre (NHIC) Colonial Waterbird Nesting Area MNRF District Offices Field naturalist clubs 	<p>Studies confirming:</p> <ul style="list-style-type: none"> Presence of >25 active nests for Herring Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern^l. Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant^l. Presence of 5 or more pairs for Brewer's Blackbird^l. The edge of the colony and a minimum 150m radius area of the habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH^{cc, ccvii}. 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^{ccxix} Index #6 provides development effects and mitigation measures. 	<p>The study area does not contain rocky islands, peninsulas, or water bodies required to support coloniality-nesting bird breeding habitat.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Migratory Butterfly Stopover Areas					
<p><u>Rationale:</u> Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter</p>	<p>Painted Lady Red Admiral</p> <p><u>Special Concern:</u> Monarch</p>	<p>Combination of ELC Community Series; need to have present one Community Series from each landclass:</p> <p>Field: CUM CUT CUS</p> <p>Forest: FOC FOD FOM CUP</p> <p>Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.</p>	<p>A butterfly stopover area will be a minimum of 10ha in size with a combination of field and forest habitat present, and will be located within 5km of Lake Ontario and Erie^{cxlix}.</p> <ul style="list-style-type: none"> 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}. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> MNR District Offices Natural Heritage Information Centre (NHIC) Agriculture Canada in Ottawa may have list of butterfly experts. Field Naturalist Clubs Toronto Entomologists Association Conservation Authorities 	<p>Studies confirm:</p> <ul style="list-style-type: none"> 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}. 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 White Admiral's is to be considered significant^l. SWHMIST^{cxlix} Index #16 provides development effects and mitigation measures. 	<p>The study area is not located within 5km of Lake Ontario or Lake Erie.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Landbird Migratory Stopover Areas					
<p><u>Rationale:</u> Sites with a high diversity of species as well as high numbers are most significant</p>	<p>All migratory songbirds</p> <p>Canadian Wildlife Service Ontario website: http://www.on.ec.gc.ca/wildlife_e.html</p> <p>All migrant raptors species</p> <p>Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)</p>	<p>All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD</p>	<p>Woodlots need to be >5 ha¹ in size and within 5km^{iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv} of Lake Ontario and Erie. If woodlands are rare in an area of shoreline, woodland fragments 2-5ha can be considered for this habitat</p> <ul style="list-style-type: none"> • If multiple woodlands are located along the shoreline those Woodlands <2km from Lake Erie or 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 and Lake Erie are Candidate SWH^{cxlviii}. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Ontario Important Bird Areas (IBA) Program 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Use of the habitat by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates¹. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (March/May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{cccxi}. • SWHMIST^{cxlix} Index #9 provides development effects and mitigation measures. 	<p>The treed features in the study area are not within 5km of Lake Ontario or Lake Erie.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Deer Winter Congregation Areas					
<p><u>Rationale:</u> Deer movement during winter in the southern areas of Ecoregion 7E 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}</p>	White-tailed Deer	<p>All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD</p> <p>Conifer plantations (CUP) smaller than 50 ha may also be used.</p>	<ul style="list-style-type: none"> Woodlots >100 ha in size or if large woodlots are rare in a planning area woodlots>50ha¹. Deer movement during winter in Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands^{cxlviii}. 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^{ccxxiv}. Woodlots with high densities of deer due to artificial feeding are not significant¹. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> MNRF District Offices LIO/NRVIS 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by 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 MNRF¹. 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}. SWHMIST^{cxlix} Index #2 provides development effects and mitigation measures. 	<p>The treed features within the study area are not >50ha in area.</p> <p>Not present.</p>

Significant Wildlife Habitat Assessment Tables

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Cliff and Talus Slopes					
<p><u>Rationale:</u> Cliffs and Talus Slopes are extremely rare habitats in Ontario.</p>	<p>Any ELC Ecosite within Community Series:</p> <p>TAO CLO TAS CLS TAT CLT</p>	<p>A Cliff is vertical to near vertical bedrock >3m in height.</p> <p>A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.</p>	<p>Most cliff and talus slopes occur along the Niagara Escarpment.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Confirm any ELC Vegetation Type for Cliffs or Talus Slopes^{lxxviii} • SWHMIST^{cxlix} Index #21 provides development effects and mitigation measures. 	<p>The study area does not contain cliffs or talus slopes.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Sand Barrens					
<p><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.</p>	<p>ELC Ecosites: SBO1 SBS1 SBT1</p> <p>Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always ≤ 60%.</p>	<p>Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. 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%.</p>	<p>A sand barren area >0.5ha in size</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website • Field naturalist clubs • Conservation Authorities 	<ul style="list-style-type: none"> • Confirm any ELC Vegetation Type for Sand Barrens^{lxviii} • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotics sp)^l. • SWHMIST^{cxlix} Index #20 provides development effects and mitigation measures. 	<p>The study area does not contain sand barrens.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Alvar					
<p><u>Rationale:</u> Alvars are extremely rare habitats in Ecoregion 7E</p>	<p>ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2</p> <p>Five Alvar Indicator Species: 1) Carex crawei 2) Panicum philadelphicum 3) Eleocharis compressa 4) Scutellaria parvula 5) Trichostema brachiatum</p> <p>These indicator species are very specific to Alvars within Ecoregion 7E^{cxlix}</p>	<p>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^{bcxviii}.</p>	<p>An Alvar site > 0.5ha in size^{bcxv}. Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie^{cxclx}.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Alvars of Ontario (2000), Federation of Ontario Naturalists^{bcxvi}. • Ontario Nature – Conserving Great Lakes Alvars^{bcxvii}. • Natural Heritage Information Centre (NHIC) has location information available on their website • OMNRF Staff • Field Naturalist clubs • Conservation Authorities 	<p>Field studies identify four of the five Alvar indicator species^{bcxv} at a candidate Alvar site is Significant</p> <ul style="list-style-type: none"> • 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^{bcxv}. • SWHMIST^{cxclix} Index #17 provides development effects and mitigation measures. 	<p>The study area does not contain alvars.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Old Growth Forest					
<p><u>Rationale:</u> Due to historic logging practices and land clearance for agriculture, old growth forest is rare in Ecoregion 7E.</p>	<p>Forest Community Series: FOD FOC FOM SWD SWC SWM</p>	<p>Old growth forests are characterized by heavy mortality or turnover of overstorey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.</p>	<p>Woodland area is >0.5ha</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 	<p>Field Studies will determine:</p> <ul style="list-style-type: none"> • If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat^{cxviii}. • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities ^{cxviii} (cut stumps will not be present) • Determine ELC Vegetation Type for forest area containing the old growth characteristics^{boxviii}. • SWHMIST^{cxlix} Index #23 provides development effects and mitigation measures. 	<p>The study area does not contain old growth forest.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Savannah					
<p><u>Rationale:</u> Savannahs are extremely rare habitats in Ontario.</p>	<p>TPS1 TPS2 TPW1 TPW2 CUS2</p>	<p>A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%.</p> <p>In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario)^{cc}.</p>	<p>No minimum size to siteⁱ Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location data available on their website • Field naturalists clubs • Conservation Authorities 	<p>Field studies confirm one or more of the Savannah indicator species listed in^{xxxv} Appendix N should be presentⁱ. Note: Savannah plant spp. list from Ecoregion 7E should be used.</p> <ul style="list-style-type: none"> • Area of the ELC Vegetation type is the SWH^{xxxviii}. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMIST^{cxlix} Index #18 provides development effects and mitigation measures. 	<p>The study area does not contain savannah.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Tallgrass Prairie					
<p><u>Rationale:</u> Tallgrass Prairies are extremely rare habitats in Ontario.</p>	TPO1 TPO2	<p>A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover.</p> <p>In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario)^{cc}.</p>	<p>No minimum size to siteⁱ. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Natural Heritage Information Centre (NHIC has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities 	<p>Field studies confirm one or more of the Prairie indicator species listed in^{boxv} Appendix N should be presentⁱ. Note: Prairie plant spp. list from Ecoregion 7E should be used.</p> <ul style="list-style-type: none"> • Area of the ELC Vegetation Type is the SWH^{boxviii}. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMIST^{boxix} Index #19 provides development effects and mitigation measures. 	<p>The study area does not contain tallgrass prairie.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Other Rare Vegetation Communities					
<p><u>Rationale:</u> Plant communities that often contain rare species which depend on the habitat for survival.</p>	<p>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.</p>	<p>Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.</p>	<p>ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M^{cxlviii}.</p> <p>The OMNRF/NHIC will have up to date listing for rare vegetation communities.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Natural Heritage Information Centre (NHIC) has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities 	<p>Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG^{cxlviii}.</p> <ul style="list-style-type: none"> • Area of the ELC Vegetation Type polygon is the SWH. • SWHMIST^{cxlix} Index #37 provides development effects and mitigation measures. 	<p>Vegetation surveys conducted in the subject property will confirm the presence or absence of rare vegetation communities.</p> <p>Candidate SWH.</p>

Significant Wildlife Habitat Assessment Tables

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Waterfowl Nesting Area					
Rationale: Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 Note: includes adjacency to Provincially Significant Wetlands	A waterfowl nesting area extends: 120m ^{cxlix} from a wetland (>0.5ha) or a wetland (>0.5ha) with small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120m of each individual wetland where waterfowl nesting is known to occur ^{cxlix} . • Upland areas should be at least 120m 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 CAs	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards ¹ , or, • Presence of 10 or more nesting pairs for listed species including Mallards ¹ . • 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 120m ^{cxviii} from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMIST ^{cxlix} Index #25 provides development effects and mitigation measures.	The study area does not contain wetlands required for waterfowl nesting. Not present.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Bald Eagle and Osprey Nesting, Foraging and Perching Habitat					
<p><u>Rationale:</u> Nest sites are fairly uncommon in Ecoregion 7E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.</p>	<p>Osprey</p> <p><u>Special Concern:</u> Bald Eagle</p>	<p>ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.</p>	<p>Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.</p> <p>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.</p> <p>Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms).</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Natural Heritage Information Center (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 format and does not include 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 CAs • Field naturalists clubs 	<p>Studies confirm the use of these nests by:</p> <ul style="list-style-type: none"> • One or more active Osprey or Bald Eagle nests in an area^{cxviii}. • 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 300m radius around the nest or the contiguous woodland stand is the SWH^{ccvii}, maintaining undisturbed shorelines with large trees within this area is important^{cxviii}. • For a Bald Eagle the active nest and a 400-800m radius around the nest is the SWH^{ccvi, ccvii}. Area of the habitat from 400-800m is dependant on site lines from the nest to the development and inclusion of perching and foraging habitat^{ccvi}. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for ≥3 years or suspected of not being used for >5 years before being considered not significant^{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. 	<p>The study area does not contain waterbodies with forested shorelines, islands, or other structures.</p> <p>Not present.</p>

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Woodland Raptor Nesting Habitat					
<p><u>Rationale:</u> Nests sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.</p>	<p>Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk</p>	<p>May be found in all forested ELC Ecosites.</p> <p>May also be found in SWC, SWM, SWD and CUP3</p>	<p>All natural or conifer plantation woodland/forest stands combined >30ha or with >4ha of interior habitat^{lxxxviii, lxxxix, xc, xcj, xciii, xciv, xcvi, cxxxii}. Interior habitat determined with a 200m buffer^{cdviii}.</p> <ul style="list-style-type: none"> • 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. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • OMNRF Districts • Check the Ontario Breeding Bird Atlas^{ccv} or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada • Reports and other information available from CAs 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of 1 or more active nests from species list is considered significant^{cxviii}. • Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha of habitat is the SWH^{ccvii}. (the 28ha 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 early 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. 	<p>The study area does not contain forested areas >30ha with >4ha of interior habitat.</p> <p>Not present.</p>

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Turtle Nesting Area					
<p><u>Rationale:</u> These habitats are rare and when identified will often be the only breeding site for local populations of turtles.</p>	<p>Midland Painted Turtle</p> <p><u>Special Concern:</u> Northern Map Turtle Snapping Turtle</p>	<p>Exposed mineral soil (sand or gravel) areas adjacent (<100m)^{cxlviii} or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1</p>	<ul style="list-style-type: none"> • Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other 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. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 Center (NHIC) Field naturalist clubs 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of 5 or more nesting Midland Painted Turtles^l • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH^l • 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^{cxlix}. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observation studies observing the turtles nesting is a recommended method. • SWHMIST^{cxlix} Index #28 provides development effects and mitigation measures for turtle nesting habitat. 	<p>The study area lacks suitable aquatic habitat and includes several road intersections.</p> <p>Not present.</p>

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Seeps and Springs					
Rationale: Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	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, cxlii, cxiv} . <u>Information Sources</u> • Topographical Map • Thermography • Hydrological surveys conducted by CAs and MOE • Field naturalists 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 ^l seeps/springs should be considered SWH. • The area of a ELC forest 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 ^{cxlviii} . • SWHMIST ^{cxlix} Index #30 provides development effects and mitigation measures.	The study area is not located within the headwaters of a stream or river system. Not present.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Amphibian Breeding Habitat (Woodland)					
<p>Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations</p>	<p>Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog</p>	<p>All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD</p> <p>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.</p>	<p>• Presence of a wetland, pond or woodland pool (including vernal pools) >500m² (about 25m diameter) ^{ccvii} within or adjacent (within 120m) to a woodland (no minimum size) ^{cboddi, bxiii, bxv, bxvi, bxvii, bxviii, bxix, bxx}. Some small wetlands may not be mapped and may be important breeding pools for amphibians.</p> <p>• Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat^{cxviii}.</p> <p><u>Information Sources</u></p> <p>• Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records</p> <p>• Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property.</p> <p>• OMNRF Districts and wetland evaluations</p> <p>• Field naturalist clubs</p> <p>• Canadian Wildlife Service Amphibian Road Call Survey</p> <p>• Ontario Vernal Pool Association: http://www.ontariovernalpools.org</p>	<p>Studies confirm:</p> <p>• 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.</p> <p>• 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 woodland/wetlands.</p> <p>• The habitat is the wetland area plus a 230m radius of woodland area ^{bxiii, bxv, bxvi, bxvii, bxviii, bxix, bxx}. 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.</p> <p>• SWHMIST^{cxlix} Index #14 provides development effects and mitigation measures.</p>	<p>The study area does not contain wetlands or waterbodies adjacent to woodlands.</p> <p>Not present.</p>

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Amphibian Breeding Habitat (Wetland)					
Rationale: Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario Landscapes	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	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.	<ul style="list-style-type: none"> Wetlands >500m² (about 25m diameter)^{ccvii} supporting high species diversity are significant: some small or ephemeral habitats may not be identified on MNR mapping and could be important amphibian breeding habitats^{clxxxiv}. Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. Bullfrogs require permanent water bodies with abundant emergent vegetation. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> 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 CAs 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog or toad species and with at least 20 breeding individuals (adults and eggs masses)^{lxxx}. ^{lxxxiii} or 2 or more of the listed frog/toad species with Call Level of 3. or; Wetland with confirmed breeding Bullfrogs are significant^l. The ELC ecosite wetland area and the shoreline are the SWH. A combination of observational study and call count surveys ^{cviii} to determine breeding/larval stages will be required during the spring (May March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/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. 	<p>The study area does not contain wetlands.</p> <p>Not present.</p>

Significant Wildlife Habitat Assessment Tables

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Marsh Bird Breeding Habitat					
<p><u>Rationale:</u> Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.</p>	<p>American Bittern Virginia Rail Sora Common Gallinule American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Green Heron Trumpeter Swan</p> <p><u>Special Concern:</u> Black Tern Yellow Rail</p>	<p>MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1</p> <p>For Green Heron: All SW, MA and CUM1 sites</p>	<ul style="list-style-type: none"> Nesting occurs in wetlands All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present^{cxiv}. For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> OMNRF Districts and wetland evaluations Field naturalist clubs Natural Heritage Information Centre (NHIC) Reports and other information available from CAs Ontario Breeding Bird Atlas^{ccv} 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species¹. Note: any wetland with breeding of 1 or more Trumpeter Swans, Black Terns, Green Heron or Yellow Rail is SWH¹. 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"^{ccxi} SWHMIST^{cxlix} Index #35 provides development effects and mitigation measures 	<p>The study area does not contain wetlands.</p> <p>Not present.</p>

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Open Country Bird Breeding Habitat					
<p><u>Rationale:</u> 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.</p>	<p>Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow</p> <p><u>Special Concern:</u> Short-eared Owl</p>	<p>CUM1 CUM2</p>	<p>Large grassland areas (includes natural and cultural fields and meadows) >30ha^{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)^l.</p> <p>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.</p> <p>The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Agricultural land classification maps Ministry of Agriculture • Local birder clubs • Ontario Breeding Bird Atlas^{ccv} • EIS Reports and other information available from CAs 	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> • Presence of nesting or breeding of 2 or more of the listed species^l. • 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 	<p>The large fields present in the study area are actively used for farming and are not considered suitable habitat for the listed species.</p> <p>Not present.</p>

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Shrub/Early Successional Bird Breeding Habitat					
<p><u>Rationale:</u> 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.</p>	<p>Indicator Spp: Brown Thrasher Clay-coloured Sparrow</p> <p>Common Spp. Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher</p> <p><u>Special Concern:</u> Yellow-breasted Chat Golden-winged Warbler</p>	<p>CUT1 CUT2 CUS1 CUS2 CUW1 CUW2</p> <p>Patches of shrub ecosites can be complexed into a larger habitat such as woodland area for some bird species.</p>	<p>Large natural 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)^l.</p> <p>Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species^{clxxiii}.</p> <p>Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs • Ontario Breeding Bird Atlas^{ccv} • Reports and other information available from CAs 	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species^l. • A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat^l. • 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. 	<p>The study area does not contain successional fields >10ha in size. Fields in the study area are actively used for farming and are not considered suitable habitat for the listed species.</p> <p>Not present.</p>

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Terrestrial Crayfish					
<p><u>Rationale:</u> Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. Cci</p>	<p>Chimney or Digger Crayfish (<i>Fallicambarus fodiens</i>) Devil Crawfish or Meadow Crayfish (<i>Cambarus Diogenes</i>)</p>	<p>MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM CUM1 with inclusions of above meadow marsh ecosites can be used by terrestrial crayfish</p>	<p>Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish.</p> <ul style="list-style-type: none"> • Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998. 	<p>Studies Confirm:</p> <ul style="list-style-type: none"> • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites^{cci}. • Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the large 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^{cci} • SWHMIST^{cdix} Index #36 provides development effects and mitigation measures. 	<p>The agricultural fields in the study area may contain suitable substrates and moisture to support these species.</p> <p>Candidate SWH.</p>

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Special Concern and Rare Wildlife Species					
<p><u>Rationale:</u> These species are quite rare or have experienced significant population declines in Ontario</p>	<p>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).</p>	<p>All plant and animal element occurrences (EO) within a 1 or 10km grid.</p> <p>Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.</p>	<p>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^{lxviii}.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Natural Heritage Information Centre (NHIC) will have the Special Concern and Provincially Rare (S1-S3, SH) species lists and element occurrences for these species. • NHIC Website: "Get Information" http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas^{ccv} • Expert advice should be sought as many of the rare spp. have little information available about their requirements. 	<p>Studies Confirm:</p> <ul style="list-style-type: none"> • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • 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 to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat for foraging habitat. • SWHMIST^{cxlix} Index #37 provides development effects and mitigation measures. 	<p>The subject property and study area may provide suitable habitat for various special concern and rare wildlife species.</p> <p>Candidate SWH.</p>

Significant Wildlife Habitat Assessment Tables

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: 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.	Eastern Newt American Toad Blue-spotted Salamander Spotted Salamander Four-toed Salamander Gray Treefrog Northern Leopard Frog Pickerel Frog 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 ^{cxlviv, cxlvv, cxlvi, cxlvii, cxlviii, cxlix, clxxx, clxxxi} Movement corridors must be considered when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule ¹ . <u>Information Sources</u> • MNRF District Office • Natural Heritage Information Centre NHIC • Reports and other information available from CAs • 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.	The study area does not contain wetlands and thus does not provide suitable amphibian breeding habitat. Not present.

Appendix II Issues Summary Checklist

The following appendix contains documents that are difficult to make screen reader accessible. Please contact Madison Postma at mpostma@nrsl.on.ca for further description or details of these documents at any time.

The document is a check list that was completed by Jeremy Bannon for the City of London and the Upper Thames River Conservation Authority. The check list was used to scope the focus of the Environmental Impact Study and includes information such as required surveys, specific details about the subject property, and which policies the study should conform to.

APPENDIX B - Environmental Study Scoping Checklist

Application/Project Name: _____
Proponent: _____ Date: _____
Proposed Project Works: _____
Study Type: _____
Lead Consultant: _____
Key Contact: _____
Subconsultants: _____

Technical Review Team:
<input type="checkbox"/> Ecologist Planner: _____ <input type="checkbox"/> Province – Species at Risk: _____
<input type="checkbox"/> Planner for the File: _____ <input type="checkbox"/> Province - Other: _____
<input type="checkbox"/> Conservation Authority: _____ Contact: _____
<input type="checkbox"/> EEPAC: _____ <input type="checkbox"/> Other: _____
<input type="checkbox"/> Project Manager, Environmental Assessment: _____
<input type="checkbox"/> First Nation(s): _____

Subject Lands and Study Area:

Location/Address and Size (ha) of Subject Lands:

Study Area Size (approximate ha): _____ Map (attached): _____

Position of Site in Subwatershed: _____

Tributary Fact Sheet: _____

Is the proposed location within the vicinity of the Thames River (<120 m)? Yes No

If Yes, initiate engagement with local First Nation communities. Consultation activity to be provided at Application Review stage.

Policy:

- Study must demonstrate how it conforms to the Provincial Policy Statement
- Study must demonstrate how it conforms to *The London Plan*

Map 1 Place Types:

- Green Space
- Environmental Review

Other Place Types: _____

Map 4 Active Mobility Network:

Pathway placement and future trail accesses shall be considered as part of this study.

Map 5 Natural Heritage System:

(Subject Lands and Study Area delineated on current aerial photographs)

- | | |
|--|---|
| <input type="checkbox"/> Provincially Significant Wetland | Name: _____ |
| <input type="checkbox"/> Wetlands | <input type="checkbox"/> Unevaluated Wetlands* |
| <input type="checkbox"/> Area of Natural & Scientific Interest | Name: _____ |
| <input type="checkbox"/> Environmentally Significant Area | Name: _____ |
| <input type="checkbox"/> Potential ESAs | <input type="checkbox"/> Upland Corridors |
| <input type="checkbox"/> Significant Woodlands | <input type="checkbox"/> Woodlands |
| <input type="checkbox"/> Significant Valleylands | <input type="checkbox"/> Valleylands |
| <input type="checkbox"/> Unevaluated Vegetation Patches | <input type="checkbox"/> Potential Naturalization Areas |

Patch No. _____

** ELC (air photo interpretation and / or previous studies) may identify potential wetlands or other potential features not captured on Map 5.*

Map 6 Hazards and Natural Resources:

Maximum Hazard Line Conservation Authority Regulation Limit (and text based regulatory limit) – Project falls under *Conservation Authority Act* Section 28

Required Field Investigations:

Aquatic:

- Aquatic Habitat Assessment: _____
- Fish Community (Collection): _____
- Spawning Surveys: _____
- Benthic Invertebrate Survey: _____
- Mussels: _____
- Other: _____

Wetlands:

- Wetland Delineation: _____
- Wetland Evaluation (OWES): _____
- Other: _____

Terrestrial (Wetland, Upland and Lowland):

- Vegetation Communities (ELC): _____
- Botanical Inventories Winter Spring Summer Fall
- Breeding Bird Surveys (type & frequency): _____
- Raptor Surveys: _____ Shoreline Birds: _____
- Crepuscular Surveys: _____ Grassland Surveys: _____
- Amphibian Surveys (type & frequency): _____
- Reptile Surveys:
 - Turtle (type & frequency): _____
 - Snake (type & frequency): _____
 - Other (type & frequency): _____
- Bat Habitat, Cavity & Acoustic Surveys: _____
- Mammal Surveys: _____
 - Winter Wildlife Surveys: _____
- Butterflies (Lepidoptera): _____
- Dragonflies / Damselflies (Odonata): _____
- Species at Risk Specific Surveys: _____
- Species of Conservation Concern Surveys: _____
- Significant Wildlife Habitat Surveys: _____
- Other field investigations: _____

Supporting Concurrent Studies/Investigations:

- Hydrogeological/Groundwater: _____
- Surface Water/Hydrology: _____
- Water Balance: _____
- Fluvial Geomorphological: _____
- Geotechnical: _____
- Tree Inventory: _____
- Other: _____

Evaluation of Significance:

Federal:

- Fish Habitat Other Federal: _____
- Species at Risk (SARA)

Provincial:

- Provincially Significant Wetlands
- Significant Woodlands
- Significant Valleylands
- Significant Wildlife Habitat Ecoregion 7E
- Areas of Natural & Scientific Interest
- Fish Habitat
- Water Resource Systems
- Species at Risk (ESA): _____

Municipal/London:

- Environmentally Significant Areas (ESAs), Potential ESAs
- Significant Woodlands, Woodlands
- Significant Valleylands, Valleylands
- Wetlands, Unevaluated Wetlands
- Significant Wildlife Habitat
- Unevaluated Vegetation Patches
- Other Vegetation Patches >0.5 ha
- Potential Naturalization Area
- Other: _____

Impact Assessment:

- Impact Assessment Required
- Net Effects Table Required

Environmental Management Recommendations:

- Environmental Management Plan: _____
- Specifications & Conditions of Approval: _____
- Other: _____

Environmental Monitoring:

- Baseline Monitoring: _____
- Construction Monitoring: _____
- Post-Construction Monitoring: _____

Additional Requirements and Notes:

Appendix III
Species at Risk (SAR) and Species of Conservation Concern (SCC)
Screening Tables

The following appendix contains documents that are difficult to make screen reader accessible. Please contact Madison Postma at mpostma@nrsl.on.ca for further description or details of these documents at any time.

The following documents contains the results of a screening exercise to assess the presence of possible Species at Risk and Species of Conservation Concern within the study area of the subject property, based on the preliminary background review and the results of the field studies.

Scientific Name	Common Name	S-RANK ¹	SARO ¹	COSEWIC ²	SARA ²	SARA Schedule ²	Habitat Requirements	Suitable Habitats within Subject Property	Rationale
<i>Chaetura pelagica</i>	Chimney Swift	S3B	THR	T	T	Schedule 1	Commonly found in urban areas near buildings; nests in chimneys, hollow trees, and crevices of rock cliffs. Feeds over open water. ^{3,4}	No	Suitable chimneys, rock cliffs, and open water features are not present in the subject property or study area.
<i>Chordeiles minor</i>	Common Nighthawk	S4B	SC	SC	T	Schedule 1	Open ground; clearings in dense forests (including burns and logged areas); rock barrens; peat bogs; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs. ^{3,4}	No	Suitable habitat was not found within the subject property during field work.
<i>Contopus virens</i>	Eastern Wood-pewee	S4B	SC	SC	SC	Schedule 1	Mid-canopy layer of forest clearings and edges of deciduous and mixed forest. Abundant in intermediate-age mature forest stands with little understory vegetation. ^{3,4}	No	The deciduous wooded feature on the subject property is not mature enough to support this species.
<i>Dolichonyx oryzivorus</i>	Bobolink	S4B	THR	T	T	Schedule 1	Large (>10 ha), open expansive grasslands, pastures, hayfields, meadows or fallow fields with dense ground cover. Occasionally nest in large (>50 ha) fields of winter wheat and rye in southwestern Ontario. ^{3,4}	No	The subject property does not contain the grasslands and fields required to support this species. The agricultural fields to the south and east of the subject property may provide ground cover of sufficient size for this species.
<i>Hirundo rustica</i>	Barn Swallow	S4B	THR	SC	T	Schedule 1	Farmlands, rural areas and other open or semi-open areas near body of water. Nests almost exclusively on human-made structures such as open barns, buildings, bridges and culverts. ^{3,4}	No	The subject property does not contain open landscapes or anthropogenic structures preferred by this species. Farmlands and buildings within the study area may provide suitable habitat for this species.
<i>Hylocichla mustelina</i>	Wood Thrush	S4B	SC	T	T	Schedule 1	Carolinian and Great Lakes-St. Lawrence forest zones. Undisturbed moist mature deciduous or mixed forest with deciduous sapling growth. Near pond or swamp. Must have some trees higher than 12 m. ^{3,4}	No	The subject property and study area are relatively disturbed and urban, with few nearby water features.
<i>Riparia riparia</i>	Bank Swallow	S4B	THR	T	T	Schedule 1	Nests in burrows in natural and human-made settings with vertical faces in silt and sand deposits. Usually on banks of river and lakes, but also found in sand and gravel pits. ^{3,4}	No	Silt and sand deposits, sand and gravel pits, and banks are not present in the subject property or study area.
<i>Sturnella magna</i>	Eastern Meadowlark	S4B, S3N	THR	T	T	Schedule 1	Open pastures, hayfields, grasslands or grassy meadows with elevated singing perches (small trees, shrubs or fence posts). Also weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields or other open areas. Generally prefers larger tracts of habitat >10 ha, but will sometimes use smaller tracts. ^{3,4}	No	The subject property does not contain the large open fields required to support this species. The large agricultural features and roadside features in the study area may provide suitable habitat.
<i>Vermivora chrysoptera</i>	Golden-winged Warbler	S3B	SC	T	T	Schedule 1	Areas with young shrubs surrounded by mature forest, including locations that have recently been disturbed, such as abandoned fields, field edges, hydro or utility right-of-ways, or logged areas with saplings and grasses. ^{3,4}	No	The subject property and study area contain disturbed habitat with young shrubs, but lack the adjacent mature forest to support this species.

Scientific Name	Common Name	S-RANK ¹	SARO ¹	COSEWIC ²	SARA ²	SARA Schedule ²	Habitat Requirements	Suitable Habitats within Subject Property	Rationale
<i>Chelydra serpentina</i>	Snapping Turtle	S4	SC	SC	SC	Schedule 1	Slow-flowing rivers and streams, lakes, and permanent or semi-permanent wetlands with soft substrates and vegetation. Key habitat requirements: open areas with structures for basking, open sand or gravel areas for nesting, shallow areas with soft substrates to bury in, soft banks or substrates for hibernation. ³	No	The watercourse identified within the agricultural field east of the subject property is unlikely to have suitable slow-flowing conditions, soft substrates, and vegetation to support this species. Wetlands, watercourses, and appropriate substrates are not present in the study area.
<i>Emydoidea blandingii</i>	Blanding's Turtle (Great Lakes / St. Lawrence population)	S3	THR	E	T	Schedule 1	Eutrophic, shallow wetlands such as marshes, ponds, swamps, bogs, fens, or coastal wetlands, with soft, muddy substrates, abundant aquatic vegetation, and basking structures (logs, stumps, hummocks). Large overland movements occur between aquatic habitats and to open sandy or gravelly areas for nesting. Forest habitat is important for upland movements. Overwintering typically occurs in permanent wetlands. ⁷	No	Wetlands with abundant vegetation, basking opportunities, and connected forested habitat are not present in the subject property or study area.
<i>Graptemys geographica</i>	Northern Map Turtle	S3	SC	SC	SC	Schedule 1	Large bodies of water such as rivers and lakes with soft bottoms, aquatic vegetation, abundant mollusc prey, and basking structures such as logs or rocks. Nesting occurs in open areas with soft substrates such as sand or gravel. Hibernate on the bottom of deep areas of lakes or deep, slow-moving sections of rivers. ³	No	Large bodies of water with aquatic vegetation, prey, and basking structures are not present in the subject property or study area.
<i>Heterodon platirhinos</i>	Eastern Hog-nosed Snake	S3	THR	T	T	Schedule 1	Open habitats, such as open woods, brushland or forest edges, with well-drained loose or sandy soils, well-drained substrates. Specializes in hunting and eating toads; occurs in habitats near or adjacent to wetland habitats where toads are present. Rocks, logs, stumps, etc. are used for shelter. Use snout to dig nests as well as to dig burrows for overwintering. ¹¹	No	Suitable wetland habitats that would support prey populations are not present in the subject property or study area.
<i>Pantherophis gloydi</i> pop. 2	Eastern Foxsnake (Carolinian population)	S2	END	E	E	Schedule 1	Open natural and semi-natural upland habitats, such as meadows, fields, restored prairies, and marshes and creeks. Root wads and logs provide cover and shelter. Nests in rotten logs, stumps, dune slopes, decaying piles of vegetation. Hibernates communally underground in animal burrows, or in old wells or foundations. ¹²	No	Suitable unforested upland and aquatic habitat are not present in the subject property or study area.
<i>Regina septemvittata</i>	Queensnake	S2	END	E	E	Schedule 1	Rivers, streams and lakes with clear water, rocky or gravel bottoms, and an abundance of crayfish. Also in marsh and wetland habitats. Rarely found more than 5m from a shoreline. Requires shelter and basking objects both in the water and on shore such as rocks, logs, and vegetation. Hibernation sites include crevices or fissures in bedrock, small mammal burrows, openings along tree roots, or abutments of old bridges. ¹⁴	No	Suitable clear water bodies, watercourses, and shorelines are not present in the subject property or study area.

Scientific Name	Common Name	S-RANK ¹	SARO ¹	COSEWIC ²	SARA ²	SARA Schedule ²	Habitat Requirements	Suitable Habitats within Subject Property	Rationale
<i>Microtus pinetorum</i>	Woodland Vole	S3?	SC	SC	SC	Schedule 1	Mature deciduous forest in the Carolinian region where there is a deep litter layer that allows it to burrow. ^{3,4}	No	The forested feature within the subject property is likely not mature enough to support this species.
<i>Myotis leibii</i>	Eastern Small-footed Myotis	S2S3	END				Roosts in caves, mine shafts, crevices or buildings that are in or near woodland. Hibernates in cold dry caves or mines. Maternity colonies in caves or buildings. Hunts in forests. ^{3,4}	No	Suitable habitat was not found within the subject property during field work.
<i>Myotis septentrionalis</i>	Northern Myotis	S3	END	E	E	Schedule 1	Roosts in houses and man-made structures but prefers hollow trees or under loose bark. Hibernates in mines or caves. Hunts within forest, below the canopy. ^{3,4}	No	Suitable habitat was not found within the subject property during field work.
<i>Taxidea taxus jacksoni</i>	American Badger (Southwestern Ontario population)	S2	END	E	E	Schedule 1	Open grasslands, oak savannahs, sand barrens and farmland. ^{3,4}	No	Suitable habitat was not found within the subject property during field work.
<i>Danaus plexippus</i>	Monarch	S2N, S4B	SC	END	SC	Schedule 1	Adults found in a diversity of habitats with a variety of wildflowers. Caterpillars are confined to meadows and open areas where milkweeds grow (larval food plants). ³	No	Suitable habitat for the larval food plants of this species was not found on the subject property.
<i>Arisaema dracontium</i>	Green Dragon	S3	SC	SC	SC	Schedule 3	Moist forests, especially along river banks and floodplains. ²³	No	The forested feature within the subject property is likely too dry to support this species.
<i>Juglans cinerea</i>	Butternut	S2?	END	E	E	Schedule 1	Stream banks and swamps, as well as upland beech-maple, oak-hickory, and mixed hardwood stands. ²³	No	Suitable habitat was not found within the subject property during field work.

Appendix IV

Significant Wildlife Habitat (SWH) Screening Tables

The following appendix contains documents that are difficult to make screen reader accessible. Please contact Madison Postma at mpostma@nrsl.on.ca for further description or details of these documents at any time.

The following documents contains the results of a screening exercise to assess the presence of Significant Wildlife Habitat within the study area of the subject property, based on the preliminary background review and the results of the field studies.

Significant Wildlife Habitat Assessment Tables

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Terrestrial)					
<u>Rationale:</u> Habitat important to migrating waterfowl	American Black Duck Northern Pintail Gadwall Blue-winged Teal Green-winged Teal American Wigeon Northern Shoveler Tundra Swan	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites. - Fields with seasonal flooding and waste grain in the Long Point, Rondeau, Lake. St. Clair, Grand Bend and Pt. Pelee areas may be important to Tundra Swans.	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} <u>Information Sources</u> • 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 (CAs) • 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 ^j or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependant on local site conditions and adjacent land use is the significant wildlife habitat ^{cxlviii} . • 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). • SWHMIST ^{cxlix} Index #7 provides development effects and mitigation measures.	The agricultural fields in the study area may flood with sheet water in the spring. Candidate SWH. Not present in the subject property.

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Waterfowl Stopover and Staging Areas (Aquatic)					
<p><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</p>	<p>Canada Goose Cackling Goose Snow Goose Green-winged Teal American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Blue-winged Teal Hooded Merganser Common Merganser Red-breasted Merganser Lesser Scaup Greater Scaup Common Goldeneye Bufflehead Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Canvasback Redhead Ruddy Duck Brant White-winged Scoter Black Scoter</p>	<p>MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7</p>	<p>• 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).</p> <p><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</p>	<p>Studies carried out and verified presence of: • Aggregations of 100¹ or more of listed species for 7 days¹, 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). • SWHMIST^{cxlix} Index #7 provides development effects and mitigation measures.</p>	<p>The study area does not contain water bodies or suitable watercourses with abundant food supply.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Shorebird Migratory Stopover Area					
<p><u>Rationale:</u> High quality shorebird stopover habitat is extremely rare and typically has a long history of use</p>	<p>Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin</p>	<p>BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5</p>	<p>Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats.</p> <p>Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 Center (NHIC) Shorebird Migratory Concentration Area 	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of 3 or more of listed species and > 1000¹ 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 >100¹ 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^{cxviii} • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"^{ccxi} • SWHMIST^{cdix} Index #8 provides development effects and mitigation measures. 	<p>The study area does not contain aquatic features with shoreline habitat to support migratory shorebirds.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Raptor Wintering Area					
<p><u>Rationale:</u> Sites used by multiple species, a high number of individuals and used annually are most significant</p>	<p>Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl</p> <p><u>Special Concern:</u> Short-eared Owl Bald Eagle</p>	<p><u>Hawks/Owls:</u> Combination of ELC Community Series; need to have present one Community Series from each land class.</p> <p>Forest: FOD, FOM, FOC</p> <p>Upland: CUM, CUT, CUS, CUW</p> <p><u>Bald Eagle:</u> Forest Community Series: FOD, FOM, FOC, SWD, SWM, or SWC, on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).</p>	<p>The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors.</p> <p>Raptor wintering (hawk/owl) sites need to be > 20ha^{cxlviii, cxlix} with a combination of forest and upland^{xxvi, xvii, xviii, xix, xx, xxi}.</p> <p>Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands^{cxlix}</p> <p>Field area of the habitat is to be wind swept with limited snow depth or accumulation.</p> <p>Eagle sites have open water and large trees and snags available for roosting^{cxlix}</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • OMNRF Districts • Natural clubs • Natural Heritage Information Centre (NHIC) Raptor Winter Concentration Area • Data from Bird Studies Canada • Reports and other information available from CAs • Results of Christmas Bird Counts 	<p>Studies confirm the use of these habitats by:</p> <ul style="list-style-type: none"> • One or more Short-eared Owls, or, One of more Bald Eagles or; at least 10 individuals and two listed hawk/owl species • To be significant a site must be used regularly (3 in 5 years)^{cxlix} for a minimum of 20 days by the above number of birds¹. • 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} • SWHMIST^{cxlix} Index #10 and #11 provides development effects and mitigation measures. 	<p>The subject property and study area do not contain woodland and upland communities >15ha to support raptor wintering.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹		Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹		Defining Criteria ¹	Assessment Details
Wildlife Habitat: Bat Hibernacula						
<p><u>Rationale:</u> Bat hibernacula, are rare habitats in all Ontario landscapes.</p>	<p>Big Brown Bat Eastern Pipistrelle/Tri-colored Bat</p>	<p>Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)</p>	<p>Hibernacula may be found in caves, mine shafts, underground foundations and Karsts.</p> <p>Active mine sites should not be considered</p> <p>The locations of bat hibernacula are relatively poorly known.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • All sites with confirmed hibernating bats are SWH¹. • The area includes 200m radius around the entrance of the hibernaculum^{cxlviii, ccvii, i} for the 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^{ccv} "Bats and Bat Habitats: Guidelines for Wind Power Projects"^{ccv} • SWHMIST^{cxlix} Index #1 provides development effects and mitigation measures. 	<p>The study area does not contain caves, mine shafts, underground foundations, or karsts that would support bat hibernacula.</p> <p>Not present.</p>	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Bat Maternity Colonies					
<p><u>Rationale:</u> Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.</p>	<p>Big Brown Bat Silver-haired Bat</p>	<p>Maternity colonies considered SWH are found in forested Ecosites.</p> <p>All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM</p>	<p>Maternity colonies can be found in tree cavities, vegetation and often in building ^{sxxii, xxv, xxvi, xxvii, xxxi} (buildings are not considered to be SWH).</p> <ul style="list-style-type: none"> • 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}. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • OMNRF for possible locations and contact for local experts • University Biology Departments with bat experts 	<p>Maternity Colonies with confirmed use by:</p> <ul style="list-style-type: none"> • >10 Big Brown Bats¹ • >5 Adult Female Silver-haired Bats¹ • The area of the habitat includes the entire woodland or the forest stand ELC Ecosite containing the maternity colonies¹. • 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. 	<p>The treed features in the study area are not mature enough to support bat maternity colonies.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Turtle Wintering Area					
<p>Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.</p>	<p>Midland Painted Turtle</p> <p><u>Special Concern:</u> Northern Map Turtle Snapping Turtle</p>	<p>Snapping and Midland Painted Turtles: ELC Community Classes: SW, MA, OA and SA ELC Community Series: FEO and BOO</p> <p>Northern Map Turtle: Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.</p>	<ul style="list-style-type: none"> For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen^{cix, cx, cxi, cxviii}. Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH <p><u>Information Sources</u></p> <ul style="list-style-type: none"> EIS studies carried out by Conservation Authorities Field naturalists clubs OMNRF Ecologist or Biologist Natural Heritage Information Centre (NHIC) 	<ul style="list-style-type: none"> Presence of 5 over-wintering Midland Painted Turtles is significantⁱ. One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significantⁱ. 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. – Apr)^{cvi}. Congregation of turtles is more common where wintering areas are limited and therefore significant^{cix, cx, cxi, cxii}. SWHMIST^{cxix} Index #28 provides development effects and mitigation measures for turtle wintering habitat. 	<p>The study area does not contain natural, permanent bodies with suitable depth and substrates for turtle wintering.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Reptile Hibernaculum					
<p><u>Rationale:</u> Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant</p>	<p><u>Snakes:</u> Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake</p> <p><u>Special Concern:</u> Milksnake Eastern Ribbonsnake</p>	<p>For all snakes, habitat may be found in any ecosite in southern Ontario other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats.</p> <p>Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator. The existence of rock piles or slopes, stone fences, and crumbling foundations assist in identifying candidate SWH.</p>	<p>For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line^{xiv, i, ii, iii, cxi}. 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.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 CAs • Local naturalists and experts, as well as university herpetologists may also know where to find some of these sites. • Natural Heritage Information Centre (NHIC) 	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of snake hibernacula used by a minimum of five individuals of a snake sp., or, individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp., or, individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct)ⁱ. • Note: If there are Special Concern Species present, then site is SWH • Note: 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 feature in which the hibernacula is located plus a 30m buffer is the SWHⁱ. • SWHMIST^{cxix} Index #13 provides development effects and mitigation measures for snake hibernacula. 	<p>Suitable habitat was not identified within the subject property.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹		Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹		Defining Criteria ¹	Assessment Details
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)						
<p><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.</p>	<p>Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)</p>	<p>Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns</p> <p>Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1</p>	<ul style="list-style-type: none"> Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. Does not include a licensed/permitted Mineral Aggregate Operation. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Reports and other information available from CAs Ontario Breeding Bird Atlas^{ccv}. Bird Studies Canada: Nature Counts http://www.birdscanada.org/birdmon/ Field Naturalist clubs 	<p>Studies confirming:</p> <ul style="list-style-type: none"> Presence of 1 or more nesting sites with 8^{cxlvix} or 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^{ccvii}. 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. 	<p>The study area does not contain exposed soil banks, suitable structures, or the steep topography required to support these species.</p> <p>Not present.</p>	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹		Candidate SWH		Confirmed SWH	Study Area
	ELC Ecosite Codes ¹		Habitat Criteria and Information Sources ¹		Defining Criteria ¹	Assessment Details
Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)						
<p><u>Rationale:</u> Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.</p>	<p>Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron</p>	<p>SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1</p>	<p>• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 CAs • MNRF District Offices • Field naturalist clubs 	<p>Studies confirming:</p> <ul style="list-style-type: none"> • Presence of 2 or more active nests of Great Blue Heron or other list species. • The habitat extends from the 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 colonies must 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^{cdix} Index #5 provides development effects and mitigation measures. 	<p>The study area does not contain water bodies, islands, or peninsulas required to support colonially-nesting bird breeding habitat.</p> <p>Not present.</p>	

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Coloniality - Nesting Bird Breeding Habitat (Ground)					
<p><u>Rationale:</u> Colonies are important to local bird population, typically sites are only known colony in area and are used annually.</p>	<p>Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird</p>	<p>Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map).</p> <p>Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird)</p> <p>MAM1 – 6 MAS1 – 3 CUM CUT CUS</p>	<ul style="list-style-type: none"> Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy 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. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> Ontario Breeding Bird Atlas^{ccv}, rare/colonial species records. Canadian Wildlife Service Reports and other information available from CAs Natural Heritage Information Centre (NHIC) Colonial Waterbird Nesting Area MNRF District Offices Field naturalist clubs 	<p>Studies confirming:</p> <ul style="list-style-type: none"> Presence of >25 active nests for Herring Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern^l. Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant^l. Presence of 5 or more pairs for Brewer's Blackbird^l. The edge of the colony and a minimum 150m radius area of the habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH^{cc, ccvii}. 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^{ccxix} Index #6 provides development effects and mitigation measures. 	<p>The study area does not contain rocky islands, peninsulas, or water bodies required to support coloniality-nesting bird breeding habitat.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Migratory Butterfly Stopover Areas					
<p><u>Rationale:</u> Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter</p>	<p>Painted Lady Red Admiral</p> <p><u>Special Concern:</u> Monarch</p>	<p>Combination of ELC Community Series; need to have present one Community Series from each landclass:</p> <p>Field: CUM CUT CUS</p> <p>Forest: FOC FOD FOM CUP</p> <p>Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.</p>	<p>A butterfly stopover area will be a minimum of 10ha in size with a combination of field and forest habitat present, and will be located within 5km of Lake Ontario and Erie^{cxlix}.</p> <ul style="list-style-type: none"> 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^{cxlvii, 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}. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> MNRF District Offices Natural Heritage Information Centre (NHIC) Agriculture Canada in Ottawa may have list of butterfly experts. Field Naturalist Clubs Toronto Entomologists Association Conservation Authorities 	<p>Studies confirm:</p> <ul style="list-style-type: none"> 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}. 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 White Admiral's is to be considered significant^l. SWHMIST^{cxlix} Index #16 provides development effects and mitigation measures. 	<p>The study area is not located within 5km of Lake Ontario or Lake Erie.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Landbird Migratory Stopover Areas					
<p><u>Rationale:</u> Sites with a high diversity of species as well as high numbers are most significant</p>	<p>All migratory songbirds</p> <p>Canadian Wildlife Service Ontario website: http://www.on.ec.gc.ca/wildlife_e.html</p> <p>All migrant raptors species</p> <p>Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)</p>	<p>All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD</p>	<p>Woodlots need to be >5 ha¹ in size and within 5km^{iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv} of Lake Ontario and Erie. If woodlands are rare in an area of shoreline, woodland fragments 2-5ha can be considered for this habitat</p> <ul style="list-style-type: none"> • If multiple woodlands are located along the shoreline those Woodlands <2km from Lake Erie or Ontario are more significant^{cxix}. • Sites have a variety of habitats: forest, grassland and wetland complexes^{cxix}. • The largest sites are more significant^{cxix} • Woodlots and forest fragments are important habitats to migrating birds^{ccxviii}, these features located along the shore and located within 5km of Lake Ontario and Lake Erie are Candidate SWH^{cxviii}. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Ontario Important Bird Areas (IBA) Program 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Use of the habitat by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates¹. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (March/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^{cxix} Index #9 provides development effects and mitigation measures. 	<p>The treed features in the study area are not within 5km of Lake Ontario or Lake Erie.</p> <p>Not present.</p>

Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Deer Winter Congregation Areas					
<p><u>Rationale:</u> Deer movement during winter in the southern areas of Ecoregion 7E 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}</p>	White-tailed Deer	<p>All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD</p> <p>Conifer plantations (CUP) smaller than 50 ha may also be used.</p>	<ul style="list-style-type: none"> • Woodlots >100 ha in size or if large woodlots are rare in a planning area woodlots>50ha^l. • Deer movement during winter in Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands^{cxlviii}. • 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^{ccxxiv}. • Woodlots with high densities of deer due to artificial feeding are not significant^l. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • MNRF District Offices • LIO/NRVIS 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by 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^l. • 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}. • SWHMIST^{cxlix} Index #2 provides development effects and mitigation measures. 	<p>The treed features within the study area are not >50ha in area.</p> <p>Not present.</p>

Significant Wildlife Habitat Assessment Tables

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Cliff and Talus Slopes					
<p><u>Rationale:</u> Cliffs and Talus Slopes are extremely rare habitats in Ontario.</p>	<p>Any ELC Ecosite within Community Series:</p> <p>TAO CLO TAS CLS TAT CLT</p>	<p>A Cliff is vertical to near vertical bedrock >3m in height.</p> <p>A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.</p>	<p>Most cliff and talus slopes occur along the Niagara Escarpment.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • Confirm any ELC Vegetation Type for Cliffs or Talus Slopes^{lxxviii} • SWHMIST^{cxlix} Index #21 provides development effects and mitigation measures. 	<p>The study area does not contain cliffs or talus slopes.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Sand Barrens					
<p><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.</p>	<p>ELC Ecosites: SBO1 SBS1 SBT1</p> <p>Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always ≤ 60%.</p>	<p>Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. 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%.</p>	<p>A sand barren area >0.5ha in size</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website • Field naturalist clubs • Conservation Authorities 	<ul style="list-style-type: none"> • Confirm any ELC Vegetation Type for Sand Barrens^{lxviii} • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotics sp)^l. • SWHMIST^{cxlix} Index #20 provides development effects and mitigation measures. 	<p>The study area does not contain sand barrens.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Alvar					
<p><u>Rationale:</u> Alvars are extremely rare habitats in Ecoregion 7E</p>	<p>ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2</p> <p>Five Alvar Indicator Species: 1) Carex crawei 2) Panicum philadelphicum 3) Eleocharis compressa 4) Scutellaria parvula 5) Trichostema brachiatum</p> <p>These indicator species are very specific to Alvars within Ecoregion 7E^{cdlx}</p>	<p>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^{bxviii}.</p>	<p>An Alvar site > 0.5ha in size^{bxv}. Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie^{cxci}.</p> <p><u>Information Sources</u> • Alvars of Ontario (2000), Federation of Ontario Naturalists^{bxvi}. • Ontario Nature – Conserving Great Lakes Alvars^{ccviii}. • Natural Heritage Information Centre (NHIC) has location information available on their website • OMNRF Staff • Field Naturalist clubs • Conservation Authorities</p>	<p>Field studies identify four of the five Alvar indicator species^{bxv} at a candidate Alvar site is Significant</p> <ul style="list-style-type: none"> • 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^{bxv}. • SWHMIST^{cxlix} Index #17 provides development effects and mitigation measures. 	<p>The study area does not contain alvars.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Old Growth Forest					
<p><u>Rationale:</u> Due to historic logging practices and land clearance for agriculture, old growth forest is rare in Ecoregion 7E.</p>	<p>Forest Community Series: FOD FOC FOM SWD SWC SWM</p>	<p>Old growth forests are characterized by heavy mortality or turnover of overstorey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.</p>	<p>Woodland area is >0.5ha</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 	<p>Field Studies will determine:</p> <ul style="list-style-type: none"> • If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat^{cxviii}. • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities ^{cxviii} (cut stumps will not be present) • Determine ELC Vegetation Type for forest area containing the old growth characteristics^{boxviii}. • SWHMIST^{cxlix} Index #23 provides development effects and mitigation measures. 	<p>The study area does not contain old growth forest.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Savannah					
<p><u>Rationale:</u> Savannahs are extremely rare habitats in Ontario.</p>	<p>TPS1 TPS2 TPW1 TPW2 CUS2</p>	<p>A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%.</p> <p>In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario)^{cc}.</p>	<p>No minimum size to site^l Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location data available on their website • Field naturalists clubs • Conservation Authorities 	<p>Field studies confirm one or more of the Savannah indicator species listed in^{xxxv} Appendix N should be present^l. Note: Savannah plant spp. list from Ecoregion 7E should be used.</p> <ul style="list-style-type: none"> • Area of the ELC Vegetation type is the SWH^{xxxviii}. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMIST^{cdix} Index #18 provides development effects and mitigation measures. 	<p>The study area does not contain savannah.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Tallgrass Prairie					
<p><u>Rationale:</u> Tallgrass Prairies are extremely rare habitats in Ontario.</p>	TPO1 TPO2	<p>A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover.</p> <p>In Ecoregion 7E, known Tallgrass Prairie and savannah remnants are scattered between Lake Huron and Lake Erie, near Lake St. Clair, north of and along the Lake Erie shoreline, in Brantford and in the Toronto area (north of Lake Ontario)^{cc}.</p>	<p>No minimum size to siteⁱ. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Natural Heritage Information Centre (NHIC has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities 	<p>Field studies confirm one or more of the Prairie indicator species listed in^{boxv} Appendix N should be presentⁱ. Note: Prairie plant spp. list from Ecoregion 7E should be used.</p> <ul style="list-style-type: none"> • Area of the ELC Vegetation Type is the SWH^{boxviii}. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMIST^{boxix} Index #19 provides development effects and mitigation measures. 	<p>The study area does not contain tallgrass prairie.</p> <p>Not present.</p>

Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 7E.

Rare Vegetation Community ¹	Candidate SWH			Confirmed SWH	Study Area
	ELC Ecosite Codes ¹	Habitat Description ¹	Detailed Information and Sources ¹	Defining Criteria ¹	Assessment Details
Other Rare Vegetation Communities					
<p><u>Rationale:</u> Plant communities that often contain rare species which depend on the habitat for survival.</p>	<p>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.</p>	<p>Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.</p>	<p>ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M^{cxlviii}.</p> <p>The OMNRF/NHIC will have up to date listing for rare vegetation communities.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Natural Heritage Information Centre (NHIC) has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities 	<p>Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG^{cxlviii}.</p> <ul style="list-style-type: none"> • Area of the ELC Vegetation Type polygon is the SWH. • SWHMIST^{cxlix} Index #37 provides development effects and mitigation measures. 	<p>Vegetation surveys conducted in the subject property did not identify rare vegetation communities.</p> <p>Not present.</p>

Significant Wildlife Habitat Assessment Tables

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: 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 Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 Note: includes adjacency to Provincially Significant Wetlands	A waterfowl nesting area extends: 120m ^{cxlix} from a wetland (>0.5ha) or a wetland (>0.5ha) with small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120m of each individual wetland where waterfowl nesting is known to occur ^{cxlix} . • Upland areas should be at least 120m 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 CAs	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards ¹ , or, • Presence of 10 or more nesting pairs for listed species including Mallards ¹ . • 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 120m ^{cxviii} from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMIST ^{cxlix} Index #25 provides development effects and mitigation measures.	The study area does not contain wetlands required for waterfowl nesting. Not present.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Bald Eagle and Osprey Nesting, Foraging and Perching Habitat					
<p><u>Rationale:</u> Nest sites are fairly uncommon in Ecoregion 7E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat.</p>	<p>Osprey</p> <p><u>Special Concern:</u> Bald Eagle</p>	<p>ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.</p>	<p>Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.</p> <p>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.</p> <p>Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms).</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Natural Heritage Information Center (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 format and does not include 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 CAs • Field naturalists clubs 	<p>Studies confirm the use of these nests by:</p> <ul style="list-style-type: none"> • 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 300m 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 400-800m radius around the nest is the SWH^{ccvi, ccvii}. Area of the habitat from 400-800m is dependant on site lines from the nest to the development and inclusion of perching and foraging habitat^{ccvi}. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for ≥3 years or suspected of not being used for >5 years before being considered not significant^{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. 	<p>The study area does not contain waterbodies with forested shorelines, islands, or other structures.</p> <p>Not present.</p>

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Woodland Raptor Nesting Habitat					
<p><u>Rationale:</u> Nests sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.</p>	<p>Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk</p>	<p>May be found in all forested ELC Ecosites.</p> <p>May also be found in SWC, SWM, SWD and CUP3</p>	<p>All natural or conifer plantation woodland/forest stands combined >30ha or with >4ha of interior habitat^{jxxxviii, lxxxix, xc, xcj, xciii, xciv, xcvi, cxviii}. Interior habitat determined with a 200m buffer^{cdviii}.</p> <ul style="list-style-type: none"> • 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. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • OMNRF Districts • Check the Ontario Breeding Bird Atlas^{ccv} or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada • Reports and other information available from CAs 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of 1 or more active nests from species list is considered significant^{cxviii}. • Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha of habitat is the SWH^{ccvii}. (the 28ha 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 early 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. 	<p>The study area does not contain forested areas >30ha with >4ha of interior habitat.</p> <p>Not present.</p>

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Turtle Nesting Area					
<p><u>Rationale:</u> These habitats are rare and when identified will often be the only breeding site for local populations of turtles.</p>	<p>Midland Painted Turtle</p> <p><u>Special Concern:</u> Northern Map Turtle Snapping Turtle</p>	<p>Exposed mineral soil (sand or gravel) areas adjacent (<100m)^{cxlviii} or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1</p>	<ul style="list-style-type: none"> • Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other 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. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • 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 Center (NHIC) Field naturalist clubs 	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of 5 or more nesting Midland Painted Turtlesⁱ • One or more Northern Map Turtle or Snapping Turtle nesting is a SWHⁱ • 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^{cxlix}. • Field investigations should be conducted in prime nesting season typically late spring to early summer. Observation studies observing the turtles nesting is a recommended method. • SWHMIST^{cxlix} Index #28 provides development effects and mitigation measures for turtle nesting habitat. 	<p>The study area lacks suitable aquatic habitat and includes several road intersections.</p> <p>Not present.</p>

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Seeps and Springs					
Rationale: Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	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, cxlii, cxiv} . <u>Information Sources</u> • Topographical Map • Thermography • Hydrological surveys conducted by CAs and MOE • Field naturalists 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 ^l seeps/springs should be considered SWH. • The area of a ELC forest 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 ^{cxlviii} . • SWHMIST ^{cxlix} Index #30 provides development effects and mitigation measures.	The study area is not located within the headwaters of a stream or river system. Not present.

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Amphibian Breeding Habitat (Woodland)					
<p>Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations</p>	<p>Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog</p>	<p>All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD</p> <p>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.</p>	<p>• Presence of a wetland, pond or woodland pool (including vernal pools) >500m² (about 25m diameter) ^{ccvii} within or adjacent (within 120m) to a woodland (no minimum size) ^{cboddi, lbiii, lbv, lbvi, lbvii, lbviii, lbix, lbx}. Some small wetlands may not be mapped and may be important breeding pools for amphibians.</p> <p>• Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat^{cxviii}.</p> <p><u>Information Sources</u></p> <p>• Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records</p> <p>• Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property.</p> <p>• OMNRF Districts and wetland evaluations</p> <p>• Field naturalist clubs</p> <p>• Canadian Wildlife Service Amphibian Road Call Survey</p> <p>• Ontario Vernal Pool Association: http://www.ontariovernalpools.org</p>	<p>Studies confirm:</p> <ul style="list-style-type: none"> • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/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. • 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 woodland/wetlands. • The habitat is the wetland area plus a 230m radius of woodland area ^{lbiii, lbv, lbvi, lbvii, lbviii, lbix, lbx, lbxi}. 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. 	<p>The study area does not contain wetlands or waterbodies adjacent to woodlands.</p> <p>Not present.</p>

Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Amphibian Breeding Habitat (Wetland)					
<p>Rationale: Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario Landscapes</p>	<p>Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog</p>	<p>ELC Community Classes SW, MA, FE, BO, OA and SA.</p> <p>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.</p>	<ul style="list-style-type: none"> Wetlands >500m² (about 25m diameter)^{ccvii} supporting high species diversity are significant: some small or ephemeral habitats may not be identified on MNR mapping and could be important amphibian breeding habitats^{clxxxiv}. Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. Bullfrogs require permanent water bodies with abundant emergent vegetation. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> 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 CAs 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog or toad species and with at least 20 breeding individuals (adults and eggs masses)^{lxxx}. ^{lxxxiii} or 2 or more of the listed frog/toad species with Call Level of 3. or; Wetland with confirmed breeding Bullfrogs are significant^l. The ELC ecosite wetland area and the shoreline are the SWH. A combination of observational study and call count surveys ^{cviii} to determine breeding/larval stages will be required during the spring (May March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/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. 	<p>The study area does not contain wetlands.</p> <p>Not present.</p>

Significant Wildlife Habitat Assessment Tables

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Marsh Bird Breeding Habitat					
<p>Rationale: Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.</p>	<p>American Bittern Virginia Rail Sora Common Gallinule American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Green Heron Trumpeter Swan</p> <p><u>Special Concern:</u> Black Tern Yellow Rail</p>	<p>MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1</p> <p>For Green Heron: All SW, MA and CUM1 sites</p>	<ul style="list-style-type: none"> Nesting occurs in wetlands All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present^{cxiv}. For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. <p><u>Information Sources</u></p> <ul style="list-style-type: none"> OMNRF Districts and wetland evaluations Field naturalist clubs Natural Heritage Information Centre (NHIC) Reports and other information available from CAs Ontario Breeding Bird Atlas^{ccv} 	<p>Studies confirm:</p> <ul style="list-style-type: none"> Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species¹. Note: any wetland with breeding of 1 or more Trumpeter Swans, Black Terns, Green Heron or Yellow Rail is SWH¹. 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"^{ccxi} SWHMIST^{cxlix} Index #35 provides development effects and mitigation measures 	<p>The study area does not contain wetlands.</p> <p>Not present.</p>

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Open Country Bird Breeding Habitat					
<p><u>Rationale:</u> 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.</p>	<p>Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow</p> <p><u>Special Concern:</u> Short-eared Owl</p>	<p>CUM1 CUM2</p>	<p>Large grassland areas (includes natural and cultural fields and meadows) >30ha^{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)^l.</p> <p>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.</p> <p>The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Agricultural land classification maps Ministry of Agriculture • Local birder clubs • Ontario Breeding Bird Atlas^{ccv} • EIS Reports and other information available from CAs 	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> • Presence of nesting or breeding of 2 or more of the listed species^l. • 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 	<p>The large fields present in the study area are actively used for farming and are not considered suitable habitat for the listed species.</p> <p>Not present.</p>

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Shrub/Early Successional Bird Breeding Habitat					
<p><u>Rationale:</u> 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.</p>	<p>Indicator Spp: Brown Thrasher Clay-coloured Sparrow</p> <p>Common Spp. Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher</p> <p><u>Special Concern:</u> Yellow-breasted Chat Golden-winged Warbler</p>	<p>CUT1 CUT2 CUS1 CUS2 CUW1 CUW2</p> <p>Patches of shrub ecosites can be complexed into a larger habitat such as woodland area for some bird species.</p>	<p>Large natural field areas succeeding to shrub and thicket habitats >10ha^{cxiv} 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)¹.</p> <p>Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species^{cxiii}.</p> <p>Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs • Ontario Breeding Bird Atlas^{ccv} • Reports and other information available from CAs 	<p>Field Studies confirm:</p> <ul style="list-style-type: none"> • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species¹. • A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat¹. • 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. 	<p>The study area does not contain successional fields >10ha in size. Fields in the study area are actively used for farming and are not considered suitable habitat for the listed species.</p> <p>Not present.</p>

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Terrestrial Crayfish					
Rationale: Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. <small>Ccii</small>	Chimney or Digger Crayfish (<i>Fallicambarus fodiens</i>) Devil Crawfish or Meadow Crayfish (<i>Cambarus Diogenes</i>)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM CUM1 with inclusions of above meadow marsh ecosites can be used by terrestrial crayfish	Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can't be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. <u>Information Sources</u> • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998.	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites ^{cci} . • Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the large 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 ^{cci} • SWHMIST ^{cdix} Index #36 provides development effects and mitigation measures.	Suitable habitat was not identified within the subject property. Not present.

Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: Special Concern and Rare Wildlife Species					
<p><u>Rationale:</u> These species are quite rare or have experienced significant population declines in Ontario</p>	<p>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).</p>	<p>All plant and animal element occurrences (EO) within a 1 or 10km grid.</p> <p>Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.</p>	<p>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^{lxviii}.</p> <p><u>Information Sources</u></p> <ul style="list-style-type: none"> • Natural Heritage Information Centre (NHIC) will have the Special Concern and Provincially Rare (S1-S3, SH) species lists and element occurrences for these species. • NHIC Website: "Get Information" http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas^{ccv} • Expert advice should be sought as many of the rare spp. have little information available about their requirements. 	<p>Studies Confirm:</p> <ul style="list-style-type: none"> • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • 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 to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat for foraging habitat. • SWHMIST^{cdix} Index #37 provides development effects and mitigation measures. 	<p>Suitable habitat for various special concern and rare wildlife species was not identified within the subject property.</p> <p>Not present.</p>

Significant Wildlife Habitat Assessment Tables

Table 5. Characteristics of Animal Movement Corridors for Ecoregion 7E.

	Wildlife Species ¹	Candidate SWH		Confirmed SWH	Study Area
		ELC Ecosite Codes ¹	Habitat Criteria and Information Sources ¹	Defining Criteria ¹	Assessment Details
Wildlife Habitat: 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.	Eastern Newt American Toad Blue-spotted Salamander Spotted Salamander Four-toed Salamander Gray Treefrog Northern Leopard Frog Pickerel Frog 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 ^{cb00iv, cb00v, cb00vi, cb00vii, cb00viii, cb00ix, cb00x, cb00xi} Movement corridors must be considered when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule ¹ . <u>Information Sources</u> • MNRF District Office • Natural Heritage Information Centre NHIC • Reports and other information available from CAs • 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.	The study area does not contain wetlands and thus does not provide suitable amphibian breeding habitat. Not present.

Appendix V

Vascular Flora and Wildlife Species Lists

The following appendix contains documents that are difficult to make screen reader accessible. Please contact Madison Postma at mpostma@nrsl.on.ca for further description or details of these documents at any time.

The following documents contain the complete lists of all plant, bird, herpetofauna, mammal, butterfly, and odonate species observed within the subject property during the field studies, or have reported within the vicinity of the study area through the preliminary background review.

Plant Species Reported from the Study Area - 38 Exeter Road (Project #2803)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Middlesex	NHIC Data*	NRSI Observed
		NDMNR 2021	MECP 2022	Government of Canada 2021	Government of Canada 2021	Government of Canada 2021	Oldham 2017	NDMNR 2022	NRSI Results From XXXX
Dicotyledons	Dicots								
Apiaceae	Carrot or Parsley Family								
<i>Daucus carota</i>	Wild Carrot	SE5					IC		X
Asteraceae	Composite or Aster Family								
<i>Arctium minus</i>	Common Burdock	SE5					IC		X
<i>Cirsium arvense</i>	Creeping Thistle	SE5					IC		X
<i>Cirsium discolor</i>	Field Thistle	S3					R		X
<i>Solidago altissima</i>	Tall Goldenrod	S5							X
<i>Tanacetum vulgare</i>	Common Tansy	SE5					IX		X
Brassicaceae	Mustard Family								
<i>Alliaria petiolata</i>	Garlic Mustard	SE5					IC		X
Caprifoliaceae	Honeysuckle Family								
<i>Lonicera tatarica</i>	Tatarian Honeysuckle	SE5					IX		X
Celastraceae	Staff-tree Family								
<i>Euonymus alatus</i>	Winged Euonymus	SE2					IR		X
Cornaceae	Dogwood Family								
<i>Cornus racemosa</i>	Gray Dogwood	S5					X		X
<i>Cornus sericea</i>	Red-osier Dogwood	S5					C		X
Juglandaceae	Walnut Family								
<i>Juglans nigra</i>	Black Walnut	S4?					X		X
Onagraceae	Evening-primrose Family								
<i>Oenothera biennis</i>	Common Evening-primrose	S5					X		X
Phytolaccaceae	Pokeweed Family								
<i>Phytolacca americana</i>	Common Pokeweed	S4					X		X
Rosaceae	Rose Family								
<i>Rubus occidentalis</i>	Black Raspberry	S5					C		X
Rubiaceae	Madder Family								
<i>Galium aparine</i>	Cleavers	S5					X		X
Salicaceae	Willow Family								
<i>Populus deltoides</i>	Eastern Cottonwood	S5					X		X
<i>Salix euxina</i>	Crack Willow	SE					IX		X
<i>Salix interior</i>	Sandbar Willow	S5					C		X
Scrophulariaceae	Figwort Family								
<i>Verbascum thapsus</i>	Common Mullein	SE5					IC		X
Vitaceae	Grape Family								
<i>Parthenocissus vitacea</i>	Thicket Creeper	S5					X		X
Monocotyledons	Monocots								
Araceae	Arum Family								
<i>Arisaema dracontium</i>	Green Dragon	S3		SC	SC	Schedule 3	U	X	
Poaceae	Grass Family								
<i>Bromus inermis</i>	Smooth Brome	SE5					IC		X
<i>Phragmites australis</i>	Common Reed	SU							X
<i>Poa pratensis</i>	Kentucky Bluegrass	S5							X
TOTAL								1	24

*NHIC Atlas Square(s): 17MH7752

References

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 Ministry of the Environment, Conservation, and Parks (MECP). 2022. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2022-01-31. Available: <https://www.ontario.ca/page/species-risk-ontario>
 Government of Canada. 2021. Species at Risk Public Registry: Species Search. COSEWIC Last Assessment Date: 2021-05-05. Available: <https://species-registry.canada.ca/index-en.html#/species?sortBy=commonNameSort&sortDirection=asc&pageSize=10>
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Bird Species Reported from the Study Area - 38 Exeter Road EIS (Project #2803)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	OBBA*	NHIC Data**
		NDMNRF 2021	MECP 2022	Government of Canada 2021	Government of Canada 2021	Government of Canada 2021	BSC et al. 2006	NDMNRF 2022
Anatidae	Ducks, Geese & Swans							
<i>Aix sponsa</i>	Wood Duck	S5B, S3N					CO	
<i>Anas platyrhynchos</i>	Mallard	S5					CO	
<i>Branta canadensis</i>	Canada Goose	S5					CO	
<i>Lophodytes cucullatus</i>	Hooded Merganser	S5					CO	
Phasianidae	Partridges, Grouse & Turkeys							
<i>Bonasa umbellus</i>	Ruffed Grouse	S5					PO	
<i>Meleagris gallopavo</i>	Wild Turkey	S5					CO	
Columbidae	Pigeons & Doves							
<i>Columba livia</i>	Rock Pigeon	SNA					CO	
<i>Zenaidura macroura</i>	Mourning Dove	S5					CO	
Cuculiformes	Cuckoos & Anis							
<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	S4B					PO	
<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	S4S5B					PO	
Caprimulgidae	Goatsuckers							
<i>Chordeiles minor</i>	Common Nighthawk	S4B	SC	SC	T	Schedule 1	PR	
Apodidae	Swifts							
<i>Chaetura pelagica</i>	Chimney Swift	S3B	THR	T	T	Schedule 1	CO	X
Trochilidae	Hummingbirds							
<i>Archilochus colubris</i>	Ruby-throated Hummingbird	S5B					PR	
Rallidae	Rails, Gallinules & Coots							
<i>Porzana carolina</i>	Sora	S5B					PR	
<i>Rallus limicola</i>	Virginia Rail	S4S5B					PR	
Charadriidae	Plovers & Lapwings							
<i>Charadrius vociferus</i>	Killdeer	S4B					CO	
Scolopacidae	Sandpipers & Allies							
<i>Actitis macularia</i>	Spotted Sandpiper	S5B					PR	
<i>Scolopax minor</i>	American Woodcock	S4B					PO	
Ardeidae	Hérons & Bitterns							
<i>Ardea herodias</i>	Great Blue Heron	S4					PO	
<i>Butorides virescens</i>	Green Heron	S4B					CO	
Cathartidae	Vultures							
<i>Cathartes aura</i>	Turkey Vulture	S5B, S3N					CO	
Accipitridae	Hawks, Kites, Eagles & Allies							
<i>Accipiter cooperii</i>	Cooper's Hawk	S4	NAR	NAR	NS	No schedule	CO	
<i>Accipiter striatus</i>	Sharp-shinned Hawk	S5	NAR	NAR	NS	No schedule	CO	
<i>Buteo jamaicensis</i>	Red-tailed Hawk	S5	NAR	NAR	NS	No schedule	CO	
Strigidae	Typical Owls							
<i>Bubo virginianus</i>	Great Horned Owl	S4					CO	
<i>Megascops asio</i>	Eastern Screech-Owl	S4	NAR	NAR	NS	No schedule	CO	
Alcedinidae	Kingfishers							
<i>Megasceryle alcyon</i>	Belted Kingfisher	S5B, S4N					PR	
Picidae	Woodpeckers							
<i>Colaptes auratus</i>	Northern Flicker	S5					CO	
<i>Dryobates pubescens</i>	Downy Woodpecker	S5					CO	
<i>Dryobates villosus</i>	Hairy Woodpecker	S5					CO	

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	OBBA*	NHIC Data**
		NDMNRF 2021	MECP 2022	Government of Canada 2021	Government of Canada 2021	Government of Canada 2021	BSC et al. 2006	NDMNRF 2022
<i>Melanerpes carolinus</i>	Red-bellied Woodpecker	S5					CO	
<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	S5B, S3N					PR	
Falconidae	Caracaras & Falcons							
<i>Falco sparverius</i>	American Kestrel	S4					PR	
Tyrannidae	Tyrant Flycatchers							
<i>Contopus virens</i>	Eastern Wood-Pewee	S4B	SC	SC	SC	Schedule 1	PO	
<i>Empidonax minimus</i>	Least Flycatcher	S5B					PO	
<i>Empidonax traillii</i>	Willow Flycatcher	S4B					PO	
<i>Myiarchus crinitus</i>	Great Crested Flycatcher	S5B					CO	
<i>Sayornis phoebe</i>	Eastern Phoebe	S5B					CO	
<i>Tyrannus tyrannus</i>	Eastern Kingbird	S4B					CO	
Vireonidae	Vireos							
<i>Vireo gilvus</i>	Warbling Vireo	S5B					CO	
<i>Vireo olivaceus</i>	Red-eyed Vireo	S5B					CO	
Corvidae	Crows & Jays							
<i>Corvus brachyrhynchos</i>	American Crow	S5					CO	
<i>Cyanocitta cristata</i>	Blue Jay	S5					CO	
Alaudidae	Larks							
<i>Eremophila alpestris</i>	Horned Lark	S4					PR	
Hirundinidae	Swallows							
<i>Hirundo rustica</i>	Barn Swallow	S4B	THR	SC	T	Schedule 1	CO	
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S4S5B					CO	
<i>Progne subis</i>	Purple Martin	S3B					PO	
<i>Riparia riparia</i>	Bank Swallow	S4B	THR	T	T	Schedule 1	CO	
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	S4B					CO	
<i>Tachycineta bicolor</i>	Tree Swallow	S4S5B					CO	
Paridae	Chickadees & Titmice							
<i>Poecile atricapillus</i>	Black-capped Chickadee	S5					CO	
Sittidae	Nuthatches							
<i>Sitta canadensis</i>	Red-breasted Nuthatch	S5					CO	
<i>Sitta carolinensis</i>	White-breasted Nuthatch	S5					CO	
Troglodytidae	Wrens							
<i>Thryothorus ludovicianus</i>	Carolina Wren	S4					CO	
<i>Troglodytes aedon</i>	House Wren	S5B					CO	
Poliophtillidae	Gnatcatchers							
<i>Poliophtila caerulea</i>	Blue-gray Gnatcatcher	S4B					CO	
Turdidae	Thrushes							
<i>Catharus fuscescens</i>	Veery	S5B					PO	
<i>Hylocichla mustelina</i>	Wood Thrush	S4B	SC	T	T	Schedule 1	PR	
<i>Sialia sialis</i>	Eastern Bluebird	S5B, S4N	NAR	NAR	NS	No schedule	CO	
<i>Turdus migratorius</i>	American Robin	S5					CO	
Mimidae	Mockingbirds, Thrashers & Allies							
<i>Dumetella carolinensis</i>	Gray Catbird	S5B, S3N					CO	
<i>Toxostoma rufum</i>	Brown Thrasher	S4B					CO	
Sturnidae	Starlings							
<i>Sturnus vulgaris</i>	European Starling	SNA					CO	
Bombycillidae	Waxwings							
<i>Bombycilla cedrorum</i>	Cedar Waxwing	S5					CO	

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	OBBA*	NHIC Data**
		NDMNR 2021	MECP 2022	Government of Canada 2021	Government of Canada 2021	Government of Canada 2021	BSC et al. 2006	NDMNR 2022
Passeridae	Old World Sparrows							
<i>Passer domesticus</i>	House Sparrow	SNA					CO	
Fringillidae	Finches & Allies							
<i>Haemorhous mexicanus</i>	House Finch	SNA					CO	
<i>Spinus tristis</i>	American Goldfinch	S5					CO	
Emberizidae	New World Sparrows & Allies							
<i>Melospiza georgiana</i>	Swamp Sparrow	S5B, S4N					PO	
<i>Melospiza melodia</i>	Song Sparrow	S5					CO	
<i>Passerculus sandwichensis</i>	Savannah Sparrow	S5B, S3N					CO	
<i>Pipilo erythrophthalmus</i>	Eastern Towhee	S4B, S3N					PR	
<i>Pooecetes gramineus</i>	Vesper Sparrow	S4B					PR	
<i>Spizella passerina</i>	Chipping Sparrow	S5B, S3N					CO	
<i>Spizella pusilla</i>	Field Sparrow	S4B, S3N					PR	
Icteridae	Troupials & Allies							
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	S5					CO	
<i>Dolichonyx oryzivorus</i>	Bobolink	S4B	THR	T	T	Schedule 1	PR	
<i>Icterus galbula</i>	Baltimore Oriole	S4B					CO	
<i>Icterus spurius</i>	Orchard Oriole	S4B					CO	
<i>Molothrus ater</i>	Brown-headed Cowbird	S5					CO	
<i>Quiscalus quiscula</i>	Common Grackle	S5					CO	
<i>Sturnella magna</i>	Eastern Meadowlark	S4B, S3N	THR	T	T	Schedule 1	CO	X
Parulidae	Wood Warblers							
<i>Geothlypis trichas</i>	Common Yellowthroat	S5B, S3N					CO	
<i>Setophaga pensylvanica</i>	Chestnut-sided Warbler	S5B					PO	
<i>Setophaga petechia</i>	Yellow Warbler	S5B					CO	
<i>Setophaga pinus</i>	Pine Warbler	S5B, S3N					PR	
<i>Setophaga ruticilla</i>	American Redstart	S5B					PO	
<i>Vermivora cyanoptera</i>	Blue-winged Warbler	S4B					PR	
Cardinalidae	Cardinals, Grosbeaks & Allies							
<i>Cardinalis cardinalis</i>	Northern Cardinal	S5					CO	
<i>Passerina cyanea</i>	Indigo Bunting	S5B					CO	
<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	S5B					CO	
<i>Piranga olivacea</i>	Scarlet Tanager	S5B					PO	
Total							91	2

*OBBA Atlas Square: 17MH75

**NHIC Atlas Square: 17MH7752

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Reptile and Amphibian Species Reported from the Study Area - 38 Exeter Road EIS (Project #2803)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA	ORAA*	NHIC Data**
		NDMNR 2021	MECP 2022	Government of Canada 2021	Government of Canada 2021	Government of Canada 2021	Ontario Nature 2019	NDMNR 2022
Turtles								
<i>Chelydra serpentina</i>	Snapping Turtle	S4	SC	SC	SC	Schedule 1	X	
<i>Chrysemys picta marginata</i>	Midland Painted Turtle	S4		SC	SC	Schedule 1	X	
<i>Emydoidea blandingii</i>	Blanding's Turtle (Great Lakes / St. Lawrence)	S3	THR	E	E	Schedule 1	X	
<i>Graptemys geographica</i>	Northern Map Turtle	S3	SC	SC	SC	Schedule 1	X	
<i>Trachemys scripta</i>	Pond Slider	SNA					X	
Snakes								
<i>Pantherophis gloydi pop. 2</i>	Eastern Foxsnake (Carolinian population)	S2	END	E	E	Schedule 1	X	
<i>Heterodon platirhinos</i>	Eastern Hog-nosed Snake	S3	THR	T	T	Schedule 1	X	
<i>Lampropeltis triangulum</i>	Milksnake	S4	NAR	SC	SC	Schedule 1	X	
<i>Ophedrys vernalis</i>	Smooth Greensnake	S4					X	
<i>Nerodia sipedon sipedon</i>	Northern Watersnake	S5	NAR	NAR	NS	No schedule	X	
<i>Regina septemvittata</i>	Queensnake	S2	END	E	E	Schedule 1	X	
<i>Storeria dekayi</i>	Dekay's Brownsnake	S5	NAR	NAR	NS	No schedule	X	
<i>Thamnophis sirtalis sirtalis</i>	Eastern Gartersnake	S5					X	
Salamanders								
<i>Ambystoma maculatum</i>	Spotted Salamander	S4					X	
<i>Hemidactylum scutatum</i>	Four-toed Salamander	S4	NAR	NAR	NS	No schedule	X	
<i>Notophthalmus viridescens viridescens</i>	Red-spotted Newt	S5					X	
<i>Plethodon cinereus</i>	Eastern Red-backed Salamander	S5					X	
Frogs and Toads								
<i>Anaxyrus americanus</i>	American Toad	S5					X	
<i>Hyla versicolor</i>	Gray Treefrog	S5					X	
<i>Pseudacris triseriata pop. 1</i>	Western Chorus Frog (Carolinian population)	S4	NAR	NAR	NS	No schedule	X	
<i>Pseudacris crucifer</i>	Spring Peeper	S5					X	
<i>Lithobates catesbeianus</i>	American Bullfrog	S4					X	
<i>Lithobates clamitans</i>	Green Frog	S5					X	
<i>Lithobates palustris</i>	Pickereel Frog	S4	NAR	NAR	NS	No schedule	X	
<i>Lithobates pipiens</i>	Northern Leopard Frog	S5	NAR	NAR	NS	No schedule	X	
<i>Lithobates sylvaticus</i>	Wood Frog	S5					X	
Total							26	0

*ORAA Atlas Square: 17MH75

**NHIC Atlas Square: 17MH7752

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Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNR). 2021. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2021-07-29. Available: <https://www.ontario.ca/page/get-natural-heritage-information>

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Mammal Species Reported from the Study Area - 38 Exeter Road EIS (Project #2803)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Ontario Mammal Atlas	NHIC Data**
		NDMNR 2021	MECP 2022	Government of Canada 2021	Government of Canada 2021	Government of Canada 2021	Dobbyn 1994	NDMNR 2022
Didelphimorphia	Opossums							
<i>Didelphis virginiana</i>	Virginia Opossum	S4					X	
Eulipotyphla	Shrews, Moles, Hedgehogs, and Allies							
<i>Blarina brevicauda</i>	Northern Short-tailed Shrew	S5					X	
<i>Condylura cristata</i>	Star-nosed Mole	S5					X	
<i>Parascalops breweri</i>	Hairy-tailed Mole	S4					X	
<i>Sorex cinereus</i>	Masked Shrew	S5					X	
<i>Sorex fumeus</i>	Smoky Shrew	S5					X	
<i>Sorex hoyi</i>	Pygmy Shrew	S4					X	
<i>Sorex palustris</i>	Water Shrew	S5					X	
Chiroptera	Bats							
<i>Eptesicus fuscus</i>	Big Brown Bat	S4					X	
<i>Lasionycteris noctivagans</i>	Silver-haired Bat	S4					X	
<i>Lasiurus borealis</i>	Eastern Red Bat	S4					X	
<i>Lasiurus cinereus</i>	Hoary Bat	S4					X	
<i>Myotis leibii</i>	Eastern Small-footed Myotis	S2S3	END				X	
<i>Myotis septentrionalis</i>	Northern Myotis	S3	END	E	E	Schedule 1	X	
Lagomorpha	Rabbits and Hares							
<i>Lepus americanus</i>	Snowshoe Hare	S5					X	
<i>Lepus europaeus</i>	European Hare	SNA					X	
<i>Sylvilagus floridanus</i>	Eastern Cottontail	S5					X	
Rodentia	Rodents							
<i>Castor canadensis</i>	Beaver	S5					X	
<i>Erethizon dorsatum</i>	Porcupine	S5					X	
<i>Glaucomys volans</i>	Southern Flying Squirrel (Great Lakes Pla	S4	NAR	NAR	NS	No schedule	X	
<i>Marmota monax</i>	Woodchuck	S5					X	
<i>Microtus pennsylvanicus</i>	Meadow Vole	S5					X	
<i>Microtus pinetorum</i>	Woodland Vole	S3?	SC	SC	SC	Schedule 1	X	
<i>Mus musculus</i>	House Mouse	SNA					X	
<i>Napaeozapus insignis</i>	Woodland Jumping Mouse	S5					X	
<i>Ondatra zibethicus</i>	Muskrat	S5					X	
<i>Peromyscus leucopus</i>	White-footed Mouse	S5					X	
<i>Peromyscus maniculatus</i>	Deer Mouse	S5					X	
<i>Rattus norvegicus</i>	Norway Rat	SNA					X	
<i>Sciurus carolinensis</i>	Eastern Gray Squirrel	S5					X	
<i>Synaptomys cooperi</i>	Southern Bog Lemming	S4					X	
<i>Tamias striatus</i>	Eastern Chipmunk	S5					X	
<i>Tamiasciurus hudsonicus</i>	Red Squirrel	S5					X	
<i>Zapus hudsonius</i>	Meadow Jumping Mouse	S5					X	
Canidae	Canines							
<i>Canis latrans</i>	Coyote	S5					X	
<i>Vulpes vulpes</i>	Red Fox	S5					X	
Felidae	Felines							
<i>Lynx canadensis</i>	Canada Lynx	S5	NAR	NAR	NS	No schedule	X	
Mephitidae	Skunks and Stink Badgers							
<i>Mephitis mephitis</i>	Striped Skunk	S5					X	
Mustelidae	Weasels and Allies							
<i>Mustela erminea</i>	Ermine	S5					X	
<i>Mustela frenata</i>	Long-tailed Weasel	S4					X	
<i>Neovison vison</i>	American Mink	S4					X	
<i>Taxidea taxus jacksoni</i>	American Badger (Southwestern Ontario	S1	END	E	E	Schedule 1	X	X
Procyonidae	Raccoons and Allies							
<i>Procyon lotor</i>	Northern Raccoon	S5					X	
Artiodactyla	Deer and Bison							
<i>Cervus elaphus</i>	Elk	SNA	EXT				X	
<i>Odocoileus virginianus</i>	White-tailed Deer	S5					X	
Total							43	1

*Mammal Atlas Square Numbers: MT

**NHIC Atlas Squares: 17MH7752

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Butterfly Species Reported from the Study Area - 38 Exeter Road EIS (Project #2803)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Ontario Butterfly Atlas*	NHIC Data**
		NDMNRF 2021	MECP 2022	Government of Canada 2021	Government of Canada 2021	Government of Canada 2021	Macnoughton et al. 2022	NDMNRF 2022
Hesperiidae	Skippers							
<i>Anatrytone logan</i>	Delaware Skipper	S4					X	
<i>Ancyloxypha numitor</i>	Least Skipper	S5					X	
<i>Epargyreus clarus</i>	Silver-spotted Skipper	S4					X	
<i>Erynnis baptisiae</i>	Wild Indigo Duskywing	S4					X	
<i>Erynnis brizo</i>	Sleepy Duskywing	S1					X	
<i>Erynnis icelus</i>	Dreamy Duskywing	S5					X	
<i>Erynnis juvenalis</i>	Juvenal's Duskywing	S5					X	
<i>Euphyes vestris</i>	Dun Skipper	S5					X	
<i>Poanes hobomok</i>	Hobomok Skipper	S5					X	
<i>Polites mystic</i>	Long Dash Skipper	S5					X	
<i>Polites peckius</i>	Peck's Skipper	S5					X	
<i>Polites themistocles</i>	Tawny-edged Skipper	S5					X	
<i>Pompeius verna</i>	Little Glassywing	S4					X	
<i>Thymelicus lineola</i>	European Skipper	SNA					X	
<i>Wallengrenia egeremet</i>	Northern Broken Dash	S5					X	
Papilionidae	Swallowtails							
<i>Papilio cressphontes</i>	Giant Swallowtail	S4					X	
<i>Papilio glaucus</i>	Eastern Tiger Swallowtail	S5					X	
<i>Papilio polyxenes</i>	Black Swallowtail	S5					X	
<i>Papilio troilus</i>	Spicebush Swallowtail	S4					X	
Pieridae	Whites and Sulphurs							
<i>Colias eurytheme</i>	Orange Sulphur	S5					X	
<i>Colias philodice</i>	Clouded Sulphur	S5					X	
<i>Pieris oleracea</i>	Mustard White	S4					X	
<i>Pieris rapae</i>	Cabbage White	SNA					X	
Lycaenidae	Harvesters, Coppers, Hairstreaks, Blues							
<i>Callophrys augustinus</i>	Brown Efin	S5					X	
<i>Celastrina lucia</i>	Northern Spring Azure	S5					X	
<i>Celastrina neglecta</i>	Summer Azure	S5					X	
<i>Celastrina sp.</i>	Azure species	SNA					X	
<i>Cupido comyntas</i>	Eastern Tailed Blue	S5					X	
<i>Lycaena epixanthe</i>	Bog Copper	S4S5					X	
<i>Lycaena phlaeas</i>	American Copper	S5					X	
<i>Satyrium acadica</i>	Acadian Hairstreak	S4					X	
<i>Satyrium calanus</i>	Banded Hairstreak	S4					X	
<i>Satyrium liparops</i>	Striped Hairstreak	S5					X	
<i>Strymon melinus</i>	Gray Hairstreak	S4					X	
Nymphalidae	Brush-footed Butterflies							
<i>Aglais milberti</i>	Milbert's Tortoiseshell	S5					X	
<i>Asterocampa celtis</i>	Hackberry Emperor	S3					X	
<i>Asterocampa clyton</i>	Tawny Emperor	S3					X	
<i>Boloria bellona</i>	Meadow Fritillary	S5					X	
<i>Boloria selene</i>	Silver-bordered Fritillary	S5					X	
<i>Cercyonis pegala</i>	Common Wood-Nymph	S5					X	
<i>Chlosyne nycteis</i>	Silvery Checkerspot	S5					X	
<i>Coenonympha tullia</i>	Common Ringlet	S5					X	
<i>Danaus plexippus</i>	Monarch	S2N,S4B	SC	E	SC	Schedule 1	X	
<i>Euphydryas phaeton</i>	Baltimore Checkerspot	S4					X	
<i>Junonia coenia</i>	Common Buckeye	SNA					X	
<i>Lethe anhedon</i>	Northern Pearly-Eye	S5					X	
<i>Lethe appalachia</i>	Appalachian Brown	S4					X	
<i>Lethe eurydice</i>	Eyed Brown	S5					X	
<i>Libytheana carinenta</i>	American Snout	SNA					X	
<i>Limenitis archippus</i>	Viceroy	S5					X	
<i>Limenitis arthemis arthemis</i>	White Admiral	S5					X	
<i>Limenitis arthemis astyanax</i>	Red-spotted Purple	S5					X	
<i>Megisto cymela</i>	Little Wood-Satyr	S5					X	
<i>Nymphalis antiopa</i>	Mourning Cloak	S5					X	
<i>Nymphalis l-album</i>	Compton Tortoiseshell	S5					X	
<i>Phyciodes cocyta</i>	Northern Crescent	S5					X	
<i>Phyciodes tharos</i>	Pearl Crescent	S4					X	

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Ontario Butterfly Atlas*	NHIC Data**
		NDMNRf 2021	MECP 2022	Government of Canada 2021	Government of Canada 2021	Government of Canada 2021	Macnaughton et al. 2022	NDMNRf 2022
<i>Polygonia comma</i>	Eastern Comma	S5					X	
<i>Polygonia interrogationis</i>	Question Mark	S5					X	
<i>Polygonia progne</i>	Gray Comma	S5					X	
<i>Speyeria cybele</i>	Great Spangled Fritillary	S5					X	
<i>Vanessa atalanta</i>	Red Admiral	S5B					X	
<i>Vanessa cardui</i>	Painted Lady	S5B					X	
<i>Vanessa virginiensis</i>	American Lady	S5					X	
Total							40	0

*TEA Atlas Square: 17MH75

**NHIC Atlas Square: 17MH7752

References

Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRf). 2021. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2021-07-29. Available: <https://www.ontario.ca/page/get-natural-heritage-information>

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Odonate Species Reported from the Study Area - 38 Exeter Road (Project #2803)

Scientific Name	Common Name	SRANK	SARO	COSEWIC	SARA	SARA Schedule	Odonate Atlas*	NHIC Data**
		NDMNRF 2021	MECP 2022	Government of Canada 2021	Government of Canada 2021	Government of Canada 2021	OOAD 2022	NDMNRF 2022
Calopterygidae	Broadwinged Damselflies							
<i>Calopteryx maculata</i>	Ebony Jewelwing	S5					X	
<i>Hetaerina americana</i>	American Rubyspot	S4					X	
Lestidae	Spreadwings							
<i>Lestes congener</i>	Spotted Spreadwing	S5					X	
<i>Lestes dryas</i>	Emerald Spreadwing	S5					X	
<i>Lestes eurinus</i>	Amber-winged Spreadwing	S4					X	
<i>Lestes rectangularis</i>	Slender Spreadwing	S5					X	
<i>Lestes unguiculatus</i>	Lyre-tipped Spreadwing	S5					X	
Coenagrionidae	Narrow-winged Damselflies							
<i>Argia apicalis</i>	Blue-fronted Dancer	S4					X	
<i>Argia tibialis</i>	Blue-tipped Dancer	S3					X	
<i>Enallagma antennatum</i>	Rainbow Bluet	S4					X	
<i>Enallagma aspersum</i>	Azure Bluet	S4					X	
<i>Enallagma basidens</i>	Double-striped Bluet	S3					X	
<i>Enallagma boreale</i>	Boreal Bluet	S5					X	
<i>Enallagma ebrium</i>	Marsh Bluet	S5					X	
<i>Enallagma exsulans</i>	Stream Bluet	S5					X	
<i>Enallagma hageni</i>	Hagen's Bluet	S5					X	
<i>Ischnura posita</i>	Fragile Forktail	S4					X	
<i>Ischnura verticalis</i>	Eastern Forktail	S5					X	
<i>Nehalennia irene</i>	Sedge Sprite	S5					X	
Aeshnidae	Darners							
<i>Aeshna constricta</i>	Lance-tipped Darter	S5					X	
<i>Aeshna umbarosa</i>	Shadow Darter	S5					X	
<i>Anax junius</i>	Common Green Darter	S5					X	
Cordulegasteridae	Spiketails							
<i>Cordulegaster diastatops</i>	Delta-spotted Spiketail	S4					X	
Corduliidae	Emeralds							
<i>Epitheta cynosura</i>	Common Baskettail	S5					X	
Libellulidae	Skimmers							
<i>Celithemis elisa</i>	Calico Pennant	S5					X	
<i>Erythemis simplicicollis</i>	Eastern Pondhawk	S5					X	
<i>Leucorrhinia intacta</i>	Dot-tailed Whiteface	S5					X	
<i>Libellula pulchella</i>	Twelve-spotted Skimmer	S5					X	
<i>Libellula semifasciata</i>	Painted Skimmer	S3					X	
<i>Pachydiplax longipennis</i>	Blue Dasher	S5					X	
<i>Plathemis lydia</i>	Common Whitetail	S5					X	
<i>Sympetrum obtrusum</i>	White-faced Meadowhawk	S5					X	
<i>Sympetrum rubicundulum</i>	Ruby Meadowhawk	S5					X	
<i>Sympetrum vicinum</i>	Autumn Meadowhawk	S5					X	
Total							34	0

*Odonate Atlas Square Numbers: 17MH75

**NHIC Atlas Squares: 17MH752

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Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF). 2021. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2021-07-29. Available: <https://www.ontario.ca/page/get-natural-heritage-information>

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Appendix VI
Tree Preservation Plan

38 Exeter Road, London Tree Preservation Plan

Prepared for:

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Project No. 2803

October 2022



NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Tree Preservation Plan

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Report submitted on October 7, 2022



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Terrestrial and Wetland Biologist / Certified Arborist (ON-2651A)

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1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by private landowner Dr. Raj Khanuja to complete a tree inventory and Tree Preservation Plan (TPP) for a small commercial development located at 38 Exeter Road in London, Ontario (Map 1). The property contains scattered trees and is generally bound by Exeter Road to the south, Wonderland Road South to the east, and existing commercial units to the north and west (Map 1). For the purposes of this report, this property proposed for development, 38 Exeter Road, will be referred to as the “subject property”.

This TPP was completed in accordance with of The London Plan (City of London 2021b), the City of London Tree Protection By-law (no. C.P.-1555-252) (2021a) and Section 12 of the Design Specifications & Requirements Manual, Tree Planting and Protection Guidelines (City of London 2018), herein referred to as “the Design Specifications”. The by-law regulates the injuring and destruction of trees on private property within the City of London that meet either of the following criteria:

1. Trees that have a trunk diameter of 50cm or greater measured 1.4m above Natural Ground Level, within the Urban Growth Boundary,
2. Trees of any size within a Tree Protection Area (as shown in Schedule B of the Tree Protection By-law),

The subject property is located entirely within the ‘Urban Growth Boundary’ as per the London Plan (2021b), and is also within one of the City’s Tree Protection Areas, as identified in Schedule D-7 of the City’s Tree Protection By-law. However, the inventoried trees are not protected by the by-law, as outlined in criteria subsection (d), which provides an exemption to trees to be removed:

“As a condition to the approval of a site plan, a plan of subdivision or a consent under section 41, 51 or 53, respectively, of the Planning Act, or as a requirement of a site plan agreement or subdivision agreement entered into under those sections.”

Despite this, a TPP is still required for site plan approval. In developing this TPP, the London Plan, Tree Protection By-law, and the Design Specifications were considered and followed as appropriate.

This report provides the findings of the tree inventory, analysis of proposed development against the trees’ overall health and structural integrity, protection measures for trees to be

retained, and recommended mitigation and compensation measures. Tree inventory data and mapping has been compared to the layout of the proposed draft concept plan that is current at the time of writing of this report, and prepared by Antrix Architects Inc. (dated September 21, 2022, plan number A0), as shown on Map 2.

2.0 Tree Inventory and Methodology

A comprehensive inventory and assessment of trees within the subject property was completed by NRSI Certified Arborists on May 4, 2022. Trees located along the boundary of the subject property, as well as trees adjacent to the subject property with the potential to be impacted by the proposed development, were also included in the inventory and assessment.

Individual trees $\geq 10\text{cm}$ Diameter at Breast Height (DBH) were surveyed using an SXBlue II GNSS GPS, and are shown on Map 2. Where a tree had multiple stems, the DBH of each stem $\geq 10\text{cm}$ DBH was recorded, however for the purposes of identifying which trees are considered Distinctive Trees, only the measurement of the largest stem was used (Sara Rowland, pers. comm. May 13, 2021). Individual trees that were $\geq 10\text{cm}$ in DBH were tagged with a pre-numbered aluminum forestry tag and assessed by NRSI arborists. Where isolated trees were located near property boundaries, or were inaccessible due to health and safety concerns, tagging was avoided. Any untagged trees have been assigned with a letter map code (e.g., A, B, C, etc.). A complete list of trees that were assessed and their overall health and potential for structural failure is included in Appendix I.

The following information was recorded for each tree:

- Species,
- DBH (centimetres),
- Approximate crown radius (metres),
- General health (excellent, good, fair, poor, very poor, dead),
- Potential for structural failure (improbable, possible, probable, imminent),
- Tree location (on-site/off-site/boundary), and
- General comments (i.e. disease, aesthetic quality, development constraints, sensitivity to development).

The overall health and potential for structural failure of each tree was assessed based on the criteria outlined in Appendix II (Dunster 2009; Dunster et al. 2013). NRSI has exercised a reasonable standard of care, skill and diligence as would be customarily and normally provided in carrying out these assessments. The assessments have been made using accepted arboricultural techniques. These include a visual examination of each tree for structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of insect attack, the condition of any visible root structures, the direction of stem lean (if any), the general condition

of the trees and the surrounding site, and the current or planned proximity of property and people. None of the trees examined on the property were dissected, cored, probed, or climbed and detailed root crown examinations involving excavation were not undertaken. The conditions for this assessment, including restrictions, professional responsibility, and third-party liability can be found in Appendix III.

2.1 Bat Habitat Assessment Methodology

Three bat species known from the area are listed as Endangered provincially and are afforded general habitat protection under the *Endangered Species Act* (2007). Bat Species at Risk (SAR) include Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Eastern Small-Footed Myotis (*Myotis leibii*).

These species are known to roost in tree cavities, hollows, or under loose bark, as well as within buildings (MNRF 2015). As part of the tree health assessments, NRSI's Certified Arborists, who are trained and experienced in the Ministry of Natural Resources and Forestry (MNRF) bat habitat assessment protocols (OMNR 2011) (MNRF 2014), visually scanned all trees $\geq 10\text{cm}$ DBH for the presence of features (i.e. cavities, loose bark, etc.) that may provide bat maternity colony habitat.

Information considered (and recorded, where applicable) for cavity trees included tree species, location, DBH, canopy cover, tree height, decay class according to Watt and Caceres (Watt and Caceres 1999), and number of potentially suitable cavities. Other criteria were also considered, including the use of cavities by other wildlife, the potential for cavities to be used by predators, supporting/surrounding habitat, and other characteristics which may contribute to the habitat requirements of these species, such as temperature regulation.

3.0 Summary of Tree Inventory Findings

In total, 52 trees were inventoried, comprising three species: Black Walnut (*Juglans nigra*), Eastern Cottonwood (*Populus deltoides*), and Crack Willow (*Salix euxina*). Of the trees inventoried and assessed, 51 (98.1%) are native species and one (1.9%) Crack Willow is non-native.

One Distinctive Tree, a Black Walnut, was identified on the subject property. However, due to the exemption from the Tree Protection By-law under subsection (d) (City of London 2021a), Distinctive status of trees does not warrant specific permitting or compensation requirements for this site plan application, and instead consideration and compensation requirements apply to all trees $\geq 10\text{cm}$ DBH, as per the London Plan (2021b). None of the tree species observed are regionally significant or protected under the *Species at Risk Act* (2002) or *Endangered Species Act* (2007).

A complete list of inventoried trees is provided in Appendix I and tree locations are shown on Map 2. Appendix IV includes both a list of tree species inventoried, their health, and whether they are native or non-native, as well as a summary of the overall health of the trees inventoried and their potential for structural failure.

3.1 Bat Habitat Findings

Each inventoried tree was assessed for suitable bat habitat, including cavities, exfoliating bark, and dead leaf clusters. All assessments were completed concurrently with the tree inventory during the leaf-off period in the spring of 2022. No suitable bat habitat was identified.

4.0 Tree Removal and Retention Analysis

The existing overall health and/or potential for structural failure was compared to the proposed development layout to determine whether existing trees would be impacted by the proposed undertaking. Avoidance, mitigation, and protection measures for trees were examined to determine which trees would be impacted and which could be retained. The retention analysis presented below is based on the proposed draft concept plan prepared by Antrix Architects Inc. (dated September 21, 2022, plan number A0), and provided to NRSI in September 2022 (Map 2).

Of the 52 inventoried trees, 41 are anticipated to require removal based on the extent of the proposed development, and/or due to their health and potential for structural failure. Two of the trees anticipated to be removed are considered boundary trees (Tree # 1112 and 1129), and six are located on the adjacent property to the west (Tree # 1114, 1122, 1124, 1125, 1127, and C). The removal or impact of boundary or off-site trees requires the permission of all owners involved, as per the City of London Tree Protection By-Law (2021a). If the main stem of any tree is located on multiple properties, all owners of those properties must be consulted before any tree removal or impact occurs. In addition, following the boundary measurement standards set by the City of London's Tree Protection Zone (TPZ) requirements (2018), Tree # 1115 located on the adjacent property to the west, has been prescribed for retention but is anticipated to be minimally impacted by the proposed development. Therefore, permission to impact will be required by neighboring landowners before construction takes place. NRSI is not aware of receipt of approval for the removal or impact to off-site or boundary trees at this time, and our recommendation for removal should not be inferred to reflect approval from any of the required parties.

The majority of the trees proposed for removal are in fair or good health with an improbable potential for structural failure, and range in size from 10.9cm to 51.5cm DBH. None of the trees anticipated to be removed were identified as dead during the tree inventory.

5.0 Compensation

The London Plan subsection 399.4.b (2021b) requires that trees shall be replaced at a ratio of one replacement tree for every 10cm of tree diameter that is removed. The recommended replacement plantings summarized in Table 1 have been developed to satisfy this requirement. Where a tree had multiple stems, the measurement of the largest stem was used to determine the number of replacement plantings required.

Table 1. Replacement Planting Summary

Number of Trees Designated for Removal	Total Diameter (cm) of Trees Designated for Removal	Number of Replacement Trees Required
41	1,065.6	107

If possible, replacement plantings should be installed on the subject property. A post-construction remediation plan may be required to further address replacement plantings, as per the Design Specifications (City of London 2018). Species used for replacement/enhancement plantings should be native to the City of London, and all plantings should adhere to the specifications outlined in Section 12.2.3 of the Design Specifications (City of London 2018). Approved Street Tree species are outlined in Appendix 5 of the Design Specifications (City of London 2018).

It is recommended that the following criteria be followed during the development of proposed planting plans, should they occur:

- The plan should be developed by, or reviewed and approved by an Ontario Landscape Architect (OLA), Certified Arborist, or Registered Professional Forester (RPF);
- Be limited to non-invasive species, with preference toward native species to the City of London;
- Include hardy, native tree species where feasible that are known to thrive in more urban conditions (i.e. compacted soil, drought, high salt tolerance),
- Include a diversity of trees from several genus to increase disease and pest tolerance and discourage monocultures (no more than 30% from a single genus, 10% from a single species),
- Include a watering and monitoring plan for two years following planting,
- Be replaced if they are documented to have died within the two-year monitoring plan,
- Be spaced so as to allow material to reach its ultimate size and form;
- Be provided with appropriate soil types and soil volumes;

- Avoid Ash species due to the risk of the Emerald Ash Borer (*Agrilus planipennis*),
- Avoid 'messy trees', such as fruiting trees or Poplars (*Populus* spp.) where plantings occur in close proximity to driveways and roadways;
- Spacing of plant material should account for the ultimate size and form of the selected species and also the purpose of the planting, whether it be for screening, shade, naturalizing, rehabilitation, etc.; and
- Special attention to location and height of trees in proximity to utilities.

6.0 Tree Protection Measures and Recommended Mitigation

6.1 Prior to Construction and Site Alteration

Temporary tree protection fencing (TPF) will be situated where trees are adjacent to the proposed development as shown on Map 2. A combined sediment and erosion control fence (i.e. silt fence) and TPF is recommended where trees are situated adjacent to the limit of disturbance. This TPF is to take the form of plastic mesh fencing (such as snow fencing), t-bar stakes, heavy duty silt fencing, and topped with 2x4 beams, as outlined in the Design Specifications (City of London 2018). Detailed requirements and a corresponding fencing diagram from the Design Specifications can be found on Map 2.

The TPF will be installed and maintained by the Developer prior to any construction activities (rough grading, vegetation and tree removal). Prior to works commencing on-site, fence installation and location should be inspected by a Certified Arborist or RPF. Signage indicating the purpose of protection fencing will be attached to the TPF every 100-150m. Recommended signage, as outlined in the Design Specifications (City of London 2018) is shown on Map 2.

Section 12.1.3 of the Design Specifications (City of London 2018) stipulates the minimum size of any TPZ based on the size of DBH of the protected trees. TPZ's for trees designated for retention are shown on Map 2, applying the protection distances specified for trees within Open Spaces and Woodlands as per the Design Specifications (City of London 2018). The minimum TPZ will be maintained for all retained trees, with the exception of Tree # 1099, 1100, and 1115, for which the TPZ cannot be maintained to its full extent due to the proposed development plan. In these cases, trees have been recommended for retention despite the expectation that a minor portion, no more than 10% of their approximate root zone, will be impacted by the proposed construction activities. This recommendation has been made with the intent of retaining as many existing trees as possible, and anticipating that the affected trees will tolerate the proposed impacts.

6.1.1 Tree Removal Timing Windows

Migratory Birds

The removal of trees and vegetation has the potential to disrupt nesting birds. The schedule of on-site work must consider the *Migratory Birds Convention Act* (MBCA) (Government of Canada 2019) construction window. All tree and vegetation removal should occur outside of the core nesting period for migratory birds as established by the Canadian Wildlife Service (CWS)

(2012). This period extends from approximately April 1 – August 31. For any tree or vegetation removal which occurs during the core nesting period, nest surveys may be conducted by a qualified biologist within small, simple habitat areas (i.e., individual isolated trees and hedgerow trees as found on the subject property) just prior to the removal activity (less than 48hrs prior to) to ensure that nesting birds are not present. If active nests are present, nests and an appropriate buffer are to be flagged and protected until the young have fledged and left the nest.

Raptors

The eggs and nests of all species of wild birds are also protected under the *Fish and Wildlife Conservation Act* (Government of Ontario 1997). This includes species identified as raptors (e.g. hawks and owls), which are not protected under the *Migratory Birds Convention Act*. It should be noted that some species of raptors breed and nest during the winter months in Ontario. Although the subject property does not contain suitable habitat for winter raptor nesting, care and consideration of the possible presence of winter nesting species should be executed should tree removal occur in the winter.

Species at Risk Bats

SAR bats and their habitats are protected by the *Endangered Species Act* (Government of Ontario 2007). In order to avoid impact to bats and their habitat, it is recommended that trees be removed outside of the bat active roosting period, which extends from approximately April 1 – September 30. Any tree removal that has the potential to impact SAR bats or their habitat requires prior correspondence with the Ministry of Environment, Conservation and Parks (MECP).

All developers/consultants/contractors, etc. are legally obligated to carry out due diligence to protect wildlife species, as described above, from harm during all phases of construction projects. Timing windows represent recommendations to avoid contravention of the above-mentioned Acts, but it should be noted that the species, as mentioned above, are afforded protection regardless of the time of year.

6.2 During Construction

Temporary TPF is to be maintained by the Developer during the entire construction period to ensure that any trees to be retained (including their root systems) are protected. Any minimal damage (i.e., damage to limbs or roots) to trees to be retained during construction must be pruned using proper arboricultural techniques. Should any of the trees intended to be retained

be seriously damaged or die as a result of construction activities, consultation with the City will be required.

6.3 Post-Construction

It is recommended that the TPF be removed upon completion of construction activities and adjacent areas are stabilized with a suitable vegetative cover to the satisfaction of the Environmental Inspector or qualified biologist. Removal of TPF and revegetation will permit increased root development for the remaining trees. A Certified Arborist or RPF must inspect all retained trees and their rooting area, and recommend remediation work if needed, as outlined in Section 12.1.6 of the Design Specifications (City of London 2018). A post-construction remediation plan may be required if damage to retained trees is noted. Following remediation activities, if needed, a final assessment should be done to ensure all protocols were met, ensuring final project approval.

7.0 Conclusion

NRSI was retained by private landowner Dr. Raj Khanuja, to complete a tree inventory and TPP for the property located at 38 Exeter Road in London, Ontario.

NRSI Certified Arborists conducted a comprehensive inventory and assessment of trees within the subject property on May 4, 2022. Trees located on the boundary of the subject property, as well as trees adjacent to the subject property with the potential to be impacted by the proposed development, were also included in the inventory and assessment. A total of 52 trees belonging to three common native and non-native species were inventoried and assessed for removal within the subject property and boundaries. Of the 52 trees inventoried, 41 are designated for removal.

It is recommended that all proposed tree removals occur with consideration to the protection and general timing windows for migratory birds, raptors, and SAR bats. It is required that written permission from impacted adjacent landowners be sought out and granted in advance of any boundary or off-property tree removals and/or injury. TPF is to be installed prior to any on-site work, in order to provide adequate protection for retained trees and their root systems. All TPF is to conform to the specifications of Section 12.1.4 of the Design Specifications (City of London 2018).

As per the compensation ratio specified in the London Plan (2021b), the installation of 107 replacement trees is required to compensate for the removal of 41 trees. Replacement plantings should consist of site-appropriate native and/or approved street tree species. For trees that cannot be planted on the subject property, a cash-in-lieu fee should be paid to the City of London.

8.0 References

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Appendix I
Tree Inventory Data

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Tree Inventory Data

Tree Number	Common Name	Scientific Name	Native/ Non-native	Stem Count	DBH (cm)	Crown Radius (m)	Potential for Structural Failure Rating	Overall Condition	Location	Proposed Action	Distinctive Tree (Y/N) ¹	Tree Protection Zone ² (m)	Comments
1083	Black Walnut	<i>Juglans nigra</i>	Native	2	34.8+34.3	5.0	Possible	Fair	On-site	Remove	N	-	Codominant stems with included bark; small broken branches; vines.
1084	Black Walnut	<i>Juglans nigra</i>	Native	1	38.3	5.0	Improbable	Good	On-site	Remove	N	-	Asymmetrical crown; small broken branches; vines.
1085	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	19.5	3.0	Improbable	Good	On-site	Remove	N	-	Asymmetrical crown; slight lean east.
1086	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	15.2	1.0	Improbable	Fair	On-site	Remove	N	-	Pistol butt; growing on slope; slight lean south; small clonal stems.
1087	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	18.8	1.5	Improbable	Good	On-site	Remove	N	-	Minor dieback; suppressed.
1088	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	20.5	4.0	Improbable	Fair	On-site	Remove	N	-	Minor lean south.
1089	Eastern Cottonwood	<i>Populus deltoides</i>	Native	2	14.5+12.7	1.0	Improbable	Good	On-site	Remove	N	-	Codominant stem; slight lean west.
1090	Black Walnut	<i>Juglans nigra</i>	Native	1	24.5	4.0	Improbable	Fair	On-site	Remove	N	-	Extensive vines; minor infill.
1091	Black Walnut	<i>Juglans nigra</i>	Native	1	27.6	4.0	Improbable	Fair	On-site	Remove	N	-	Minor dieback and broken branches; callous wounds.
1092	Black Walnut	<i>Juglans nigra</i>	Native	1	30.4	4.0	Improbable	Fair	On-site	Remove	N	-	Previous pruning; minor vines.
1093	Black Walnut	<i>Juglans nigra</i>	Native	1	16.5	3.5	Improbable	Fair	On-site	Remove	N	-	Asymmetrical crown south.
1094	Black Walnut	<i>Juglans nigra</i>	Native	2	41.2+34.7	5.0	Improbable	Fair	On-site	Remove	N	-	Codominant stems with included bark; small broken branches.
1095	Black Walnut	<i>Juglans nigra</i>	Native	4	29.3+24.3+22.4+18.9	3.0	Improbable	Fair	On-site	Remove	N	-	Multiple stems with included bark; debris collecting in branch union; small broken branches.
1096	Black Walnut	<i>Juglans nigra</i>	Native	2	28.5	3.0	Improbable	Fair	On-site	Remove	N	-	Asymmetrical crown east; codominant leaders with included bark near surface.
1097	Black Walnut	<i>Juglans nigra</i>	Native	1	12.5	1.5	Improbable	Good	On-site	Remove	N	-	Minor dieback.
1098	Black Walnut	<i>Juglans nigra</i>	Native	2	32.3+24.6	7.0	Improbable	Fair	On-site	Remove	N	-	Codominant stems with included bark; small broken branches.
1099	Black Walnut	<i>Juglans nigra</i>	Native	1	13.3	0.5	Improbable	Good	On-site	Retain	N	3.6	Minor vines.
1100	Black Walnut	<i>Juglans nigra</i>	Native	1	10.0	0.5	Improbable	Good	On-site	Retain	N	3.6	Minor vines.
1101	Black Walnut	<i>Juglans nigra</i>	Native	3	27.6+26.4+26.3	7.0	Improbable	Fair	On-site	Remove	N	-	Multiple leaders with included bark; extensive vines; small broken branches.
1102	Black Walnut	<i>Juglans nigra</i>	Native	1	32.1	5.0	Improbable	Fair	On-site	Remove	N	-	Large cankers; minor vines; tall crown.
1103	Black Walnut	<i>Juglans nigra</i>	Native	1	41.7	4.0	Probable	Fair	On-site	Remove	N	-	Large dead branches; minor vines; tall crown.
1104	Black Walnut	<i>Juglans nigra</i>	Native	1	35.2	5.0	Improbable	Fair	On-site	Remove	N	-	Asymmetrical crown toward south; small dead branches.
1105	Black Walnut	<i>Juglans nigra</i>	Native	2	21.8+21.1	3.0	Improbable	Poor	On-site	Remove	N	-	Large open cankers with failing reaction wood; vines.
1106	Black Walnut	<i>Juglans nigra</i>	Native	1	11.6	0.5	Possible	Poor	On-site	Remove	N	-	Poor vigour; extensive vines, pulling leaders over.
1107	Black Walnut	<i>Juglans nigra</i>	Native	1	32.0	4.0	Improbable	Fair	On-site	Remove	N	-	Codominant leaders with included bark; small broken branches; tall crown; minor vines.
1108	Black Walnut	<i>Juglans nigra</i>	Native	1	28.2	3.5	Improbable	Fair	On-site	Remove	N	-	Minor dieback.
1109	Black Walnut	<i>Juglans nigra</i>	Native	1	39.5	3.5	Improbable	Fair	On-site	Remove	N	-	Minor broken branches.
1110	Black Walnut	<i>Juglans nigra</i>	Native	1	51.5	5.0	Probable	Fair	On-site	Remove	Y	-	Large broken branch; vines.
1111	Black Walnut	<i>Juglans nigra</i>	Native	1	13.8	2.0	Improbable	Fair	On-site	Remove	N	-	Extensive vines.
1112	Black Walnut	<i>Juglans nigra</i>	Native	1	29.2	4.0	Improbable	Fair	Boundary	Remove	N	-	Open crown; minor vines.
1113	Black Walnut	<i>Juglans nigra</i>	Native	1	28.5	3.0	Improbable	Fair	On-site	Remove	N	-	Extensive vines; asymmetrical crown toward south.
1114	Black Walnut	<i>Juglans nigra</i>	Native	1	22.0	4.0	Improbable	Fair	Off-site	Remove	N	-	Asymmetrical crown south; vines.
1115	Black Walnut	<i>Juglans nigra</i>	Native	1	25.9	3.0	Improbable	Fair	Off-site	Retain	N	3.6	Extensive vines; sparse crown; small broken branches.
1116	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	26.1	3.0	Improbable	Fair	Off-site	Retain	N	3.6	Pistol butt; growing on slope; slight lean west.
1117	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	37.8	1.0	Improbable	Fair	Off-site	Retain	N	4.8	Pistol butt; growing in drainage ditch in standing water; dieback of lower branches; callous wound.
1118	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	18.5	1.0	Improbable	Poor	Off-site	Retain	N	3.6	Slight lean west with good reaction wood; growing at edge of drainage ditch in standing water; dieback of lower branches.
1119	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	28.9	1.5	Improbable	Fair	Off-site	Retain	N	3.6	Growing at edge of drainage ditch in standing water; pistol butt; minor vines; tall crown.
1120	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	10.0	0.5	Probable	Very Poor	Off-site	Retain	N	3.6	Growing in drainage ditch in standing water; topped at 2m, small lateral branches remain; extensive vines.
1121	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	18.0	1.0	Improbable	Fair	Off-site	Retain	N	3.6	Growing in drainage ditch in standing water; minor vines; tall, sparse crown.
1122	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	17.5	1.0	Possible	Poor	Off-site	Remove	N	-	Growing in drainage ditch in standing water; extensive vines; fallen tree leaning on stem, curved horizontal.
1123	Black Walnut	<i>Juglans nigra</i>	Native	1	21.5	3.5	Improbable	Fair	On-site	Remove	N	-	Minor vines.
1124	Black Walnut	<i>Juglans nigra</i>	Native	1	25.5	3.0	Improbable	Fair	Off-site	Remove	N	-	Minor vines; minor dieback.
1125	Black Walnut	<i>Juglans nigra</i>	Native	1	41.6	5.5	Improbable	Excellent	Off-site	Remove	N	-	No apparent problems.
1126	Black Walnut	<i>Juglans nigra</i>	Native	1	28.5	4.0	Improbable	Fair	On-site	Remove	N	-	Minor dieback.

38 Exeter Road, London Tree Protection Plan
Tree Inventory Data

Tree Number	Common Name	Scientific Name	Native/ Non-native	Stem Count	DBH (cm)	Crown Radius (m)	Potential for Structural Failure Rating	Overall Condition	Location	Proposed Action	Distinctive Tree (Y/N) ¹	Tree Protection Zone ² (m)	Comments
1127	Black Walnut	<i>Juglans nigra</i>	Native	1	30.1	4.0	Improbable	Fair	Off-site	Remove	N	-	Growing on slope at edge of drainage ditch; pistol butt; minor dieback of lower branches.
1128	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	10.9	1.0	Improbable	Fair	On-site	Remove	N	-	Minor vines; minor dieback of lower branches.
1129	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	14.3	1.0	Improbable	Fair	Boundary	Remove	N	-	Minor vines; minor dieback of lower branches.
1130	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	16.1	1.0	Improbable	Fair	On-site	Remove	N	-	Minor vines; minor dieback of lower branches.
1131	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	24.5	1.0	Improbable	Fair	On-site	Remove	N	-	Minor dieback of lower branches; small callous wounds.
A	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	26.0	3.5	Improbable	Fair	Off-site	Retain	N	3.6	Growing in drainage ditch in standing water.
B	Eastern Cottonwood	<i>Populus deltoides</i>	Native	1	26.1	4.0	Improbable	Fair	Off-site	Retain	N	3.6	Tall, small crown; growing at edge of drainage ditch.
C	Crack Willow	<i>Salix euxina</i>	Non-native	1	16.0	2.0	Possible	Very Poor	Off-site	Remove	N	-	Heavy lean east; leaning along ditch slope; dead top.

¹Where multiple stems were present, only the largest was used to determine Distinction status

²Shown for trees proposed for retention only; as per London's Design Specifications (2018) for areas designated Open Space or Woodlands

Appendix II

Tree Health and Potential for Structural Failure Assessment Criteria

Tree Health Assessment Criteria

Assessment Criteria	Definition ¹
Excellent	Represents a tree in near perfect form, health, and vigour. This tree would exhibit no deadwood, no decline, and no visible defects.
Good	Represents a tree ranging from a generally healthy tree to a near perfect tree in terms of health, vigour and structure. This tree exhibits a complete, balanced crown structure with little to no deadwood and minimal defects as well as a properly formed root flare.
Fair	Represents a tree with minor health, balance or structural issues with minimal to moderate deadwood. Branching structure shows signs of included bark or minor rot within the branch connections or trunk wood. The root flare shows minimal signs of mechanical injury, decay, poor callusing, or girdling roots. Trees in the category require minor remedial actions to improve the vigour and structure of the tree.
Poor	Represents a tree that exhibits a poor vigour, reduced crown size (<30% of crown typical of species caused by overcrowding or decline), extreme crown imbalance, or extensive rot in the branching and trunk wood. Fungus could be seen from these rotting areas, suggesting further decay. These trees have extensive crown die back with a large amount of deadwood, and possibly dead sections. These weakened areas can lead to a potential failure of tree sections. Rooting zones show signs of extensive root decay or damage (fruiting bodies or mechanical damage) or girdling roots. Trees in this category require more extensive actions to prevent failure. A tree identified as poor would be a candidate for removal in the near future.
Very Poor	Represents a tree that exhibits major health and structural defects. Quite often the defects or diseases affecting this tree will be fatal. Large quantities of fungus, large dead sections with possible cavities and bark falling off all are signs that a tree is in a major state of decline and would be identified as very poor. These trees have a probable or imminent potential for structural failure. These trees should be identified for removal.
Dead	Represents a tree that exhibits no sign of new growth, including buds, foliage, or shoot growth. These trees have a probable or imminent potential for structural failure. These trees should be identified for removal.

¹ (Dunster 2009)

Potential for Structural Failure Assessment Criteria

Assessment Criteria*	Definition ¹
Improbable	The tree or branch is not likely to fail during normal weather conditions and may not fail in many severe weather conditions within the specified time frame.
Possible	Failure could occur, but it is unlikely during normal weather conditions within the specified time frame.
Probable	Failure may be expected under normal weather conditions within the specified time frame.
Imminent	Failure has started or is most likely to occur in the near future, even if there is no significant wind or increased load. This is a rare occurrence for an assessor to encounter, and it may require immediate action to protect people from harm.
	*A specified time frame of 1 year will be used when assessing potential for structural failure.

¹ (Dunster et al. 2013)

Appendix III
Conditions of Assessment

Conditions of Tree Assessment

Limitations

This tree inventory and assessment is based on the circumstances and observations by Natural Resource Solutions Inc. (NRSI) as they existed at the time of the site inspection(s) of the Client's Property as described in this report (the "Property") and the trees situated thereon, and upon information provided by the Client to NRSI. The opinions in this assessment are given based on observations made and using generally accepted professional judgment, however, because trees are living organisms and subject to change, damage and disease, the results, observations, recommendations, and analysis as set out in this assessment are valid only at the date any such observations and analysis took place. No guarantee, warranty, representation or opinion is offered or made by NRSI as to the length of the validity of the results, observations, recommendations and analysis contained within this assessment. As a result, the Client shall not rely upon this assessment, save and except for representing the circumstances and observations at the date of site inspection(s), and the analysis and recommendations made in relation to the proposed undertaking. It is recommended that the inventoried trees discussed in this assessment should be re-assessed periodically, where required.

Further Services

Neither NRSI, nor any assessor employed or retained by NRSI (the "Assessor") for the purpose of preparing or assisting in the preparation of this assessment shall be required to provide any further consultation or services to the Client including, without limitation, acting as an expert witness or witness in any court in any jurisdiction unless the Client has first made specific arrangements with respect to such further services, including providing payment of the Assessor's regular hourly billing fees.

NRSI accepts no responsibility for the implementation of all or any part of this report, unless specifically requested to examine the implementation of such activities recommended herein. Any request for the inspection or supervision of all or part of the implementation shall be made in writing and the details agreed to in writing by both parties.

Assumptions

The Client is hereby notified that where any of the information set out and referenced in this assessment are based on assumptions, facts or information provided to NRSI, NRSI will in no way be responsible for the veracity or accuracy of any such information. Further, the Client acknowledges and agrees that NRSI has, for the purposes of preparing their assessment, assumed that the Property is in full compliance with all applicable federal, provincial, municipal and local statutes, regulations, by-laws, guidelines and other related laws. NRSI explicitly denies any legal liability for any and all issues with respect to non-compliance with any of the above-referenced statutes, regulations, by-laws, guidelines and laws as it may pertain to or affect the Property.

Restriction of Assessment

The assessment carried out was restricted to the areas as described in this report. NRSI is not legally liable for any other trees except those expressly discussed herein. The conclusions of this assessment do not apply to any areas, trees, or any other property not covered or referenced in this assessment.

Professional Responsibility

In carrying out this assessment, NRSI and any Assessor appointed for and on behalf of NRSI to perform and carry out the assessment has exercised a reasonable standard of care, skill and diligence. The assessment has been made using accepted arboricultural techniques. These include a visual examination of each tree for structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of insect attack, discolored foliage (during the leaf-on period), the condition of any visible root structures, the degree and direction of lean (if any), the general condition of the tree(s) and the surrounding site, and the current or planned proximity of property and people. Except where specifically noted in the assessment, none of the trees examined on the property were dissected, cored, probed, or climbed, and detailed root crown examinations involving excavation were not undertaken.

No guarantees are offered, or implied, that trees recommended for retention, or all parts of them, will remain standing. It is professionally impossible to predict with absolute certainty the behaviour of any single tree or group of trees, or all their component parts, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most

trees have the potential to fall, lean, or otherwise pose a danger to property and persons in the event of extreme weather conditions, and this risk can only be eliminated if the tree is removed.

Without limiting the foregoing, no liability is assumed by NRSI or its directors, officers, employers, contractors, agents or Assessors for:

- a) any legal description provided with respect to the Property;
- b) issues of title and/or ownership with respect to the Property;
- c) the accuracy of the Property line locations or boundaries with respect to the Property; and
- d) the accuracy of any other information provided to NRSI by the Client or third parties;
- e) any consequential loss, injury or damages suffered by the Client or any third parties, including but not limited to replacement costs, loss of use, earnings and business interruption; and
- f) the unauthorized distribution of the assessment.

Third Party Liability

This assessment was prepared by NRSI for the Client. The data collected reflect NRSI's best assessment of the inventoried trees situated on the Property with the information available at the time of observation. Data analysis and the assessment of potential impacts to inventoried trees is specific to the proposed undertaking as described in this report. NRSI accepts no responsibility for any damages or loss suffered by any third party or by the Client as a result of decisions made or actions based upon the use of this assessment for purposes unrelated to the proposed undertaking.

General

Any plans and/or illustrations in this assessment are included only to help the Client visualize the issues in this assessment and shall not be relied upon for any other purpose.

This report shall be considered as a whole, no sections are severable, and the assessment shall be considered incomplete if any pages are missing.

Appendix IV
Tree Data Summary Tables

Summary of Inventoried Trees

Common Name	Scientific Name	Excellent	Good	Fair	Poor	Very Poor	Dead	Total
Native Species								
Black Walnut	<i>Juglans nigra</i>	1	4	26	2			33
Eastern Cottonwood	<i>Populus deltoides</i>		3	12	2	1		18
Total		1	7	38	4	1	0	51
Non-Native Species								
Crack Willow	<i>Salix euxina</i>					1		1
Total		0	0	0	0	1	0	1
Overall Total		1	7	38	4	2	0	52

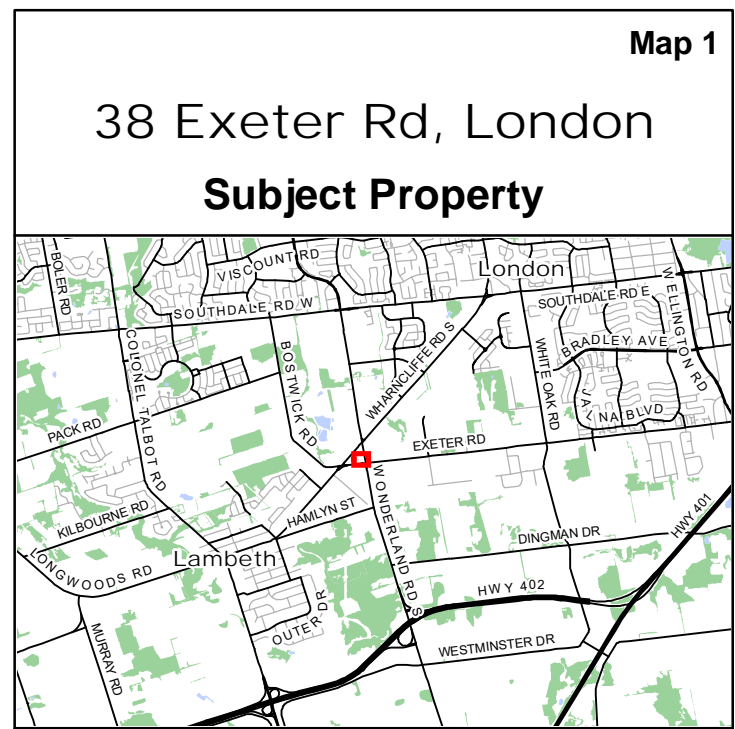
Overall Health of Trees Inventoried

Potential for Structural Failure Rating	Excellent overall condition	Good overall condition	Fair overall condition	Poor overall condition	Very poor overall condition	Dead	Total
Improbable	1	7	35	2			45
Possible			1	2	1		4
Probable			2		1		3
Imminent							0
Total	1	7	38	4	2	0	52

Maps

Map 1. Subject Property

Map 2. Tree Inventory and Preservation Plan



Legend

Subject Property



Map Produced by Natural Resource Solutions Inc. This map is proprietary and confidential and must not be duplicated or distributed by any means without express written permission of NRSI. Data provided by MNRFO Copyright: Queen's Printer Ontario. Imagery: First Base Solutions Inc. (2020).

Project: 2803 Date: May 16, 2022	NAD83 - UTM Zone 17 Size: 11x17" 1:600

Appendix VII

Net Effects Impact Table

The following appendix contains documents that are difficult to make screen reader accessible. Please contact Madison Postma at mpostma@nrsi.on.ca for further description or details of these documents at any time.

The following documents contains a table that summarizes the impact and net effect assessment completed in Section 5 of this report.

SOURCE OF IMPACT	POTENTIAL AREAS AFFECTS & POTENTIAL EFFECTS	AVOIDANCE, MITIGATION, COMPENSATION	NET EFFECTS & RATIONALE
1.0 Existing Impacts (where opportunities for net positive effects have been identified):			
5.2 Existing Conditions	The subject property currently contains a number of invasive species and has been degraded by urban pollution such as garbage and road salt.	Removing the invasive species from the property will stop their spread into surrounding area and into the greater surrounding natural features outside of the study area. Native, non-invasive plant species should be used in any future landscaping plans for the proposed development.	No significant net effects are expected.
2.0 Direct Impacts:			
5.3.1 Vegetation and Tree Removal	Removal of isolated trees and herbaceous species is proposed. This can adversely affect wildlife that rely on this habitat. Trees reduce flooding and heat island effects.	Trees are protected wherever possible, as shown in the Tree Preservation Plan. Trees should be removed outside of MBCA and active bat seasons, outlined in the TPR. Compensation trees are required at 1 tree per 10cm removed.	With proposed compensation and tree protection fencing, and adherence to wildlife timing windows, no significant net effects are expected.
5.3.2 Erosion and Sedimentation	During construction, areas of bare soil may be exposed that have the potential to erode during precipitation events and impact adjacent natural features. In the event of a heavy rain or snow melt event, sediment laden runoff can enter adjacent natural areas by way of overland flow.	Erosion and Sediment Control (ESC) fencing will be required as part of an ESC Plan.	With an effective ESC Plan, no significant net impacts are expected.
3.0 Indirect Impacts:			
5.4. Indirect Impacts	There will be no indirect impacts to the subject property as there are no natural features within close proximity to the study area that would be negatively impacted by the proposed construction.	N/A	No significant net effects are expected.