Environmental and Ecological Planning Advisory Committee Report

2nd Meeting of the Environmental and Ecological Planning Advisory Committee
January 20, 2022
Advisory Committee Virtual Meeting - during the COVID-19 Emergency
Please check the City website for current details of COVID-19 service impacts.

Attendance

PRESENT: S. Levin (Chair), I. Arturo, L. Banks, A. Boyer, S. Esan, P. Ferguson, S. Hall, S. Heuchan, B. Krichker, I. Mohamed, K. Moser, B. Samuels, S. Sivakumar, R. Trudeau, M. Wallace and I. Whiteside and H. Lysynski (Committee Clerk) ABSENT: A. Bilson Darko, L. Grieves and J. Khan ALSO PRESENT: S. Butnari, C. Creighton, G. Dales, K. Edwards, M. Fontaine, K. Johnson, J. MacKay, M. McKillop, B. Page, E. Williamson and P. Yanchuk The meeting was called to order at 5:00 PM

1. Call to Order

1.1 Disclosures of Pecuniary Interest

That it BE NOTED that M. Wallace disclosed a pecuniary interest in clause 4.1, having to do with the Working Group comments on the property located at 4519 Colonel Talbot Road, by indicating that his employer has a business relationship with the company that prepared the Environmental Impact Study.

2. Scheduled Items

2.1 Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment

That a Working Group BE ESTABLISHED consisting of S. Heuchan, B. Krichker, K. Moser and S. Sivakumar, with respect to the Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment; it being noted that the Environmental and Ecological Planning Advisory Committee (EEPAC) heard a presentation from T. Doucette, R.V. Anderson Associates Limited, with respect to this matter.

2.2 Windermere Road Improvements Municipal Class Environmental Assessment – Environmental Impact Study

That a Working Group BE ESTABLISHED consisting of I. Arturo, S. Hall, S. Levin, K. Moser and B. Samuels, with respect to the Windermere Road Improvements Municipal Class Environmental Assessment; it being noted that the Environmental and Ecological Planning Advisory Committee (EEPAC) heard a presentation from D. Eusebi, Stantec Consulting Ltd., with respect to this matter.

3. Consent

3.1 1st Report of the Environmental and Ecological Planning Advisory Committee

That it BE NOTED that the 1st Report of the Environmental and Ecological Planning Advisory Committee, from its meeting held on December 16, 2021, was received.

4. Sub-Committees and Working Groups

4.1 4519 Colonel Talbot Road

That the Working Group report relating to the property located at 4519 Colonel Talbot Road BE REFERRED to the Civic Administration for consideration.

4.2 Trails Working Group Update - Verbal

That the attached Trails Advisory Group presentation BE RECEIVED for information; it being noted that the Environmental and Ecological Planning Advisory Committee heard a presentation from K. Moser, with respect to this matter.

5. Items for Discussion

5.1 Notice of Planning Application - 1160 Wharncliffe Road South

That a Working Group BE ESTABLISHED consisting of S. Levin, B. Krichker and S. Sivakumar, with respect to the Notice of Planning Application for a Draft Plan of Subdivision, Official Plan and Zoning By-law Amendments dated January 6, 2022 and an Environmental Impact Study, relating to the property located at 1160 Wharncliffe Road South.

5.2 Notice of Planning Application - 3207 Woodhull Road

That it BE NOTED that the Notice of Planning Application for Official Plan and Zoning By-law Amendments dated January 12, 2022, relating to the property located at 3207 Woodhull Road, was received.

5.3 Adelaide Wastewater Treatment Plant Climate Change Resiliency Class EA EIS

That a Working Group BE ESTABLISHED consisting of S. Levin and K. Moser, with respect to the Environmental Impact Study for the Adelaide Wastewater Treatment Plant.

5.4 Greenway Wastewater Treatment Plant Climate Change Resiliency Class EA EIS

That a Working Group BE ESTABLISHED consisting of P. Ferguson, B. Krichker and I. Whiteside, with respect to the Environmental Impact Study for the Greenway Wastewater Treatment Plant.

5.5 Mobility Master Plan

That it BE NOTED that the Environmental and Ecological Planning Advisory Committee (EEPAC) heard a presentation from K. Johnson, Engineer In Training and M. Fontaine, Manager, Public Engagement, with respect to the Mobility Master Plan.

6. Adjournment

The meeting adjourned at 7:32 PM.

Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study

Environmental Impact Study (EIS)

Revised Draft

January 12, 2022

Prepared for:

London
CANADA

arva

BEST MANAGED COMPANIES
Platinum member

Oxford Street West and Gideon Drive Environmental Assessment (EA) Study

Environmental Impact Study (EIS) Revised Draft

Prepared for: City of London

Prepared by:

Paul Mikoda, B.Sc. – Terrestrial Ecologist

Courtney Beneteau, M.Sc. – Fisheries Biologist

Natasha Welch, B.Sc. – Aquatic Ecologist

Reviewed by:

Tisha Doucette, B.Sc., E.P., ENV SP – Planning Ecologist

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RVA 205505

January 12, 2022

Executive Summary

R.V. Anderson Associates Limited (RVA) was retained by the City of London (City) to undertake a Municipal Class Environmental Assessment (EA) Study and Preliminary Design for improvements to the Oxford Street West and Gideon Drive intersection (Project). The Project will be undertaken as a Schedule B project in accordance with the Municipal Class EA process. In support of the Class EA, a scoped Environmental Impact Study (EIS) was prepared to verify and document existing natural heritage features within the study area in accordance with the City of London Official Plan (OP) and the City of London Environmental Management Guidelines.

The EIS describes the natural heritage features and functions within the Study Area and identifies potential impacts the Project may have on them. Through the preliminary impact analysis, RVA recommends mitigation measures to avoid the potential impacts. The EIS was initiated through a comprehensive review of available background data, including citizen science databases, prior reports, and local and provincial planning documents. Information collated from this process was summarized and was provided to relevant agencies for their review and comment to scope the field work and reporting. Field review included breeding bird surveys, a single site visit during the active growing season to complete a floral inventory, Ecological Land Classification/review, incidental observations of wildlife and signs within and beyond the right-of-way (ROW), as well as an aquatic habitat assessment at the Tributary C crossing of Oxford Street West. Additional visits were made to measure water quality in Tributary C and to perform a tree inventory.

The Study Area is located in a landscape which is transitioning from rural residential and agricultural land use to a commercial and urban residential one, with sections of preserved natural areas associated with wetlands, watercourses or other designated features. Tributary C, a coldwater stream with a resident Brook Trout (*Salvelinus fontinalis*) population, is the primary watercourse in and adjacent to the Study Area. This feature is associated with Significant Valleylands, Significant Wildlife Habitat (SWH) and a Provincially Significant Wetland (PSW) and is regulated by the Upper Thames River Conservation Authority (UTRCA). Several exotic invasive species were noted and have been mapped within and beyond the Study Area including European Common Reed (*Phragmites*), Common Buckthorn (*Rhamnus cathartica*), and Autumn Olive (*Elaeagnus umbellate*).

Based on the existing condition of the Study Area, the preliminary design, and construction methodologies, the Project is not expected to have any significant, long-term negative impacts on the natural environment. Further analysis of impacts in the next phase of design will be required to determine the potential effects of the project on the water balance and implications to the PSW and Tributary C. Opportunities for ecological benefits exist in the control and removal of invasive species, as well as revegetation of the area post-construction with native grass, forb, and shrub species with a focus on wildlife and pollinator habitat.

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1.0 Introduction

The City of London (City) has retained R.V. Anderson Associates Ltd. (RVA) to undertake a Municipal Class Environmental Assessment (EA) Study and Preliminary Design for improvements to the Oxford Street West and Gideon Drive intersection (Project). The Oxford Street West and Gideon Drive intersection is currently a three-legged, stop controlled intersection. However, the extension of Kains Road is underway and meets the intersection as the fourth leg, north of the intersection. Oxford Street is a major east/west corridor in the city that also connects surrounding areas west of the city. The ongoing and future developments on the west side of the City, like those associated with the Kains Road extension and nearby developments, are anticipated to increase the traffic volumes through the Oxford Street West and Gideon Drive intersection.

In support of the Class EA, a scoped Environmental Impact Study (EIS) is required to identify and evaluate existing Natural Heritage Features within the Study Area, assess impacts and net effects of the Project to these features, and provide environmental management recommendations in accordance with the City of London Official Plan (OP) and the City of London Environmental Management Guidelines.

1.1 Indigenous Land Acknowledgement

The Project is located within the traditional territory of the Attawandaron, Anishinaabeg, Haudenosaunee, and Lunaapeewak peoples. The local First Nation communities of this area include Chippewas of the Thames First Nation (COTTFN), Oneida Nation of the Thames, and Munsee-Delaware Nation. The Project is located within the London Township Treaty area to which the COTTFN) is a signatory, and also falls within the Big Bear Creek Additions to Reserve (ATR) land selection area.

1.2 Study Area

The Project includes the City right of way (ROW) surrounding the Oxford Street West and Gideon Drive intersection (Subject Lands) and within 120 m bordering those lands (Study Area) (Figures 1.1 and 1.2, also see Appendix A).

Figure 1.1 – Oxford Street West and Gideon Drive General Study Area

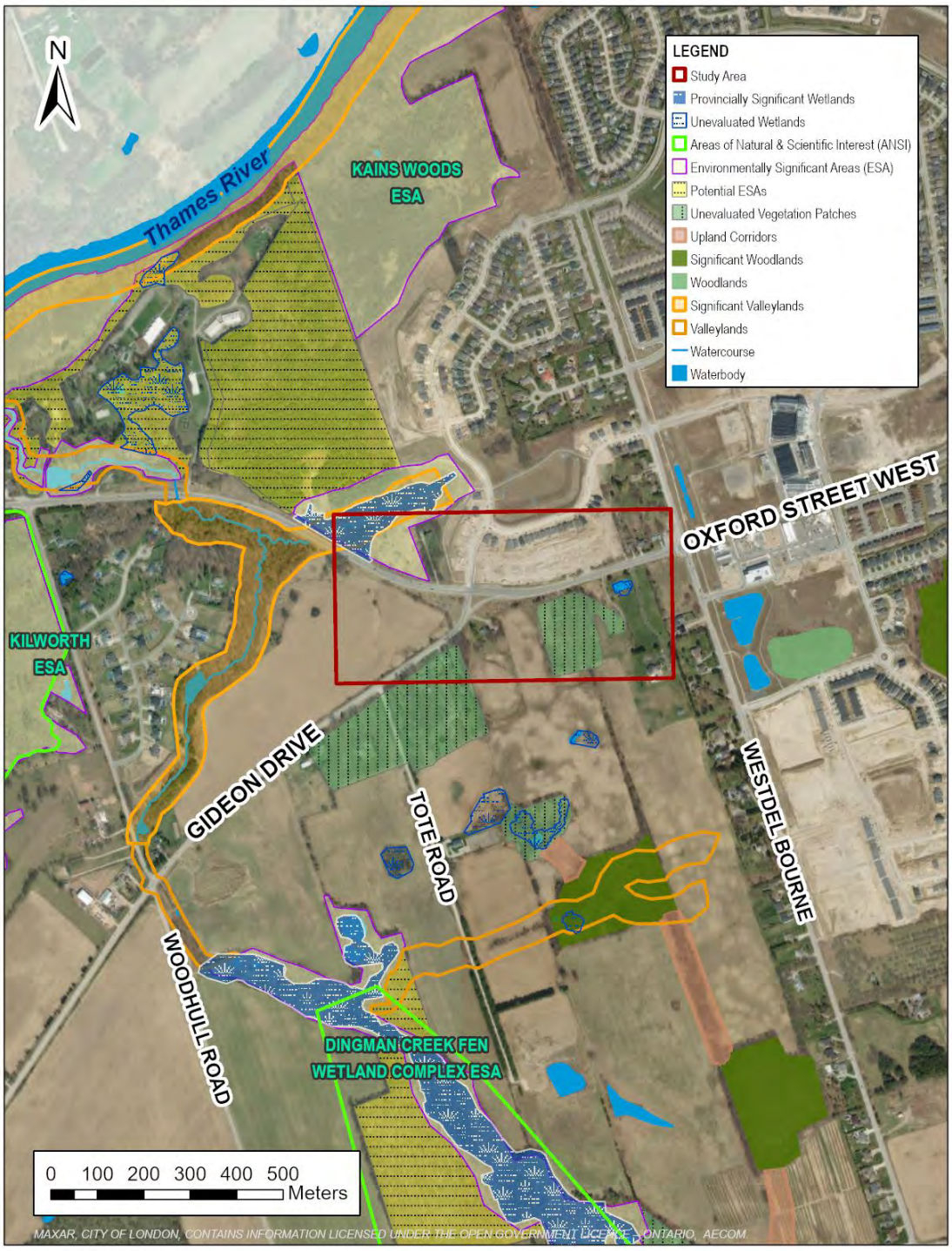

Figure 1.2 – Natural Heritage Features in the General Study Area

1.3 Project Intent and EIS Objectives

The intent of the Project is to undertake an EA study to provide the framework for the identification, systematic review and evaluation of alternatives based on the consideration of all aspects of the environment, including public and agency input. The EA will identify the needs and balance the requirements of the full range of potential users within the community and will recommend a design that reflects both the existing and planned land and corridor uses.

The objectives of this EIS include:

- Characterizing the existing natural heritage features within the Study Area through field investigations and consultation with agencies;
- Evaluating the significance of the identified natural heritage features and functions;
- Identifying potential constraints and opportunities of the Project;
- Assessing the potential impacts of the Project on the natural heritage features; and
- Determining mitigation measures to minimize the impacts and recommending enhancement possibilities where possible.

1.4 Study Scoping

On March 26, 2021, an EIS Scoping meeting was held with the City of London's Environmental & Parks Planning Division, the Upper Thames River Conservation Authority (UTRCA), the City of London's Environmental and Ecological Planning Advisory Committee (EEPAC), and RVA.

The EIS Scoping Letter and Checklist reviewed during the EIS Scoping Meeting are provided in Appendix B.

During the EIS Scoping Meeting it was determined that the proposed improvements will be contained within the City ROW, and it was agreed that unevaluated features would be considered significant and mitigated for accordingly. As such, an evaluation of significance and boundary delineation is not required as part of this EIS. It was also agreed that field investigations would be limited to complement the existing inventory of the natural environment in support of this Project. The following studies were undertaken to inform the EIS: Tree Inventory, Floral Inventory, Aquatic Habitat/Surface Drainage, Significant Wildlife Habitat, Breeding Birds, and Incidental Wildlife.

2.0 Governing Environmental Policy Framework

The governing policy framework provides guidance on the protection of natural heritage features and the evaluation of their significance. Candidate features identified within the Study Area were evaluated against the applicable federal, provincial, and municipal planning policies.

2.1 Federal Legislation

2.1.1 Fisheries Act

The *Fisheries Act* (Government of Canada 1985) is administered by Fisheries and Oceans Canada (DFO) and provides a framework for the proper management and control of fisheries as well as the conservation and protection of fish and fish habitat, including the prevention of pollution. In June of 2019, Canada modernized the *Fisheries Act;* the new provisions and stronger protections aim to better support the sustainability of Canada's fish and fish habitat for future generations. In particular, Section 34.4 prohibits any work, undertaking or activity (other than fishing) that results in the death of fish; Section 35.1 prohibits the harmful alteration, disruption or destruction of fish habitat (HADD); and Section 36 prohibits the deposit of deleterious substances.

The *Fisheries Act* requires that projects avoid causing death of fish or HADD of fish habitat unless authorized by DFO or a designated representative. Proponents are responsible for planning and implementing works, undertakings or activities in a manner that avoids harmful impacts to fish and fish habitat. Should proponents believe that their work, undertaking or activity will result in harmful impacts to fish and fish habitat, a Request for Review (RFR) must be submitted, and the DFO will work with them to assess the risk and provide advice and guidance on how to comply with the *Fisheries Act*.

2.1.2 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) was passed in 1917 and updated in 1994 to implement the Migratory Birds Convention, a treaty signed with the United States in 1916 (Government of Canada 1994a). Environment and Climate Change Canada administers the MBCA, which is enforced through the Migratory Birds Regulations. Together the MBCA and Migratory Birds Regulations serve to protect most migratory birds, their nests, and eggs anywhere they are found in Canada (Government of Canada 1994b).

2.1.3 Species at Risk Act

At a federal level, Species at Risk (SAR) designations for species occurring in Canada are initiated by the completion of a comprehensive Status Report by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). If approved by the federal Minister of the Environment, species are added to the federal List of Wildlife Species at Risk (Government of Canada 2002).

Species that are included on Schedule 1 as Endangered or Threatened are afforded both individual and critical habitat protection on federal lands under the *Species at Risk Act* (SARA). On private or provincially owned lands, only aquatic species listed as Endangered, Threatened or Extirpated are protected under SARA, unless ordered by the Governor in Council.

2.2 Provincial Legislation

2.2.1 Environmental Assessment Act

The *Environmental Assessment Act* (Government of Ontario 1990a) was created to provide for the protection, conservation, and wise management of the environment in Ontario. The Act applies to:

- (a) enterprises or activities or proposals, plans or programs in respect of enterprises or activities by or on behalf of Her Majesty in right of Ontario or by a public body or public bodies or by a municipality or municipalities;
- (b) major commercial or business enterprises or activities or proposals, plans or programs in respect of major commercial or business enterprises or activities of a person or persons, other than a person referred to in clause (a), designated by the regulations;
- (c) an enterprise or activity or a proposal, plan or program in respect of an enterprise or activity of a person or persons, other than a person or persons referred to in clause (a), if an agreement is entered into under Section 3.0.1 in respect of the enterprise, activity, proposal, plan or program. R.S.O. 1990, c. E.18, s. 3; 2001, c. 9, Sched. G, s. 3 (3).

The Oxford Street West and Gideon Drive intersection improvement project is being completed in accordance with the Municipal Class Environmental Assessment (MCEA), Schedule "B". In support of the MCEA, an EIS was conducted.

2.2.2 Provincial Policy Statement

The Provincial Policy Statement (PPS, Ministry of Municipal Affairs and Housing (MMAH) 2020) sets the policy direction for regulating development and land use planning in the province. Both provincial and local land-use planning decisions build on the PPS and its relevant policies. This report deals specifically with the policies contained in Part V, Section 2.1 (Natural Heritage) of the PPS which is directed at protection and management of natural heritage systems and features. A natural heritage system is defined by the Province of Ontario as:

A system made up of natural heritage features and areas, and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems. These systems can include natural heritage features and areas, federal and provincial parks and conservation reserves, other natural heritage features, lands that have been restored or have the potential to be restored to a natural state, areas that support hydrologic functions and working landscapes that enable ecological functions to continue. (MMAH 2020).

Natural heritage features of significance are described in the Natural Heritage Reference Manual (MNR, 2010) and include:

- significant wetlands;
- significant coastal wetlands;
- other coastal wetlands in Ecoregions 5E, 6E and 7E;

- fish habitat;
- significant woodlands;
- significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
- habitat of endangered and threatened species;
- significant wildlife habitat; and
- significant areas of natural and scientific interest (ANSIs).

Development and site alteration is not permitted in:

- significant wetlands in Ecoregions 5E, 6E and 7E and significant coastal wetlands;
- significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E, significant woodlands and significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River), significant wildlife habitat, significant ANSIs, and coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4(b), unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions; and
- fish habitat or habitat of endangered and threatened species except in accordance with provincial and federal requirements.

2.2.3 Endangered Species Act

At the provincial level, SAR and their habitats are protected under the *Endangered Species Act* (ESA, Government of Ontario 2007) which is administered by the Ministry of Environment, Conservation and Parks (MECP). SAR designations for species in Ontario are initiated by the completion of a comprehensive Status Report by the Committee on the Status of Species at Risk in Ontario (COSSARO), and if approved by the provincial Minister of the Environment, Conservation and Parks, species are added to the Species at Risk in Ontario (SARO) List (O. Reg. 230/08) under the ESA. Section 9(1) of the ESA, 2007 prohibits the killing, harming, harassment, capture, taking, possession, transport, collection, buying, selling, leasing, trading, or offering to buy, sell, lease or trade species listed as Extirpated, Endangered, or Threatened on the SARO List. Section 10(1) prohibits damaging or destroying habitat of Endangered or Threatened species on the SARO List and may apply to Extirpated species through special regulations. General habitat protection applies to all Endangered and Threatened species, with some species having 'categorized habitat', which protects areas within specific distances from known records. Some SAR are afforded a more precise habitat protection through a habitat regulation (regulated habitat), as identified in Ontario Regulation 242/08. Species designated as Special Concern are not protected under the Act.

The ESA, 2007 does include provisions for permits under Section 17(2)(c) that would otherwise contravene the Act. Projects which propose impacts to SAR or their habitat would require a permit or other process (e.g., registration) to proceed without contravening the Act.

2.2.4 Conservation Authorities Act

Section 28(1) of the *Conservation Authorities Act* (Government of Ontario 1990b) empowers Conservation Authorities with the ability to make regulations governing development that can have an impact on watercourses and water bodies, including wetlands. The Study Area is located within the Upper Thames River Conservation Authority (UTRCA) watershed, and sections are regulated under the Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses, Ontario Regulation (O. Reg.) 157/06 (see Appendix A – Map 2 for regulation areas).

Under O. Reg. 157/06, UTRCA may grant permission to straighten, change, divert, or interfere with the existing channel of a river, creek, stream, or watercourse, or to change or interfere with a wetland under conditions outlined in the regulation (Government of Ontario 1990c).

2.2.5 Clean Water Act

In response to the Walkerton crisis in 2000, the *Clean Water Act*, 2006, was established to protect raw municipal drinking water at its source by preventing its contamination and overuse. Source water includes untreated water taken from underground aquifers and surface water features, such as streams, rivers, and lakes, to supply municipal drinking water systems. The *Clean Water Act* legislates the development of watershed-based source protection plans that identify community driven policies and programs to manage and protect the quality and quantity of both existing and future municipal drinking water sources. Once a Source Water Protection Plan is approved by the Ministry of the Environment, Conservation and Parks (MECP), its policies are implemented by the various authorities designated by the Source Protection Plan.

The Approved Source Water Protection Plan for the Thames-Sydenham & Region Source Water Protection Areas (2015) was reviewed to inform of any source water protection details in the Study Area. The Study Area is within the Upper Thames River source protection area. While highly vulnerable aquifer and significant groundwater recharge areas are mapped within the Study Area, no wellhead protection areas or intake protection zones were identified. Conservation Authorities were designated as plan implementors within the Thames-Sydenham & Region Source Water Protection Plan area and are responsible for assisting with policies implemented by other authorities.

2.2.6 Invasive Species Act

Invasive species are an emerging concern, both due to impacts to ecosystems as well as land use and infrastructure. In Ontario, the *Invasive Species Act* (ISA, Government of Ontario 2015) sets out rules to prevent and control the spread of invasive species. The ISA recognizes two classes of invasive species: prohibited and restricted. In the case of restricted invasive species, it is illegal to import, deposit, release, breed/grow, buy, sell, lease or trade restricted invasive species. Prohibited species have the same restrictions, but it is also illegal to possess or transport these species.

2.3 Municipal Legislation

2.3.1 The London Plan and 1989 Official Plan

The City is currently working with two official plans. The London Plan was adopted by City Council and was approved by the province in December 2016 (City of London 2021). The London Plan remains partially under appeal, and until it is fully in force, the 1989 Official Plan (City of London 1989) must also be consulted. The London Plan establishes a policy framework to guide the City's growth and development.

The London Plan describes the *City's Natural Heritage System is a system of natural heritage features and areas and linkages intended to provide connectivity at the regional or site level and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of native species, and ecosystems* (Policy 1298). It further goes on to explain that *the Natural Heritage policies of this Plan provide for the identification and protection of natural heritage features and areas and the ecological functions, processes, and linkages that they provide over the long term* (Policy 1307).

Map 5 of the London Plan details the Natural Heritage System features, and within the Study Area and surrounding area, there are no site-specific appeals. Significant components of the Natural Heritage System identified or delineated for protection are shown as Green Space Place Type on Map 1 of the Plan. The features and areas included in the Green Space Place Type include:

- Fish Habitat;
- Habitat of Endangered Species and Threatened Species;
- Provincially Significant Wetlands (PSW) and Wetlands;
- Significant Woodlands and Woodlands;
- Significant Valleylands ;
- Significant Wildlife Habitat (SWH);
- Areas of Natural and Scientific Interest (ANSI);
- Water Resource Systems;
- Environmentally Significant Areas (ESA);
- Upland Corridors;
- Naturalization Areas; and
- Other lands as identified through an environmental study.

Natural heritage features and areas within the Environmental Review Place Type (as delineated on Map 1 of the Plan) include:

- Unevaluated Wetlands;
- Unevaluated Vegetation Patches;
- Valleylands; and
- Potential Environmentally Significant Areas.

Relevant areas and features from Map 1 and Map 5 of The London Plan within the Study Area are shown on Map 2 in Appendix A.

Environmental Impact Studies – Policies 1431 through 1437, include the requirements for when an EIS is required, i.e., *where development or site alteration is proposed within or adjacent to components of the Natural Heritage System* (Policy 1432), and what shall be included in an EIS (Policy 1436).

Permitted Uses and Activities – Infrastructure – Policies 1395 through 1402, state that *new or expanded infrastructure shall be permitted within the Natural Heritage System only where it is clearly demonstrated through an environmental assessment process under the* Environmental Assessment Act*, including an environmental impact study, that it is the preferred alternative for the location of the infrastructure* (Policy 1396).

Furthermore, that *for infrastructure projects within the Natural Heritage System, the City shall require specific mitigation and compensatory mitigation measures that are identified in the accepted environmental impact study to address impacts to natural features and functions caused by the construction or maintenance of the infrastructure* (Policy 1400).

3.0 Methodology

A desktop review was completed for the entire Study Area, with field investigations focussed on the ROW / roadside.

3.1 Review of Background Information and Potential Species at Risk Data

The preliminary background review included review of the following publicly available sources, including databases and published reports, for information related to geological and natural environment components within the Study Area:

Table 3.1 – Summary of Background Information Sources Reviewed

Survey Type	Data
Past Studies	• 14 Gideon Drive and 2012 Oxford Street West – Environmental Impact Study (MTE 2020); • Eagle Ridge Subdivision Phase II – Scoped Environmental Impact Study (AECOM 2016); • Functional Design of the Tributary C Storm Drainage and Stormwater Management Servicing Works (Matrix 2015); and, • Municipal Class Environmental Study Report – Schedule 'C' – Storm/Drainage & Stormwater Management,

Survey Type	Data
	Transportation & Sanitary Trunk Servicing Works for Tributary C, Downstream Thames Subwatershed (AECOM 2013).
City of London	• The London Plan (City of London 2021); • 1989 Official Plan (City of London 1989); and, • City of London Open Data.
MECP	• Information Request Letter; and, • Source Protection Information Atlas.
Northern Development, Mines, Natural Resources and Forestry (NDMNRF, formally Ministry of Natural Resources and Forestry (MNRF))	• Aylmer District Information Request Letter; • Natural Heritage Information Centre (NHIC) database; • NHIC Make A Map: Natural Heritage Areas; • Land Information Ontario (LIO) Mapping – Aquatic Resource Areas (ARA); and, • Fish ON-Line.
Upper Thames River Conservation Authority (UTRCA)	• Information Request Letter; • Thames-Sydenham & Region Source Protection Region Online Mapping; and, • UTRCA Watershed Report Card – River Bend (UTRCA 2017).
Fisheries and Oceans Canada (DFO)	• Aquatic SAR Mapping.
Ministry of Agriculture, Food and Rural Affairs (MAFRA)	• AgMaps.
Other Publicly Available Data	• Ontario Breeding Bird Atlas (OBBA, Cadman *et al.* 2007); • Ontario Nature – Ontario Reptile and Amphibian Atlas (ORAA, Ontario Nature 2021); • iNaturalist (screened to include Research Grade and Threatened species); • Ontario Moth Atlas (Kaposi *et al.* 2021); • Ontario Butterfly Atlas (MacNaughton *et al.* 2021); • Ontario Freshwater Fishes Life History Database, Robert J. Eakins (1999-2021); and, • eBird (Warbler Woods).

3.2 Agency Consultation and Background Review

Natural heritage information requests were sent to the following agencies on March 8, 2021. Agencies generously responded with the following information for the Study Area, which was utilized in the creation of this report. Agency Correspondence can be found in Appendix B.

MECP – Information pertaining to aquatic and terrestrial SAR potentially present in the vicinity of the Study Area was requested. After completing an initial SAR information screening MECP provided a response on June 18, 2021. In addition to the SAR identified during the background review, MECP added three additional SAR occurrences to RVA's SAR list not previously identified.

MNDNRF (Aylmer District) – Additional natural heritage data was requested to supplement information obtained during the background review. MNDMNRF (previously MNRF) provided a response on April 13, 2021, with nothing further to add.

UTRCA – Additional natural heritage data was requested to supplement information obtained during the background review. UTRCA provided a response on September 2, 2021, which included information related to regulation mapping, woodlots, fish records, and benthic data.

3.3 Field Investigations

Field investigations were conducted in the 2021 spring/summer field season as shown in Table 3.2. In addition to targeted surveys, all incidental wildlife, habitat, and pertinent landscape data was recorded to support a thorough assessment of the Study Area.

Table 3.2 – Field Investigations Schedule

Survey Type	Date	Weather	RVA Staff
Breed Bird Survey; Vegetation; Incidental Observations	June 2	Partly cloudy, 10 °C	Paul Mikoda
Fish and Fish Habitat – Assessment; Incidental Observations	June 16	Sunny, 20 °C	Natasha Welch
Breeding Bird Survey; Vegetation/ELC; Incidental Observations	June 16	Sunny, 20 °C	Paul Mikoda
Tree Inventory (>10 cm)	*August 12*	*Overcast with rain, 23 °C*	*Ron Koudys L.A. Inc.*
Fish and Fish Habitat – Water Quality	September 8	Broken clouds, 23 °C	Courtney Beneteau

Survey Type	Date	Weather	RVA Staff
Tree Inventory (<10 cm)	*November 20*	*Clear, 5 °C*	*Ron Koudys L.A. Inc.*

The following sections provide detailed methodologies used to assess the flora and fauna during field investigations.

3.3.1 Ecological Land Classification and Vegetation Inventory

Ecological Land Classification (ELC) mapping had been completed for most of the Study Area in the previous EISs noted in Table 3.1 above, which were referenced during the field visit. A single-season floral inventory and ELC confirmation/update was completed for the Study Area. Field visits were timed to correspond with a spring/summer inventory window to identify as many plant species as possible. ELC was completed for areas not previously recorded and areas with existing ELC were reviewed and updated as per Lee *et al.* (1998).

Vegetation surveys were restricted to the right of way (ROW) within the Study Area and immediately adjacent areas. Surveys were completed over two field visits (following breeding bird surveys) by walking transects throughout the roadsides. Areas exhibiting variation in floral or topographical composition, such as ditches or vegetation clumps, were reviewed in further detail. Species not readily identifiable in the field were sampled and identified later utilizing Michigan Flora Online (Reznicek *et al.* 2011).

3.3.2 Tree Inventory

Trees and woody vegetation within and adjacent to the roadway were inventoried in two surveys by Ron Koudys Landscape Architects Inc. (RKLA) these reports can be found in Appendix G. Information recorded included tree species, dbh (diameter at breast height), crown radius, structural form, and notes on tree health and condition.

3.3.3 Breeding Birds

Breeding birds were assessed within the Study Area using the Ontario Breeding Bird Atlas point-count protocol and augmented with incidental data as pertinent (e.g., breeding evidence) (Cadman 2003). Species recorded outside of dedicated surveys were included as field work occurred during the migratory bird breeding season. The locations of the breeding bird survey points are presented in Appendix A – Map 6 and field sheets are provided in Appendix D.

3.3.4 Significant Wildlife Habitat and Incidental Terrestrial Wildlife

During all site visits, terrestrial wildlife, including call and signs, were recorded. Specific habitats surveyed for included gravel roadsides (reptile nesting), mammal burrows (often on slopes), crayfish burrows (associated with ditches or wetlands), recently disturbed soils, potential cover

objects, or other anomalous or unique features or habitat within the Study Area including large dead or decaying (wildlife) trees. Wildlife surveys were conducted in conjunction with floral surveys, described above.

Targeted surveys for snag and cavity trees (i.e., in leaf-off conditions) were not included in the scope of this EIS. Potential habitat for SAR bats was inferred from the tree inventory, where the condition of all trees was documented (Koudys 2021).

3.3.5 Significant Features

Potentially Significant Wildlife Habitat (SWH) features were identified using the criteria in the Significant Wildlife Habitat Criteria Schedule for Ecoregion 7E (MNRF 2015) and the Significant Wildlife Habitat Technical Guide (MNRF 2000). The significance of vegetation patches was evaluated using the City's Guideline Document for the Evaluation of Ecologically Significant Woodlands (2006).

3.3.6 Aquatic Habitat

The potential for fish habitat was investigated in the Study Area. Fish habitat investigations were limited to the municipal ROW and involved identifying and recording:

- Potential surface flow connectivity to Tributary C;
- Water chemistry including temperature, dissolved oxygen, pH, and conductivity;
- Habitat information/locations including stream morphology, bed substrate, bank characteristics, stream flow and depth;
- "Critical" or important habitat areas including potential spawning areas, nursery cover, and feeding areas; and
- Potential constraints, habitat compensation or enhancement opportunities.

Photographs were taken of the in-stream habitat and roadside ditches. This representative photographic record can be found in Appendix C.

3.4 Species at Risk Screening

Provincially protected SAR can be found throughout Ontario in both documented and undocumented populations. A list of SAR with potential to occur in the Study Area was compiled from background sources and the habitat requirements for these species were identified using the MNRF's Significant Wildlife Habitat Technical Guide (OMNR 2015) and assessment reports from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The field studies described above were compared to the known habitat preferences and general locations of SAR noted in background review documents to determine the potential that these species or their habitat could occur in the Study Area. SAR that were confirmed to be present or were determined to have a high probability of occurring in the Study Area are discussed in detail in Section 5.0.

4.0 Existing Conditions

The natural heritage system features (as shown on Map 5 of the London Plan) within the Study Area include: significant valleylands, ESAs, unevaluated wetlands, unevaluated vegetation patches, fish habitat, and PSWs. Other natural heritage features which require an evaluation to determine presence/absence, such as SWH and SAR, will be discussed in the following sections, along with those confirmed in the Study Area.

An overview of the natural heritage features and regulated areas in the Study Area is presented in Appendix A – Map 2.

4.1 Physical Setting

4.1.1 Physiography and Soils

The Study Area is underlain by Middle Devonian-aged bedrock composed of limestone, dolostone, and shale of the Hamilton Group (OGS 2011). The Study Area is within a confluence of two Physiographic Units, with the bulk being within the Caradoc Sand Plains and London Annex (including the Gideon and Oxford intersection) with the eastern section just within the upper edge of the Mount Elgin Ridges unit. Within the Study Area, the Sand Plains are part of an ancient Spillway and associated Sand Plain, while the Mount Elgin Ridges unit here is composed of a Till Moraine (Chapman and Putnam 2007). Surficial geology within the Study Area is variable as a result of historic glacial processes. Lands in the eastern half of the Study Area are generally glaciolacustrine till with areas of both fine and coarse-textured materials, while lands in the western half are formed by glaciofluvial activity, though a small 'T' shaped island of till remains immediately west of the intersection, extending west south of Oxford and south to cross Gideon Drive. Soils within the Study Area are composed mainly of moderately to imperfectly drained Muriel silt/clay loams with gentle slopes, with a small area of variably drained, gently sloping Teeswater silt loams in the western section. At the western limit of the Study Area is an area of Eroded Channel associated with Tributary C (Hagerty and Kingston 1992).

4.1.2 Subwatershed

The Study Area is located within the downstream extent of the Upper Thames River watershed falling within the River Bend subwatershed, which drains a catchment area of approximately 58 km^2. According to UTRCA's 2017 Watershed Report Card, land use within the River Bend subwatershed is dominated by agriculture (41%), with urban and natural areas comprising 28% and 26% of the landscape, respectfully (UTRCA 2017). However, due to the subwatershed receiving flows from upstream areas, water quality within the River Bend catchment area is influenced by activities occurring throughout the Upper Thames watershed. While water quality has improved over the years, little change has occurred within the last decade with certain contaminants still found to exceed provincial guidelines (UTRCA 2017).

Within the Upper Thames River planning area, natural cover is highest within the River Bend subwatershed, with forest cover comprising 19.3% of the landscape. While forest cover exceeds the watershed average of 11.1%, it is below the federal guidelines (30%) with many existing woodlots too small to support sensitive forest interior species. While forest cover does not meet national standards, forested riparian zones were found to exceed Environment Canada's guideline. With less than 10% of watercourses within the River Bend subwatershed confirmed to be cool/coldwater systems, which are becoming rarer throughout the province, retaining, and restoring riparian cover is important to retain these thermal regimes. Conversely, forest cover is currently declining due to surrounding urbanization (UTRCA 2017).

4.1.3 Topography and Drainage

The topography of the Study Area generally slopes down to the northwest, draining towards Tributary C which crosses the northwest extent of the Study Area. Tributary C then flows to the Thames River approximately 700 metres (m) northwest of the Study Area. Surface drainage within the Study Area is conveyed by overland flow, roadside ditches, and municipal drains, eventually discharging into Tributary C and surrounding wetlands.

A municipal drain known as Parker Drain is present within the Study Area. Parker Drain is delineated to function as a class F drain conveying intermittent flow northwest through the eastern extent of the study area, towards the upstream extent of Tributary C. Parker Drain transitions into a class D drain where it connects with Tributary C to convey permanent flow from the northeast to southwest into the Study Area. Recent areal imagery shows the landscape through which the class F reach of Parker Drain flowed, previously managed as agricultural land, is currently under development, suggesting this surface water feature has been removed from the landscape.

Significant changes to the Study Area's topography and drainage are currently underway north of Oxford Street to accommodate a new housing development. In support of this new housing development, drainage patterns have been altered, but inputs to Tributary C should be maintained. A detailed study regarding the new development and site alterations, which includes a water balance analysis, was completed in 2015 (Matrix 2015).

4.2 Designated Natural Areas

No provincially or locally designated parks, conservation areas, reserves, or Areas of Natural or Scientific Interest (ANSI) were identified in the Study Area. The following sections examine the designated natural areas and features found in the Study Area.

4.2.1 Wetlands and Provincially Significant Wetlands (PSWs)

The wetland associated with Tributary C was found to be provincially significant as it provides supportive habitat to the resident Brook Trout (*Salvelinus fontinalis*) population through

groundwater discharge, buffering from adjacent land uses, and shading of surface water by its swamp communities (AECOM 2016).

The unevaluated wetland, located south of Oxford Street near the eastern extent of the Study Area, was investigated from the property edge. It was observed to support cattails (*Typha* sp.) as well as the invasive Yellow Iris (*Iris pseudacorus*). This wetland appears to be an anthropogenic landscape feature (dug pond), as it does not appear on 1954 Ortho Imagery. Further review of publicly available orthoimagery shows this feature was originally an open water habitat which has been slowly infilling with vegetation over time.

Wetlands and PSWs are presented in Appendix A – Map 2.

4.2.2 Environmentally Significant Areas (ESAs)

The Kains Woods ESA, which includes the PSW noted above, and as described in the AECOM 2013 EIS, is present in the northwestern-most extent of the Study Area. The ESA overlaps entirely with the Brook Trout habitat and PSW noted above, but also provides habitat for one provincially rare (S3) plant species which was observed, Slender Mountain Mint (*Pycnanthemum tenuifolium)*, five regionally rare (R1 and R2 species) plant species with an unknown regional status, and several regionally and locally identified birds of conservation concern (AECOM 2013).

Surrounding the Study Area are two other recognized ESAs: Dingman Creek Fen Wetland Complex (500 m to the south) and Kilworth (600 m to the west). All ESAs in and around the Study Area are presented in Appendix A – Map 2.

4.2.3 Significant Valleylands

In the northwest corner of the Study Area, significant valleylands are associated with Tributary C (Appendix A – Map 2). Valleylands contain and provide a link for many aspects of the natural heritage system, facilitating species richness, movement, and diversity. In addition, they also provide protection from flooding and other natural hazard processes (Policy 1345 of the London Plan). There are no other valleylands identified within the Study Area.

4.2.4 Regulated Areas

O. Reg. 157/06 (the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation) under Section 28 of the *Conservation Authorities Act*, administrated by the UTRCA, applies to the area surrounding Tributary C in the Study Area (Appendix A – Map 2). Under this regulation, any development, site alteration, construction, or placement of fill within the regulated area requires a permit from UTRCA, as does interference with a wetland or any alteration to an existing watercourse channel.

4.2.5 Unevaluated Vegetation Patch

Two Unevaluated Vegetation Patches are indicated within the Study Area (The London Plan Map 5 – Natural Heritage). These patches are not adjacent to each other or any additional vegetation patches, as shown in Appendix A – Map 2. One patch, located on municipal addresses 2012 and 1976 Oxford Street West, was assessed as part of a recent report (MTE 2020). During the field work to support this study (2018), the Unevaluated Vegetation Patch was classified as a Mineral Cultural Woodland (CUW1) dominated by a canopy of Black Walnut (*Juglans niger*) and Hackberry (*Celtis occidentalis*), with Black Raspberry (*Rubus occidentalis*), Tartarian Honeysuckle (*Lonicera tatarica*) and Riverbank Grape (*Vitis riparia*) in the lower layers, with the eastern half of the community recently mowed. This report confirmed breeding habitat for Eastern Wood Pewee (*Contopus virens*, Special Concern), making the vegetation patch Significant Wildlife Habitat (SWH).

The second Unevaluated Vegetation Patch is located within the southern edge of the Study Area, along Gideon Drive, with the bulk extending outside of the Study Area boundary. This Unevaluated Vegetation Patch is located on existing residential lots 120, 80, 62, 52 44 and 36 Gideon Drive and is subject to a variety of maintenance regimes as can be seen both from Gideon Road and on ortho imagery. In fact, most of the patch along the frontage of Gideon is maintained as lawn. Similar to the patch evaluated by MTE, Black Walnut dominates the canopy of this community. Interestingly, a review of historic ortho imagery (University of Toronto 1954) shows both vegetation patches existed in some form at that time and may share a similar history. No rare or at-risk species were noted within either patch during field investigations.

4.3 Vegetation and Vegetation Communities

The Study Area is located in a landscape which is transitioning from rural residential and agricultural land use to a commercial and urban residential one, with sections of preserved natural areas associated with wetlands, watercourses or other designated features.

Within the Study Area, on the north side of Oxford Street West, land use is mainly high-density single family residential in the form of a recently approved subdivision, still under construction. Low density residential lots are located on either side of the new subdivision. In the northwestern corner, a fallowed agricultural field (Dry Moist Old Field Meadow, CUM1-1) buffers a mosaic of natural/regenerating communities associated with Tributary C, the most notable of these being various swamps (Willow Mineral Deciduous Swamp, SWD4-1; White Cedar – Hardwood Organic Mixed Swamp, SWM4-1 and Manitoba Maple Mineral Deciduous Swamp, SWD3-4) and meadow-marshes (Narrow-leaved Sedge Organic Meadow Marsh, MAM3-5; Forb Organic Meadow Marsh, MAM3-9 and Organic Meadow Marsh, MAM3), which comprise a Provincially Significant Wetland (AECOM 2013) (Appendix A – Map 3).

South of Oxford, land use is a mixture of rural/estate residential and active agriculture, but with active planning applications. Communities here are cultural in origin and vary between Black Walnut-dominated woodland (Mineral Cultural Woodland, CUM1) and Dry Moist Old Field Meadow (CUM1-1), interspersed with residences and associated maintained areas. Lands to the west of the Oxford Street West/Gideon Drive intersection are active agriculture and Dry Moist Old-Field Meadow (CUM1-1). Classification of vegetation communities in the vicinity of the Study Area were undertaken in detail as a component of prior planning applications and are incorporated into our report as noted.

The Dry Moist Old-Field Meadow in the immediate vicinity of the intersection within the Study Area, was not assessed as a component of prior studies and as a result, was evaluated during field investigations. Field sheets are included in Appendix D. All communities are common and secure in the province.

4.3.1 Tree Inventory

The inventory by RKLA captured 64 individual trees identified within the City ROW and on private properties adjacent to the proposed construction. No tree species listed as endangered or threatened were observed during the tree inventory and all trees observed are common and typical of the current land uses (Ron Koudys 2021).

4.3.2 Flora

Seven rare floral species were noted in background documents, with the potential to occur within the Study Area (Table 5.1). Most are species of very specific habitats, such as wetlands and high-quality woodlots, but some can be found as planted specimens as part of residential landscaping. None of the noted species were located during site investigations, however one rare species, Honey Locust (*Gleditsia triacanthos*, S2?) was observed as two stems on two residential properties. As it they were each noted to be the thornless variety, they are almost certainly planted landscape specimens. The potential presence of False Rue-anemone (*Enemion biternatum*) was noted as a part of the project scoping, but no individuals or suitable habitats (mature maple beech forest) were observed within the Study Area. The details of the single-season plant inventory are found in Appendix E – Table 1.

4.3.3 Invasive Species

Notable invasive species observed within the Study Area included European Common Reed (*Phragmites australis*), Common Buckthorn (*Rhamnus cathartica*), and Autumn Olive (*Elaeagnus umbellate*). Invasive species have been mapped in the Study Area and are presented in Appendix A – Map 4.

4.4 Wildlife

4.4.1 Breeding Birds

The Study Area contains terrestrial and aquatic communities and habitats that have the potential to support a variety of bird life. Birds recorded during citizen science surveys (Ontario Breeding Bird Atlas 2001-2005) are indicative of the variety of habitats present in the broader area, from interior woodland indicators to those that utilize urban habitats. At-risk species include those associated with anthropogenic habitats and features, as well as those which utilize various specialized habitats, including interior woodlands, open grasslands, and thickets (Table 5.1). As noted in Section 3.3.3, dedicated surveys for breeding birds were carried out as per the Ontario Breeding Bird Atlas point-count protocol and augmented with incidental data as pertinent (e.g., breeding evidence) (Cadman 2003) Results are summarized in Appendix E – Table 2. A single observation of a foraging Barn Swallow (*Hirundo rustica*) was the only rare/at-risk species noted during investigations. No nests or indication of nesting were noted in nor were typical nesting habitats (bridges, box culverts, etc.). The remainder of birds recorded during surveys are common and secure in the province. Road noise was notable during surveys.

4.4.2 Reptiles and Amphibians

Most of the reptile and amphibian records for the Study Area and vicinity include commonly encountered species that would be expected based on the habitat in the area. Five provincially protected at-risk species were noted, two Threatened species; Blanding's Turtle (*Emydoidea blandingii*) and Eastern Hog-nosed Snake (*Heterodon platirhinos*), and three Endangered species; Queensnake (*Regina septemvittata*), Eastern Foxsnake (*Pantherophis gloydi*) and Spiny Softshell (*Apalone spinifera*) (MECP correspondence 2021), as were additional Special Concern species (Table 5.1). No reptiles were observed during site investigations, no candidate critical habitat was observed (nests, potential hibernacula, cover objects), and no at-risk species have been recorded during prior local investigations. Many of the at-risk reptiles noted have specific habitat requirements that are not met within the Study Area, with the following exceptions. Eastern Milksnakes are habitat generalists and can be found in a variety of habitats, including anthropogenic ones such as the Cultural Meadow within the right-of-way. Snapping Turtles are likely present in nearly every permanent waterbody in southern Ontario but are not well documented as they bask less than other species. Finally, Eastern Hog-nosed Snake has very specific nesting and hibernation requirements, but otherwise is a wide-ranging habitat generalist in its search for toads, its main prey item. As a result of the limited, locally common habitat within the right-of-way, neither snake species is expected to be relying on the Study Area for critical life-history activities, instead using these areas for movement or as incidental foraging habitat. Of the two, Milksnake would be the most likely to be encountered. Snapping Turtle would be expected to be found in Tributary C with the potential to occur within the reach that is included within the Study Area. Habitat assessments are provided in Table 5.1. A Green Frog (*Rana clamitans*) was observed

in Tributary C during water quality sampling in September (Appendix E – Table 3). This species is common in southern Ontario wherever permanent water is available. Additional amphibian species, including Spring Peeper (*Pseudacris crucifer*), Wood Frog, (*Lithobates sylvaticus*), Leopard Frog (*Lithobates pipiens*), American Toad (*Anaxyrus americanus*) and Gray Treefrog (*Hyla versicolor*) were recorded associated with Tributary C wetlands as part of prior work (AECOM, 2016). In addition to supporting the amphibian species noted above, Tributary C could also support Midland Painted (*Chrysemys picta marginata*).

4.4.3 Mammals

No rare mammal species were noted as occurring in the Study Area during background review, however, MECP noted the potential presence of Endangered mammals, including American Badger (*Taxidea taxus*) and SAR bats (Endangered) which is assumed to include Little Brown Little brown bat (*Myotis lucifugus*), Northern long-eared bat (*Myotis septentrionalis*) and Tri-colored bat (*Perimyotis subflavus*). The right-of-way within the Study Area is generally sparsely treed, with most trees, and as such suitable bat habitat, occurring well outside any areas considered for tree removals. Of the trees considered for removal, one, Tree 64, a Manitoba Maple (*Acer negundo*) exhibits signs of decline that make it a candidate bat maternity habitat (see Appendix G). Four additional trees to be retained were noted in the Tree Assessment Report to be either dead or with features (rot, cavities, dead wood) that would also make them candidate bat maternity habitat. The most recent advice from MECP regarding SAR bat surveys and mitigation of impacts notes that "If a proposed activity or project is expected to adversely affect (e.g., remove, stub, etc.) 'a small number' of potential maternity or day roost trees in treed habitats, but the timing of tree removal will avoid the bat active season (April 1 – September 30 in Southern Ontario / May 1 to August 31 in Northern Ontario), then there is no need to conduct species at risk bat surveys of treed habitats." (Kathryn Markham pers. comm. March 2021).

Mammals expected to be observed within the Study Area are species commonly encountered in association with local anthropogenic and natural habitats. Mammals and sign observed during site investigations included a road-killed Red Squirrel (*Tamiasciurus hudsonicus)* in the eastern existing residential section of the Study Area and the skeletal remains of two white-tailed deer (*Odocoileus virginianus*) just west of the existing intersection, one on either side of Oxford Street West. A game trail and deer scat were also noted in association with the skeletons. (Appendix E – Table 3).

4.4.4 Insects/Other Invertebrates

The habitat types within the Study Area are suitable to support many insect species, including rare butterfly and Odonate (dragonfly and damselfly) species (Table 5.1). As insects are not commonly surveyed for and can have short periods of detection (adult stage), it is possible that other species of provincial interest may utilize habitat within or adjacent to the Study Area. A single Monarch (*Danaus plexippus*) was identified south of Oxford Street West within the Study Area, associated with the Mineral Cultural Meadow/roadside habitat, which was noted to contain Common Milkweed (*Asclepias syriaca*), a host plant for Monarch. (Appendix E – Table 3). No additional notable invertebrates (bumblebees, odonates, butterflies or moths) were observed.

4.5 Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) assessment was completed using the Ecoregion 7E Criterion (see Appendix F for assessment rationale tables). Utilizing a combination of existing data and information collected for this project, candidate wildlife habitat was identified for the following categories: Raptor Wintering Area, Turtle Wintering Area, Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs), Waterfowl Nesting, Marsh Breeding Bird Habitat, and Terrestrial Crayfish. Most of these habitats are associated with the evaluated/PSW in the northwest section of the Study Area. Amphibian Breeding Habitat (Woodland) within the PSW, breeding habitat for Eastern Wood Pewee (Special Concern) and foraging/rearing habitat for Monarch (Special Concern) was confirmed within the Study Area.

4.6 Aquatic Habitat and Communities

4.6.1 Aquatic Habitat

Within the Study Area a watercourse, known as Tributary C, crosses the northwestern extent of the Study Area (Appendix A – Map 3). Tributary C is a coldwater 1st order stream (Strahler Stream Order) that drains a wetland east of Oxford Street West, recently identified as a PSW that falls within the Kains Woods ESA (see Section 4.2.2) (Map 5 of the London Plan). West of Kains Road, Tributary C and the surrounding lands are managed as Significant Valleylands (see Section 4.2.3). Immediately downstream of the Study Area, Tributary C transitions into a 2nd order system as it continues towards the Thames River less than 1 km downstream of the Study Area.

While aquatic field investigations were limited to the municipal ROW, past studies identified Tributary C as an intermittent drainage feature northeast of the study area. Tributary C transitions into a permanent watercourse mapped as a Class D municipal drain, called Parker Drain, before flowing onto site. Within the Study Area, Parker Drain does not extend through the subject lands suggesting it transitions into a natural watercourse, not modified to accommodate agricultural drainage, approximately 140 m east of Oxford.

Within the Study Area, Tributary C flows southwest through a meadow marsh before it is conveyed west diagonally under Oxford Street West by a corrugated steel culvert. West of Oxford, Tributary C then continues through a retained natural corridor known as Woodhull Ravine (as per the City of London Open Data - Parks). While there was no evidence of hardening within the upstream and downstream study reaches, Tributary C where it crosses Oxford appears to have been straightened.

At the time of investigation, Tributary C upstream of the Oxford Street West crossing, was hydraulically connected to its floodplain and little to no surface flow was observed. Riparian and instream cover was limited to vascular macrophytes, dominated by cattails, which shaded the watercourse. Watercress was abundant and a small, vegetated island was observed within the channel and unconsolidated material form the bed substrate. As the watercourse flowed towards the culvert, the channel narrowed, and water was observed to flow both into and under the inlet due to the submerged invert being unembedded. Immediately upstream of the inlet, a backwater area was observed on the south side of the main channel. Per the findings of the geomorphic study completed in 2015, the upstream study reach was in a transitional state (Matrix 2015).

Downstream of the Oxford Street West crossing, the culvert outlet was observed to be perched approximately 0.10 m above the surface of Tributary C, resulting in the formation of a plunge pool. A ditch, draining an agricultural field to the east, flowed through a wooded area and into the channel from the south bank, discharging into the outlet pool. The flow path of the roadside ditch running parallel to the south side of Oxford was also observed to convey drainage into Tributary C, with flow appearing to discharge along the south side of the culvert outlet down the road embankment and into the channel. Fine bed material comprised the pool substrate, with sediment almost 0.5 m deep at the tail of the pool. A dense mat of Pennsylvania Bittercress (*Cardamine pensylvanica*), a type of watercress, was observed to be growing from this thick sediment.

Downstream of the pool, the channel narrowed into a riffle-run sequence with coarser material present within the riffles. Undercut banks were noted throughout the downstream reach, suggesting bank instability, but also providing additional cover and habitat for fish. Other in-stream cover was provided by overhanging and instream vascular plants, woody debris, and cobble. A mixed forest was observed to shade the channel from the south bank, while a cattail marsh formed the north bank.

The aquatic habitat features observed in the tributary are summarized in Table 4.1. Water quality parameters were also measured and are reported in Table 4.2.

The creek showed evidence of groundwater discharge with abundant watercress observed throughout the tributary surrounding Oxford Street West. Additional surface water features were noted within the Study Area and included roadside ditch swales, which were dry at the time of investigations. Due to the ephemeral nature of the roadside ditch swales, and elevations in relation

to adjacent permanent waterbodies, these drainage features were determined to provide indirect fish habitat, only contributing flows to Tributary C following rain events.

Table 4.1 – Aquatic Habitat in Tributary C – Oxford St. W. CSP Culvert Crossing

Habitat Attribute	Upstream	Downstream
Flow Regime	Permanent	Permanent
Thermal Regime	Coldwater	Coldwater
Flow Velocity (m/s)	Nil (stagnant)	0.33
Morphology (%)	Flat (100%)	Run (40%), riffle (40%), pool (10%)
Mean Wetted Depth (m)	0.26	0.08, 0.05, 0.45
Mean Wetted Width (m)	-	1.2, 1.2, 2.3
Substrate	Silt, clay, sand, detritus	Cobble, gravel, silt, sand
Bank Stability	-	Slightly to moderately unstable
Instream Cover (%)	Instream/overhanging vascular macrophytes (90/10%)	Instream/overhanging vascular macrophytes (40/10%), instream/overhanging woody debris (20/10%), undercut banks (10%), cobble (5%), organic debris (5%)
Riparian Vegetation	Mixed Forb Organic Meadow Marsh	Mixed Forest, Cattail Mineral Shallow Marsh
% Stream Shaded	60% (vascular macrophytes)	75%
Migratory Barriers	-	Perched culvert
Evidence of Groundwater	Watercress (abundant), wetland	Watercress (abundant)
Adjacent Land Use	Marsh/floodplain, construction, residential	Forest (Woodhull Ravine), marsh/floodplain, agricultural, residential

Note: Aquatic habitat characteristics observed on June 16, 2021

Table 4.2 – Water Quality in Tributary C – Oxford St. W. CSP Culvert Crossing

Parameter	Upstream	Downstream
Temperature (°C)	13.2	16.2
pH	7.75	7.90
Conductivity (µS/cm)	1072	1163
Dissolved Oxygen (mg/L)	8.79	8.65
Air Temperature (°C)	24.0	24.0

Note: Water quality parameters measured in-situ on September 8, 2021

4.6.2 Fish Community

Fish community sampling was not included in the scope of this EIS. UTRCA sampling records in Tributary C as it crosses Oxford Street West within the Study Area (Site Code UT.RI106) note Brook Trout (*Salvelinus fontinalis*) in 1999 – "many", and in 2010 – "abundant". Brook Trout is an important, native, fall-spawning species with specialized habitat requirements that restrict its distribution.

Parker Drain is classified by DFO as a class D drain indicating it supports sensitive fish species.

DFO mapping of the Study Area did not indicate any aquatic SAR, however, aquatic SAR are mapped in the Thames River, within 1 km of the Study Area; these species are discussed in Table 5.1.

4.6.1 Freshwater Mussel Community

While there are no records of freshwater mussel in the Study Area, several SAR were identified in background information within 1 km of the Study Area, due to proximity to the Thames River. These species are discussed in Table 5.1.

4.6.2 Benthic Invertebrate Community

UTRCA provided benthic invertebrate temporal sampling records from two sites in Tributary C both within and downstream of the Study Area. The Hilsenhoff Biotic Index (HBI) was calculated for each of the samples and the resulting indices and stream health estimates are provided in Table 4.3. HBI estimates the overall tolerance of the benthic community, weighted by the relative abundance of each taxonomic group. Organisms are assigned tolerance values based on their ability to live under a variety of stressful conditions, such as low oxygen content in the water. HBI values range from 0 to 10, where low HBI values reflect a higher abundance of sensitive groups, thus a higher water quality and better stream health.

Table 4.3 – Hilsenhoff Biotic Index (HBI) and Stream Health for Tributary C

UTRCA Sampling Date	Water Quality Indicator (HBI) by Site	
	UT.RI105 (Woodeden Camp)	UT.RI106 (Oxford St. W.)
23/06/1999	5.93 – Fairly Poor	5.66 – Fair
20/06/2000	n/a	5.87 – Fairly Poor
05/11/2002	5.13 – Fair	4.99 – Good

5.0 Species of Conservation Concern and Species at Risk

A variety of floral and faunal species of provincial interest have been recorded in the vicinity of the Study Area by various sources, including citizen scientists/projects and provincial databases. A long history of existing and ongoing development/habitat removal has left a landscape that is expected to support species that are tolerant of or benefit from anthropogenic landscapes and structures. A full list of SAR identified in the background sources with potential to be found in the Study Area, discussion on their habitat preferences, and probability of occurrence as determined following field investigations and assessment is presented in Table 5.1.

Table 5.1 – Species of Conservation Concern and Species at Risk Assessment

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Flora		
Hairy-fruited Sedge (*Carex trichocarpa*) S3 | N3*	The NHIC database has a record of this species in the vicinity of the Study Area. Hairy-fruited Sedge grows in marshes, floodplains and wet meadows. Suitable conditions exist for this species within the northwestern section of the Study Area.	Low – Multiple studies within and adjacent to the Study Area have failed to locate this species.
Green Dragon (*Arisaema dracontium*) Special Concern | Special Concern	The NHIC database has a record of this species in the vicinity of the Study Area. Green Dragon grows in wet to moist woodlands and riparian areas. Suitable habitat for this species is present within the northwestern section Study Area.	Low – Multiple studies within and adjacent to the Study Area have failed to locate this species.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
American Chestnut (*Castanea dentata*) Endangered | Endangered	The NHIC database has a record of this species in the vicinity of the Study Area. American Chestnut prefers dryer upland forest with sandy soils. This habitat is not present within the Study Area.	**Low –** No suitable habitat and multiple studies within and adjacent to the Study Area have failed to locate this species.
Eastern False Rue-anemone (*Enemion biternatum*) Threatened | Threatened	The NHIC database has a record of this species in the vicinity of the Study Area. Eastern False Rue-anemone grows in rich soils in deciduous forests and thickets. This habitat is not present within the Study Area.	**Low –** No suitable habitat and multiple studies within and adjacent to the Study Area have failed to locate this species.
Striped Cream Violet (*Viola striata*) S3 | N3	The NHIC database has a record of this species in the vicinity of the Study Area. Striped Cream Violet grows a variety of moist to mesic habitats, from woodlands to meadows. This habitat is present within the Study Area.	**Low** – Multiple studies within and adjacent to the Study Area have failed to locate this species.
Blue Ash (*Fraxinus quadrangulate*) Threatened | Threatened	The NHIC database has a record of this species in the vicinity of the Study Area and it has been recorded in the Kains Woods ESA. Blue Ash grows in deciduous floodplain forest. This habitat is not present within the Study Area.	**Low** – Multiple studies within and adjacent to the Study Area have failed to locate this species and it was not identified during inventories in 2021.
Orange Coneflower (*Rudbeckia fulgida*) S1 | N1	Citizen science observers noted this species in the vicinity of the Study Area. This species utilizes various habitats, including woodlands, savannahs and wetlands. Suitable habitats are present within the Study Area.	**Low** – Multiple studies within and adjacent to the Study Area have failed to locate this species.
Trumpet Creeper (*Campsis radicans*) S2? | N2	Citizen science observers noted this species in the vicinity of the Study Area. Trumpet Creeper can be aggressive and utilizes any available open habitats. Suitable habitats are present within the Study Area.	**Low** – Multiple studies within and adjacent to the Study Area have failed to locate this species.
Large Yellow Pond Lily (*Nuphar advena*) S3 | NNR	Citizen science observers noted this species in the vicinity of the Study Area. Large Yellow Pond Lily lives in sheltered shallow wetlands with mud bottoms. Suitable habitats are present within the Study Area.	**Low** – Multiple studies within and adjacent to the Study Area have failed to locate this species.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Fish		
Black Redhorse (*Moxostoma duquesnei*) Threatened | Threatened	This species lives in pools and riffle areas of medium-sized rivers and streams that are usually less than two metres deep. These rivers usually have few aquatic plants, a moderate to fast current, and a sandy or gravel bottom. In the spring, it migrates to breeding habitat where eggs are laid on gravel in fast water. The winter is spent in deeper pools. DFO records of this species are associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.
Eastern Sand Darter (*Ammocrypta pellucida*) Endangered | Threatened	This species has very specific habitat preferences and is found almost exclusively on sandy bottoms of large stream and nearshore areas of the Great Lakes in southern Ontario. NHIC and DFO records of this species are associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.
Greenside Darter (*Etheostoma blennioides*) S4 | Special Concern	This species inhabits rivers and streams where the water is fairly clear and the flow is moderate to fast. The breeding areas of this fish are areas of fast-moving water where the rocks are covered with green algae. Records of this species are associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C.
Lake Sturgeon (Great Lakes – Upper St. Lawrence River population) (*Acipenser fulvescens* pop. 3) Endangered | N3	Lake Sturgeon are coolwater benthic generalists that require a variety of habitats to complete their lifecycle. Adults inhabit soft bottom lakes and rivers, but typically migrate to shallow, fast-flowing water comprised of boulders and gravel associated with the base of waterfalls, rapids, or dams, to spawn. Moving water is critical to egg success with hatching dependent on egg aeration. During the larval stage, larvae will burrow within the gravel substrate to hide from predators while they continue to develop. NHIC records indicate this species is present within 1 km of the Study Area; however, this record is likely associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Pugnose Minnow (*Opsopoeodus emiliae*) Threatened | Threatened	This species cool, clear, shallow, heavily vegetated costal wetlands, and slow-moving river and streams with warm water and abundant vegetation. DFO records of this species are associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.
Silver Shiner (*Notropis photogenis*) Threatened | Threatened	This species prefers moderate to large size streams with swift currents that are free of weeds and have clean gravel or boulder bottoms. They live in schools and feed on crustaceans and adult flies that fall in the water or fly just above the surface. Records of this species are most likely associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.
Spotted Sucker (*Minytrema melanops*) Special Concern | Special Concern	This species inhabits clear creeks and small to moderate sized rivers with sand, gravel or hard-clay bottoms, usually free of silt, but can also be found in turbid habitats. In late spring and early summer, Spotted suckers move to rocky riffle areas of streams to breed. DFO records of this species are most likely associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, fish that reside within the Thames River cannot access Tributary C. No suitable habitat in the Study Area for this species.
Mussels		
Fawnsfoot (*Truncilla donaciformis*) Endangered | Endangered	This species inhabits medium and large rivers with moderate to slow flowing water. It usually inhabits shallow waters (one to five metres deep) with gravel, sand or muddy bottoms. DFO records of this species are associated with the Thames River, downstream of the Study Area.	Low – Due to several migration barriers downstream of the Study Area, it would be difficult for mussels (via fish hosts) to access Tributary C. No suitable habitat in the Study Area for this species.
Mapleleaf (*Quadrula quadrula*) Special Concern | Special Concern	This species if found in medium to large rivers with slow to moderate currents and firmly packed sand, gravel, or clay and mud bottoms. It also lives in lakes and reservoirs. The fish host of the Mapleleaf is the Channel Catfish.	Low – Due to several migration barriers downstream of the Study Area, it would be difficult for mussels (via fish hosts) to access Tributary C. No suitable habitat in the Study Area for this species.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Purple Wartyback (*Cyclonaias tuberculata*) S2 | N3	The species occupies small to large rivers with a range of flow conditions and favours a substrate comprised of cobble, gravel, and sand. NHIC records of the species are most likely associated with the Thames River, downstream of the Study Area.	**Low** – Due to several migration barriers downstream of the Study Area, it would be difficult for mussels (via fish hosts) to access Tributary C.
Threehorn Wartyback (*Obliquaria reflexa*) Threatened | Threatened	This species is found in large rivers with moderate current and stable gravel, sand, and mud bottoms. Common host fish for the Threehorn Wartyback are Common Shiner and Longnose Dace.	**Low** – Due to several migration barriers downstream of the Study Area, it would be difficult for mussels (via fish hosts) to access Tributary C. No suitable habitat in the Study Area for this species.
Birds		
Bald Eagle (*Haliaeetus leucocephalus*) Special Concern | N5B, N5N, N5M	Bald Eagle has been recorded in the vicinity of the Study Area as part of targeted citizen science surveys. Bald Eagles nest in large trees near lakes or large rivers feeding on fish, ducks and carrion. Trees immediately adjacent to the Thames River (north of Study Area) are likely to be preferred for nesting as compared to those within the Study Area.	**Low –** This species has not been recorded within the Study Area during targeted surveys as part of this or prior local studies.
Eastern Meadowlark (*Sturnella magna*) Threatened | Threatened	Presence of Eastern Meadowlark in the vicinity of the Study Area has been noted by multiple data sources. The species breeds primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in other open areas. Fallowed fields within the Study Area could provide nesting habitat for this species.	**Low** – A small area of potential habitat for this species (Cultural Meadow) was confirmed during site visits, but no individuals were noted during target surveys as part of this or prior local studies.
Yellow-breasted Chat (*Icteria virens*) Endangered | Endangered	The NHIC database has a record of this species in the vicinity of the Study Area, but this record is not corroborated with recent citizen science records. This is a large songbird with a distinctive song found in scrub and thickets where it nests and feeds. There is a small amount of suitable habitat for this species within the Study Area.	**Low** – No individuals were observed during targeted surveys as part of this or prior local studies.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Bobolink (*Dolichonyx oryzivorus*) Threatened | Threatened	Bobolink was recorded in the vicinity of the Study Area as part of targeted citizen science surveys. Historically found in tallgrass prairie and other open meadows, the species now breeds in hayfields. Fallowed fields within the Study Area could provide nesting habitat for this species.	**Low** – A small area of potential habitat for this species (Cultural Meadow) was confirmed during site visits, but no individuals were noted during target surveys as part of this or prior local studies.
Wood Thrush (*Hylocichla mustelina*) Special Concern | Threatened	Wood Thrush were recorded in the vicinity of the Study Area as part of targeted citizen science surveys. They live in moist, mature deciduous and mixed forests with well-developed undergrowth and tall trees for singing perches. They prefer larger forests but will also use smaller woodlots. Habitat for this species is present outside of the Study Area.	**Low** – This species was not recorded in the Study Area during targeted surveys for this or prior local studies.
Grasshopper Sparrow (*Ammodramus savannarum*) Special Concern | Special Concern	Grasshopper Sparrow was noted in the vicinity of the Study Area by citizen scientists. It breeds in open cultural and natural habitats. This habitat is present within the Study Area.	**Low** – No individuals were observed during targeted surveys for this or prior local studies.
Barn Swallow (*Hirundo rustica*) Threatened | Threatened	Recorded in the vicinity of the Study Area as part of targeted citizen science surveys. Barn Swallow are still relatively common and build their cup-shaped mud nests almost exclusively on human-made structures like open barns, under bridges, and in culverts. Suitable nesting habitat for this species likely exists within the Study Area.	**High** – One individual was observed during targeted surveys and nesting habitat (buildings) is present.
Bank Swallow (*Riparia riparia*) Threatened | Threatened	Bank Swallow were recorded in the vicinity of the Study Area as part of targeted citizen science surveys. Nests are excavated in vertical faces of silt or sand, including gravel pits and material stockpiles. Suitable habitat was not observed within the Study Area.	**Low** – No habitat or individuals were observed during targeted surveys or prior local studies.
Chimney Swift (*Chaetura pelagica*) Threatened | Threatened	Recorded in the vicinity of the Study Area as part of targeted citizen science surveys. Chimney Swifts nested in caves and hollow trees prior to European settlement and are today most often associated with chimneys and other manmade structures. Suitable habitat my be present within the Study Area.	**Low** – No habitat or individuals were observed during targeted surveys or prior local studies.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Common Nighthawk (*Chordeiles minor*) Special Concern | Special Concern	Common Nighthawk was recorded in the vicinity of the Study Area as part of targeted citizen science surveys. They nest in open areas such as forest clearings, rock barrens and shorelines, but may also nest in fields, orchards, parks and gravel along road edges and railways. In urban situations, this species nests on flat rooftops. Suitable habitat is likely present within the Study Area.	Moderate – No individuals were observed during targeted surveys or prior local studies, but nesting habitat is present (open fields and edge habitats).
Eastern Wood-Pewee (*Contopus virens*) Special Concern | Special Concern	Recorded in the Study Area as part of targeted citizen science and Environmental Impact surveys. Eastern Wood-Pewee prefers mid-canopy layer of forest clearings and edges of deciduous and mixed forests and can often be found in parks or other modified habitats. Suitable habitat is present within the Study Area.	High – Habitat for this species was confirmed in the Study Area south of Oxford Street in 2018 (MTE, 2020).
Purple Martin (*Progne subis*) S3S4B | N5B,N5M	This species was recorded in the vicinity of the Study Area during targeted citizen science surveys. In Eastern North American, it nests almost exclusively in nest boxes and foraging in the surrounding area. As a result, there is habitat for this species within the Study Area.	Low – No nest boxes and no individuals were observed during targeted surveys or prior local studies.
Reptiles		
Blanding's Turtle (*Emydoidea blandingii*) Threatened | Endangered	This species was recorded in the vicinity of the Study Area by citizen scientists. Blanding's Turtles live in shallow water, typically associated with wetlands, ponds and lakes, often with abundant aquatic vegetation. These turtles also utilize terrestrial habitats for movement, foraging and nesting. The Study Area contains limited habitats that are suitable for this species.	Low – Small amounts of wetland habitats for this species are present within and beyond the Study Area, but none were observed during these or prior local studies.
Snapping Turtle (*Chelydra serpentina*) Special Concern | Special Concern	Snapping Turtles have been recorded in the vicinity of the Study Area by citizen scientists. Snapping turtles can utilize any available permanent aquatic habitat, including lakes, rivers and wetlands, also stormwater ponds and sewage lagoons. This species is expected to be found in all permanent water features within the Study Area.	High – Though none were observed, Snapping Turtles are potentially present in all permanent water features within the Study Area, including Tributary C and the dug pond in the eastern section of the Study Area.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Northern Map Turtle (*Graptemys geographica*) Special Concern | Special Concern	Northern Map Turtles have been recorded by local citizen science observers near the Study Area. Typical habitat includes lakes and rivers of sufficient quality to support molluscs, a large part of the females' diet. Habitat for this species is outside of the Study Area associated with the Thames River	**Low** – No habitat is present within the Study Area and none were observed during these or prior local studies.
Queensnake (*Regina septemvittata*) Endangered | Endangered	Queensnake have been recorded by local citizen science observers near the Study Area. Queensnake are restricted to aquatic habitats, often watercourses but occasionally wetlands, that have a large population of crayfish, which they feed on almost exclusively. Habitat for this species is outside of the Study Area associated with the Thames River.	**Low** – No habitat is present within the Study Area and none were observed during these or prior local studies.
Spiny Softshell (*Apalone spinifera*) Endangered | Endangered	MECP noted that there were known occurrences of Spiny Softshell with the potential to also occur in the Study Area. Spiny Softshell are restricted to aquatic habitats, typically larger lakes and rivers in Ontario with well-oxygenated hibernation sites being a critical habitat component. Habitat for this species is outside of the Study Area associated with the Thames River.	**Low -** No habitat is present within the Study Area and none were observed during these or prior local studies.
Eastern Foxsnake (*Pantherophis gloydi*) Endangered | Endangered	Eastern Foxsnake have been recorded by local citizen science observers in the vicinity of the Study Area. This species is typically associated with existing or former prairie, wetland or shoreline habitats but can utilize a wide range of habitats. The Study Area is outside of its typical range in southern Ontario and the noted records are likely animals collected and released by people.	**Low** – No individuals were observed during these or prior local studies. These records are anomalous and likely attributable to human interference.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Eastern Hog-nosed Snake (*Heterodon platirhinos*) Threatened | Threatened	Eastern Hog-nosed Snake have been recorded by local citizen science observers near the Study Area. This species is associated with sandy soils, which it requires for nesting but otherwise can utilize various habitats for hunting toads, which it feeds on nearly exclusively. As this species is a generalist with a large home range, suitable habitat is found within the Study Area.	Low/Medium – No individuals were observed during these or prior local studies, however, this species is notoriously cryptic and is easily missed, even during dedicated surveys. Incidental occurrences are possible as this is a wide-ranging habitat generalist outside of nesting and hibernation seasons but the Study Area is not expected to be part of the core range of the local population, centered within Komoka Provincial Park.
Eastern Milksnake (*Lampropeltis triangulum*) S4 | Special Concern	Eastern Milksnake have been recorded by local citizen science observers in the vicinity of the Study Area. This species uses a wide variety of habitats, including fields and forests and wetlands. The Study Area includes habitat for this species.	Medium – No individuals were observed during these or prior local studies, however, this species has the potential to be occasionally encountered within the Study Area as it is a habitat generalist and can utilize anthropogenic habitats.
Insects		
Sleepy Duskywing (*Erynnis brizo)* S1 | N3*	Citizen science data reports this species is historic in the local area. Sleepy Duskywing lives in sandy habitats with oaks and pines. Suitable habitat for this species is not present in the Study Area.	Low – This species was last formally recorded in the area in 1971.
Hackberry Emperor (*Asterocampa celtis*) S3 | N3*	Citizen science data reports this species is present in the vicinity of the Study Area. Hackberry Emperor are obligate on Hackberry (Celtis spp.) and can be found where sufficient numbers of hosts are available. Suitable habitat for this species is potentially present within and adjacent to the Study Area.	Medium– This species was not observed during these or prior local studies. Host species were recorded within the Study Area during prior inventories (MTE, 2020).

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Tawny Emperor (*Asterocampa clyton*) S3 | N3*	There are citizen science records of this species is present in the vicinity of the Study Area. Tawny Emperor are obligate on Hackberry (Celtis spp.) and can be found where sufficient numbers of hosts are available. Suitable habitat for this species is potentially present within and adjacent to the Study Area.	Medium – This species was not observed during these or prior local studies. Host species were recorded within the Study Area during prior inventories (MTE, 2020).
Reversed Haploa (*Haploa reversa*) S1? | Endangered	Citizen science data reports this species in the vicinity of the Study Area. Reversed Hapola inhabits dry oak savannah, woodland and dune systems. Habitat for this species is potentially present beyond the Study Area.	Low – This species was not observed during these or prior local studies, and no host species were recorded during inventories.
Fratternal Potter Wasp (*Eumenes fraternus*) S3 | N3*	There is a citizen science record of this species near the Study Area. Little is known about this wasp but based on food requirements it could be present wherever suitable nectar sources (adults) and Lepidoptera larva (young) are found. Potential habitat for this species is present within the Study Area.	Low/Medium – This species was not observed during these or prior local studies, however, potentially suitable habitat is present.
Differentiated Grasshopper (*Melanoplus differentialis*) S3 | N3*	This species has been observed by citizen scientists immediately west of the Study Area. It lives in grasslands, woodlands, meadows and croplands, where they eat a variety of foods, including agricultural crops. Habitat for this species is found within the Study Area.	High – This species was not observed during these or prior local studies, however, based on the presence of an adult nearby, they are likely present.
Monarch (*Danaus plexippus*) Special Concern | Special Concern	There are citizen science records of this species in general area. Monarchs require milkweed plants for larva to feed on, while adults forage on the nectar of available wildflowers. As roadsides and other edge habitat may support milkweed and wildflower species, Monarchs are expected to be present within the Study Area.	High – One adult was observed within the Study Area during site investigations.

Species Name and Status (Ontario | Canada)	Species Records in the Study Area and Habitat Preference	Probability Assessment
Mammals		
American Badger (*Taxidea taxus)* Endangered | Endangered	MECP noted that there were known occurrences of American Badger with the potential to also occur in the Study Area. American Badger known to inhabit the the London area,but are not well-documented throughout their range as a result of their nocturnal and nomadic habits. Presence is most often assumed when appropriate burrows or digging associated with foraging is observed in areas known to support the species.Potential habitat for this species is within the Study Area.	**Low –** No large (>10cm) mammal burrows or signs of foraging (excavation for small mammals) were observed during site investigations by an observer familiar with badger activity. This species may pass through the area incidentally.
SAR Bats Little brown bat (*Myotis lucifugus* Northern long-eared bat (*Myotis septentrionalis*) Tri-colored bat (*Perimyotis subflavus*) Endangered | Endangered	MECP noted that there were known occurrences of SAR bats with the potential to also occur in the Study Area. Outside of known hibernacula, SAR bats are associated with dead and dying trees which provide maternity roost habitat, as well as in some cases attics and other buildings. Habitat for these species is present within the Study Area but higher-quality habitat is present outside of the Study Area associated with forested communities to the north.	**Medium –** Suitable treed habitats with the potential to support SAR bats are present in the Study Area, outside of the road right-of-way. A small number of trees within the right-of-way possess features (decay, peeling bark etc) that could provide maternity colony habitat for SAR Bats. These habitats are low quality compared to those within and beyond the Study Area associated with more natural habitats and watercourses.

Source: NHIC; NatureServe; DFO Aquatic SAR Mapping – 2021
**S*/N* – range of uncertainty about the status of the species*
S1/N1 – Critically Imperiled: At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
S2/N2 – Imperiled: At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
S3/N3 – Vulnerable: At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors
S4/N4 – Apparently Secure: At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
S5/N5 – Secure: At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.

6.0 Ecological Constraints and Opportunities

6.1 Constraints

Tributary C is a coldwater stream with a resident Brook Trout population in the City of London. This is a rare and sensitive natural feature that should be protected. North of Oxford Street West, the watercourse is surrounded by a PSW which provides habitat for a diverse community of rare plants and wildlife habitat for species of conservation concern, in particular amphibians and reptiles. The wetland is also associated with significant valleylands which border the tributary which help to buffer the watercourse from the adjacent development-related disturbances.

Detailed design should consider minimizing encroachment into sensitive features, particularly the Tributary C and the PSW. Design should also consider surface drainage patterns and impacts to the water balance.

6.2 Opportunities

Several opportunities to enhance the natural heritage system in the Study Area were identified though background research and field investigations.

Enhanced surface water treatment – Flat bottom ditches vegetated with a native wetland meadow mix will encourage infiltration, reducing flow velocity and erosive potential, and reducing road contaminants that enter the nearby watercourses. Swamp milkweed (*Asclepias incarnata*) is an ideal plant to include in this seed mix as it provides pollinator habitat, spreads and competes with invasive reeds – both benefits described further, below.

Invasive species management/Phragmites management - Notable invasive species observed within the Study Area included European Common Reed (*Phragmites australis*), Common Buckthorn (*Rhamnus cathartica*), and Autumn Olive (*Elaeagnus umbellate*). This provides an opportunity for enhancement by implementing invasive species management procedures consistent with the City's Invasive Plant Management Strategy (City of London 2020).

Pollinator habitat/roadside naturalization – Revegetation of disturbed areas with a native grass/forb seed mix and a wetland meadow mix would benefit the larger ecosystem and add diversity to the roadside habitats. Milkweed seed could be included, however as noted above, we recommend Butterfly or Swamp Milkweed (*Asclepias tuberosa; A. incarnata*) which are less common on the landscape in comparison to the common variety and also will thrive in a wetland mix. A more robust revegetation plan could include native shrubs, specifically ones with flowers and fruit that benefit local pollinators and bird species.

Wildlife crossing/signs/lights - Wildlife are regularly crossing Oxford Street West, west of the intersection. The skeletal remains of two white-tailed deer (*Odocoileus virginianus*) were observed

just west of the existing intersection, one on either side of Oxford Street West. A game trail and deer scat were also noted in association with the skeletons. A potential crossing solution for smaller wildlife would be presented when future work to rehabilitate the Tributary C culvert crossing Oxford Street West is undertaken. Since the culvert itself is perched above the streambed both upstream and downstream of the crossing, replacement would likely be proposed to restore fish passage. Intentionally oversizing the replacement culvert would be a simple way to provide wildlife passage across the road, which has potential to benefit turtles as road-killed turtles were noted by a nearby homeowner during the November 17, 2021, Public Information Centre (PIC).

7.0 Proposed Solution

7.1 Evaluation of Alternatives

The study objectives for the Project as a whole, were to evaluate and select a preferred alternative solution for the intersection improvements at Oxford Street West and Gideon Drive that would also incorporate a new connection with Kains Road and future developments. Several alternatives, noted below, were identified and evaluated, including signalized intersection, single and multi-lane roundabouts, and were compared to a 'do-nothing' alternative.

7.1.1 Alternative 1 – Do Nothing

This alternative maintains the existing condition of the Oxford Street West and Gideon Drive intersection (Figure 7.1). While doing nothing does not impact the natural features in the Study Area, it does not improve traffic operation or safety, does not accommodate projected traffic volumes, nor does it improve active transportation facilities. Do Nothing also eliminates the opportunity for enhancement of natural features.

Figure 7.1 – Alternative Solution 1 – Do Nothing

7.1.2 Alternative 2 – Signalized Intersection

This alternative consists of the installation of traffic signals, crosswalks and cycling facilities (Figure 7.2). The signalized intersection impacts the least area of natural features, while still addressing some of the traffic operation issues, but it would result in increased queuing along Oxford Street which would result in increased noise and air pollution from starts/stops and vehicle idling.

Figure 7.2 – Alternative Solution 2 – Signalized Intersection

7.1.3 Alternative 3 – Single-Lane Roundabout

This alternative consists of a traditional roundabout (one approach lane per direction), crosswalks and cycling facilities (Figure 7.3). The roundabout impacts a larger area than the first two alternatives and does provide traffic calming. This alternative would have a lower increase in noise and air pollution compared to the signalized intersection due to the reduced need for vehicles to stop or idle while at a red light.

Figure 7.3 – Alternative Solution 3 – Single-Lane Roundabout

7.1.4 Alternative 4 – Multi-Lane Roundabout

This alternative consists of a multi-lane roundabout with additional lanes to accommodate heavier traffic movements, crosswalks and cycling facilities (Figure 7.4). While this alternative impacts the largest area, similar to the single-lane roundabout, it integrates with potential future widening of Oxford Street and avoids the need for re-disturbance. This alternative would have a lower increase in noise and air pollution compared to the signalized intersection or the single lane roundabout due to the reduced need for vehicles to stop or idle while at a red light. It provides for improved flow of traffic over the single lane roundabout option.

Figure 7.4 – Alternative Solution 4 – Multi-Lane Roundabout

7.1.5 Impact Summary of Alternative Solutions

Considering the natural heritage features within the proposed project area and the ecological constraints noted in Section 6.1, the environmental impacts of each alternative were generally comparable. A brief summary of measured areas of impact for each alternative are presented in Table 7.1.

Table 7.1 – Areas (in hectares) of Impact by Alternative

Natural Feature	1 – Do Nothing	2 – Signalized Intersection	3 – Single-Lane Roundabout	4 – Multi-Lane Roundabout
Ecosites (Total)	0	0.06	0.35	0.36
Cultural Meadow (CUM1)	-	0.06	0.34	0.35
Cultural Savanah (CUS1)	-	-	0.005	0.005
Cultural Thicket (CUT1)	-	-	0.0003	0.0003
Cultural Savanah - Walnut Inclusion (CUS1)	-	-	0.0005	0.008
Confirmed SWH	0	0.06	0.34	0.35
Candidate SAR Habitat	0	0	0.005	0.01
Tree Removal (> 10 cm)	1	2	20	20

7.2 Preferred Alternative – Multi-Lane Roundabout

The overall evaluation of the alternative solutions determined the multi-lane roundabout to be the preferred solution. To accommodate this roundabout design, Oxford Street West will be slightly realigned, and the roundabout will be positioned at and to the south of the existing intersection. No additional property is required as the preferred solution will be accommodated within the existing ROW. It is however recommended that the City acquire a portion of the property at #2085 Oxford Street West to take over ownership of the existing culvert under the driveway for ongoing maintenance activities as this culvert is currently on private property and conveys flows from the public right-of-way.

Sidewalks/multi-use paths will be extended and connect to existing paths along Oxford and Kains Road and to future developments on the south side of Oxford. Stormwater management will be provided by new flat-bottom ditches with flow checks and native vegetation. Space within the roadway is being protected for potential future sanitary sewers and watermain, for future connections, should additional future developments materialize. Road work for this alternative stops short of the Tributary C crossing on Oxford Street West.

7.2.1 Proposed Project Activities

The preferred alternative includes several construction activities that have potential to impact the natural heritage features:

- Vegetation clearing;
- Excavation;
- Grading and paving;
- Dewatering/unwatering;
- Use of industrial equipment; and
- Hardening of natural pervious surfaces (i.e., new asphalt/concrete).

8.0 Preliminary Assessment of Potential Impacts

The following sections provide discussion on the potential impacts of the preferred alternative, multi-lane roundabout, on the natural heritage features and suggest avoidance and operational constraints to mitigate these impacts.

8.1 Terrestrial Vegetation

Potential direct impacts to terrestrial vegetation as a component of construction of the multi-lane roundabout and sidewalk/multi-use pathway construction include complete removal through construction and grading activities, as well as vegetation clearing to support surveying and construction equipment access. Indirect impacts to woody vegetation along the periphery of construction areas may occur due to damage to roots, stems and branches through interaction

with construction equipment. Excessive dust raised by construction activities may also negatively impact vegetation.

The preferred solution for the Oxford Street West and Gideon Drive intersection will directly impact existing anthropogenic vegetation communities. This includes mainly Cultural Meadow (CUM1-1) within roadsides/road right-of ways as well as mowed/landscaped areas within existing residential properties. These areas are occupied by pioneering native and exotic species, mainly grasses and forbs and this intersection and surrounding area have a long history of disturbance, as witnessed by the isolated area of asphalt west of the existing intersection. Two problematic invasive species, Autumn Olive and invasive Phragmites are present within the Study Area, including the proposed project footprint.

Terrestrial vegetation within the Study Area will be impacted by the proposed intersection improvement activities through clearing and removals associated with installation of a roundabout and sidewalks, as well as associated road widening, shoulder and slope grading. As the vegetation communities impacted are common, cultural features composed of pioneering species with no unique components, mitigations will focus on the retention and reduction of impacts to adjacent remaining vegetation, invasive species control and ecological revegetation.

- Revegetation of cleared areas should consider using non-invasive native plant species with high wildlife value (fruit-producing shrubs and trees, wildflowers, etc.) which will provide long-term ecological contributions to the local terrestrial system. Species and densities should be chosen so that at maturity, plants may reach typical size without interfering with each other or safe operation of the roadway, thus reducing maintenance.
- Areas of invasive Phragmites and Autumn Olive within the Study have been identified as a part of this study. Prior to the implementation of construction and efforts should be made to not spread these species. The Clean Equipment Protocol for Industry should be provided to contractors at the implementation stage to assist with these efforts.
- Control of invasive Phragmites and Autumn Olive throughout the right-of-way as a component of construction would also provide long-term benefit, as these species causes significant negative ecological impacts and Phragmites can impact infrastructure as well.

- The impacts of dust on the surrounding ecosystem can be mitigated by moistening dry soils with water as required during construction and adhering to erosion and sediment management measures as described below.

8.2 Invasive Species

Certain species, including Common Buckthorn, Autumn Olive, and Phragmites (European Common Reed) are recognized as problematic invasive species and their responsible removal will reduce the spread of these plants. Care should be taken not to spread these plants beyond their current limits during construction phases. Management of these invasive plants within the ROW should be

considered at detailed design. Mitigation measures to limit the spread should include removal of the noxious plants, especially Phragmites, prior to construction.

8.3 Terrestrial Wildlife and Habitats; Significant Wildlife Habitat

Potential impacts to wildlife and their habitats during construction can occur through direct injury and habitat loss as well as indirect impacts such as avoidance of areas of active construction and resulting modification to established daily movement patterns.

Wildlife and habitats identified during site visits were typical of rural and urbanizing areas of southern Ontario. A section of Confirmed Significant Wildlife Habitat (SWH) was located within the area proposed to be impacted by the roundabout and sidewalk/pathway design (Habitat for Special Concern Species (Monarch). This habitat (Cultural Meadow) is also present elsewhere in the Study Area and few milkweed plants are within the areas proposed to be impacted. No other Confirmed or Candidate Significant Wildlife Habitat is present within the area to be impacted.

Most of Canada's birds are protected under the MBCA. Vegetation clearing has the potential to impact breeding birds through disturbance of nesting birds and destruction of nests, eggs and young.

Construction activities have the potential to indirectly affect all other wildlife within the surrounding landscape through vibration along with light and noise pollution. This disturbance will be temporary, and it is anticipated that local wildlife is accustomed to human disturbances.

Construction activities required to implement the preferred solution will impact terrestrial wildlife habitats and have the potential to impact individuals. The following measures are recommended to reduce these impacts.

- To prevent incidental impacts to nesting birds and bat maternity colonies, woody vegetation clearing should be restricted to outside of the bat maternity and migratory bird nesting seasons, generally April 1 through October 31. If vegetation clearing must occur within this window, a qualified ecological professional should be retained to ensure no birds or bats are incidentally harmed by vegetation removals.
- Grading activities should be limited to the active season for wildlife if practical, typically May 1 through September 30 to prevent entombment within burrows, tunnels or other subterranean features.

Limiting construction activities to daylight hours will reduce the impacts to behaviour changes (avoidance) of local wildlife in response to the project. Construction of the roundabout and sidewalk/multi-use pathways has the potential to have a positive impact on the local ecosystem.

- Immediately west of the existing intersection is an area of wildlife crossing, and subsequent mortality of white-tailed deer was noted associated with this crossing. During surveys, vehicles were also noted travelling through this area at excessive speeds. The roundabout will slow traffic along Oxford Street West, which may lead to fewer wildlife-vehicle collisions.

- Use of LIDs/bioswales as a component of stormwater management provides an opportunity to diversify local vegetation as these features will support a broader variety of plant species, which will in turn provide habitat for a broader array of wildlife.

8.4 Aquatic Habitat and Communities

Potential impacts to aquatic habitats and the communities therein can be identified as: a direct loss of habitat; direct injury to fish (or other aquatic organisms) as a result of construction; or indirect changes to the aquatic habitat that may occur in the long term and/or over a larger area. In general, road reconstruction and stormwater management (new ditching) are likely to cause impacts to the surrounding riparian vegetation, changes to existing slopes and surface drainage, localized impacts to the streambed and fish habitat in potential areas of direct disturbance, and potentially more widespread impacts as a result of sedimentation and thermal changes. Potential impacts to aquatic habitat and communities have been assessed further by taking into consideration the project activities noted in Section 7.1.1 and are discussed below.

Vegetation clearing exposes soils and increases the likelihood of erosion and release of sediments into nearby water features. Impacts of terrestrial vegetation clearing and general mitigation measures are also discussed in Section 8.1.1. Release of sediment into Tributary C could have significant detrimental impacts to water quality and fish habitats. Sediments that enter a watercourse can increase stream turbidity, abrade fish gill membranes (leading to physical stress), cover spawning areas and incubating juvenile fish, cover/smother mussel beds, decrease food production, and smother eggs in nests. Removing riparian vegetation can also decrease watercourse shading, thereby potentially affecting the water temperature of surface flows, and can limit the natural shedding of organic materials which may flow into the nearby watercourse which may provide food, cover, and nutrients to the aquatic ecosystems.

Excavation will be required to install the sanitary sewers, remove the existing roads at the intersection and to prepare for the new alignment and roundabout. Excavation exposes soils and increases the likelihood of erosion and release of sediments into the nearby water features (as discussed above). Excavation also changes the shape of the land, which affects slopes and drainage. This activity will most likely also require the use of industrial equipment and grading.

Grading will be required following road realignment and roundabout construction, and to shape the new ditches and slopes. Grading operations, similar to excavation activities, disturb the ground and expose soils, increasing the likelihood of erosion and the potential release of sediments into nearby water features. These activities most likely also require the use of industrial equipment.

Dewatering of groundwater may be required during excavation for the sanitary sewers based on the groundwater elevation determined in the Preliminary Geotechnical Assessment (Golder 2021). This has potential to impact the water balance in the wetland, groundwater upwellings in Tributary C, and the groundwater recharge area.

Unwatering of stormwater may be required during roundabout construction. The resulting effluent will be directed to overland drainage swales, ultimately entering Tributary C and have potential to cause sedimentation and erosion in the receiving watercourse.

Industrial equipment accessing surface water drainage paths may release deleterious materials such as debris, oil, fuel, and grease that could be conveyed into the nearby watercourse.

As the primary impacts to the aquatic habitat and communities for this Project are associated with riparian vegetation removal, industrial equipment, changes in surface drainage, and changes to groundwater, the following measures are recommended to be carried forward into detailed design:

- Vegetation clearing impacts to the Tributary C slopes and banks should be mitigated by access limitations and Erosion and Sediment Controls (ESCs – e.g., silt fence, fibre filtration tubes, etc.) in place during construction.
- Excavation impacts will be mitigated by the ESCs implemented during construction, such as timing constraints on covering exposed slopes, and silt fence/fibre filtration tubes surrounding areas of exposed soils to slow water velocities and allow settling of suspended sediments. All permanent changes to the slopes in the area as a result of excavation will be stabilized in the short term with interim products (such as bonded fibre matrix) and long term with vegetation (grasses and native plantings). All excess materials generated by excavation will be stockpiled, handled, and disposed of in a manner that prevents entry into the adjacent waterbody or features.
- Riparian vegetation removal should be kept to a minimum, as required for construction and access only. Vegetation scheduled for removal should have proper clearing techniques implemented to protect and retain the surrounding vegetation, and root masses will be left in place for bank stabilization, where feasible.
- Restoration plan – all exposed soils should be immediately stabilized with a suitable seed and cover mix, and riparian areas should be replanted with native trees and shrubs to provide/replace stream shading.
- Enhanced swales have been included as part of the SWM design to slow the flow of stormwater, filter contaminants, and encourage infiltration by using flat-bottom ditches and appropriate vegetation (i.e., native wetland meadow mix).
- No in-water work is required for this Project, meaning no work below the high water mark of Tributary C is permitted.
- Design and implement ESCs to contain/isolate the construction zone, manage site drainage and prevent erosion of exposed soils and migration of sediment to adjacent watercourses/waterbodies during all phases of the project.
- All ESC measures should be inspected and maintained to ensure they are functioning as intended throughout the construction period and until such time that disturbed areas have stabilized.
- To prevent any deleterious substances from entering the watercourse, operate, store and maintain all equipment, vehicles and associated materials at a minimum, 30 m away from any watercourse.

- Manage and treat dewatering/unwatering effluent to prevent erosion and/or release of sediment laden or contaminated water to the waterbody. Additional dewatering considerations:
    - Use of appropriately designed and sited temporary settling basin, filter bag, overland through 30 m of vegetation, etc., such that sediment is filtered out prior to the water entering a waterbody.
    - Use of energy dissipation measures to prevent bank and bed erosion.
- Travel paths, stockpile areas and staging areas, within the vicinity of the crossing, should be pre-planned and followed.

Mitigation measures should be updated and refined during the detailed design phase of the project.

8.5 Species at Risk and Species of Conservation Concern

One species protected under the Ontario ESA Barn Swallow (Threatened) was observed during site investigations, but no protected habitat (nests) was observed. were located during field investigations.

One species of conservation concern (Monarch) was located during site investigations and another, Eastern Wood Pewee, was not located but is expected to be present based on prior surveys (MTE 2020). There is a low likelihood of impacts to individuals or important habitats of the remaining species of conservation concern and species at risk noted in Table 5.1.

The roundabout and sidewalk/multi-use pathway will result in the loss of a small amount of Cultural Meadow (CUM1-1) that provides supporting habitat for Monarch, but few host plants (milkweed). Areas of host plants are present elsewhere within as well as beyond the Study Area and are locally common. The loss of habitat proposed as a result of the project is not anticipated to affect the ability of Monarch to use remaining local habitats.

The various potential SAR and Species of Conservation Concern noted in Section 8.4 will be generally protected through the proper application of the general mitigation measures noted in the sections above. The following discussion explains any SAR specific measures and recommendations:

- Vegetation clearing timing windows (no clearing between April 1 through October 31) will serve to protect against incidental impacts to Monarch eggs, larva and pupa. The restoration plan/seed mix should consider inclusion of milkweed species, as well as various flowering plants that together could provide nectar sources throughout the active season for Monarchs. Education of construction staff regarding the potential of encountering wildlife, including turtles and snakes, as well as appropriate actions (i.e., allow the animal to leave on its own, contact a wildlife professional, etc.) is an effective mitigation against unintended impacts to wildlife.

In addition to the mitigation measures and operational constraints noted in this section, specific measures and commitments may be specified by the permitting agencies and described in the

potential issued permits and approvals. Potential permits and approvals are identified in Section 10.0.

8.6 Cumulative Impacts of Adjacent Construction

Construction and development immediately surrounding the Study Area which is already occurring or is planned may have cumulative effects to the surface flows in the Study Area. These impacts cannot be quantified in this study but should be considered at the overall land use and planning level.

9.0 Preliminary Net Effects Assessment

A preliminary assessment of the predicted net effects of the Project on the existing natural heritage features is presented in Table 9.1.

Table 9.1 – Preliminary Net Effects Assessment

Natural Feature	Potential Impacts	Mitigation Measures	Net Effects Following Mitigation	Management and Monitoring
Terrestrial Vegetation	Removal of vegetation for construction, staging, access, etc.	Floral inventory confirmed the absence of rare species.	None – currently no known rare plants present in removal areas	n/a
		Revegetate with typical lawn grass seed mix where required and native grass/forb mixture outside of areas to be maintained by municipality.	Positive – lawn grass seed would be comparable to existing conditions; addition of native species would support increased biodiversity	Restoration Plan – enhance restoration areas through invasive species management and native plantings.
	Damage to retained vegetation adjacent to the construction zone	Prepare a tree preservation plan to ensure protection of adjacent trees during construction. Demark protection area with high-visibility exclusion fencing.	None – no impacts to retained trees providing tree exclusion fencing is installed correctly and respected.	Tree Preservation Plan to protect adjacent trees
	Spread of invasive plant species.	Contractors should adhere to the Clean Equipment Protocol for Industry (Halloran *et al.* 2013)	None – no impacts from spread of invasive species.	None required though species may spread into disturbed areas from seed sources nearby. Invasives are easiest to manage during the initial stages of infestation.
Wildlife and Wildlife Habitat	Disturbance or destruction of active bird nests	Complete all necessary vegetation removals between September 1 – March 31, outside of the core breeding bird season. Instruct workers to have Suspected active nests should be vetted by an experienced professional and work modified	None – all impacts to active bird nests will be avoided through timing windows and modified work, if required.	Environmental Monitoring During Construction – ensure no active bird nests within work areas

Natural Feature	Potential Impacts	Mitigation Measures	Net Effects Following Mitigation	Management and Monitoring
		or ceased to prevent harm or disturbance to the nest.		
	Disturbance to local wildlife	Active construction to be completed during the daylight hours to reduce disturbance to crepuscular wildlife.	Low – disturbance to local wildlife will be mostly avoided.	n/a
	Harm to wildlife in the construction work area	Instruct workers that any wildlife discovered on the site is not to be harmed or harassed, and should be left to vacate the site on its own unless there is a risk of immediate harm to the animal.	None – harm or harassment of wildlife will be avoided	Environmental Monitoring During Construction – check for wildlife within work areas
		Any wildlife that is injured by construction activities should be transported immediately to an approved wildlife rehabilitator.	Low – no harm to wildlife is anticipated. However, in the unlikely event that an animal is injured by construction activities it will be transported to a wildlife rehabilitator.	Environmental Monitoring During Construction – check for wildlife within work areas
Provincially Significant Wetland (PSW)	Impacts of dewatering to construct sanitary sewers to groundwater balance.	Water balance study in detailed design should inform of potential mitigation measures and impacts.	Unknown	TBD
Tributary C	Sedimentation of surface water.	Erosion and sediment controls should be installed and maintained until vegetative cover establishes.	Low – properly installed and maintained ESC measures will reduce erosion and avoid sediment transfer to the watercourse.	Environmental Monitoring During Construction – a qualified environmental monitor should regularly inspect ESC measures to ensure they are functioning correctly.

Natural Feature	Potential Impacts	Mitigation Measures	Net Effects Following Mitigation	Management and Monitoring
		Limit construction equipment access on banks and floodplain.	Low – equipment access will be limited to work areas delineated in the contract plans; isolation methods may be employed near the watercourse.	Environmental Monitoring During Construction
		Enhanced surface water treatment with flat bottom ditches and native vegetation.	None – potential for sediment (and contaminant) retention to be enhanced in final drainage ditches.	Restoration Plan – enhance surface water treatment with native vegetation.
	Contamination of surface water by road runoff.	Design appropriate containment and treatment of road runoff to ensure that contaminated water is not directed, untreated towards the watercourse.	Low – measures will be incorporated in design to mitigate the impacts of road runoff.	Environmental Monitoring During Construction
	Impacts to groundwater upwellings and coldwater fish habitat due to dewatering to construct sanitary sewers.	Water balance study in detailed design should inform of potential mitigation measures and impacts.	Unknown	TBD
	Loss of riparian habitat surrounding the watercourse as a result of grading.	Limit design of new ditching to avoid the riparian habitat surrounding Tributary C.	Unknown – pending encroachment of final ditch design.	TBD
		Revegetate new ditches and road embankments with native species. Provide native plantings to replace any loss of the riparian habitat.	Low – vegetation will be maintained and restored in the new roadside ditches.	Restoration Plan – enhance restoration areas through invasive species management and native plantings.

Natural Feature	Potential Impacts	Mitigation Measures	Net Effects Following Mitigation	Management and Monitoring
Species at Risk and Species of Conservation Concern	Construction with slight encroachment into areas where SoCC habitats occurs.	Vegetation clearing during the inactive season for birds and insects will reduce the potential for incidental direct impacts. Revegetation of disturbed areas with native species will mitigate long-term impacts.	Low – minor loss of candidate habitat for Monarch.	Restoration Plan – enhance disturbed areas through invasive species management and native plantings, including milkweeds and flowering species.
	Opportunity for improvement of wildlife habitat	Management of areas dominated by *Phragmites* consistent with existing City funded management, control and monitoring and replace with native species.	Positive – creation of habitat for Monarch as well as adding biodiversity to the local area.	Restoration Plan – enhance restoration areas through invasive species management and native plantings.

10.0 Potential Permits and Approvals

In general, the Oxford Street West and Gideon Drive intersection improvements (and the associated stormwater upgrades, vegetation clearing, sanitary sewers, and sidewalks) have potential to impact the natural environment that cannot be fully mitigated by the measures and operational constraints described. Such impacts may require agency permitting and/or approvals, and include alterations within UTRCA regulated habitat, and potential impacts to SAR, and groundwater balance. The following list of potential approvals and permits should be considered and confirmed with the appropriate agencies during the next phase of design:

UTRCA – O. Reg. 157/06 (Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses) establishes regulated areas where development could be subject to flooding, erosion or dynamic beaches, or where interference with wetlands and alterations to shorelines and watercourses might have an adverse effect on those environmental features. UTRCA regulated lands can be found in Appendix A – Map 2. Under this regulation, any proposed development, interference or alteration within these areas requires a permit from UTRCA.

MECP – No permitting anticipated based on field work and habitats identified.

MOECC – Impacts of temporarily lowering the groundwater level to facilitate construction, potentially impacting the recharge to the wetland and watercourse require further investigation in the next phase of design and a permit to take water (PTTW) or Environmental Activity and Sector Registry (EASR) may be required.

11.0 Conclusions and Recommendations

Recommendations to be carried forward into detailed design include the following:

- Through consultation with the City and UTRCA, determine the scope of groundwater impact monitoring and water balance study required;
- Minimize tree and vegetation removal;
- Protect Tributary C from any impacts resulting from construction activities;
- Consideration of flat bottom ditches enhanced with native wetland meadow mix seed;
- Consideration of pollinator corridor plantings and enhancement;
- Consideration for the treatment of / removal of invasive Phragmites prior to commencement of construction to reduce the potential for further spread;
- Implement the Clean Equipment Protocol for Industry practices;
- Prepare an Invasive Species Management Plan for the control of priority invasive species consistent with the LIPMS (City of London 2020);
- Time construction activities outside of sensitive timing windows (e.g., vegetation removal in the late autumn through early spring);
- Produce a restoration plan that includes restoration or enhancement of adjacent natural heritage features; and

- Prepare a plan for monitoring during construction: ESCs, wildlife presence, etc.

Post-construction monitoring activities may include:

- Inspect seeded and planted material for deficiencies and replace as required under warranty; and
- Vegetation monitoring to assess the success of plantings and *Phragmites* management.

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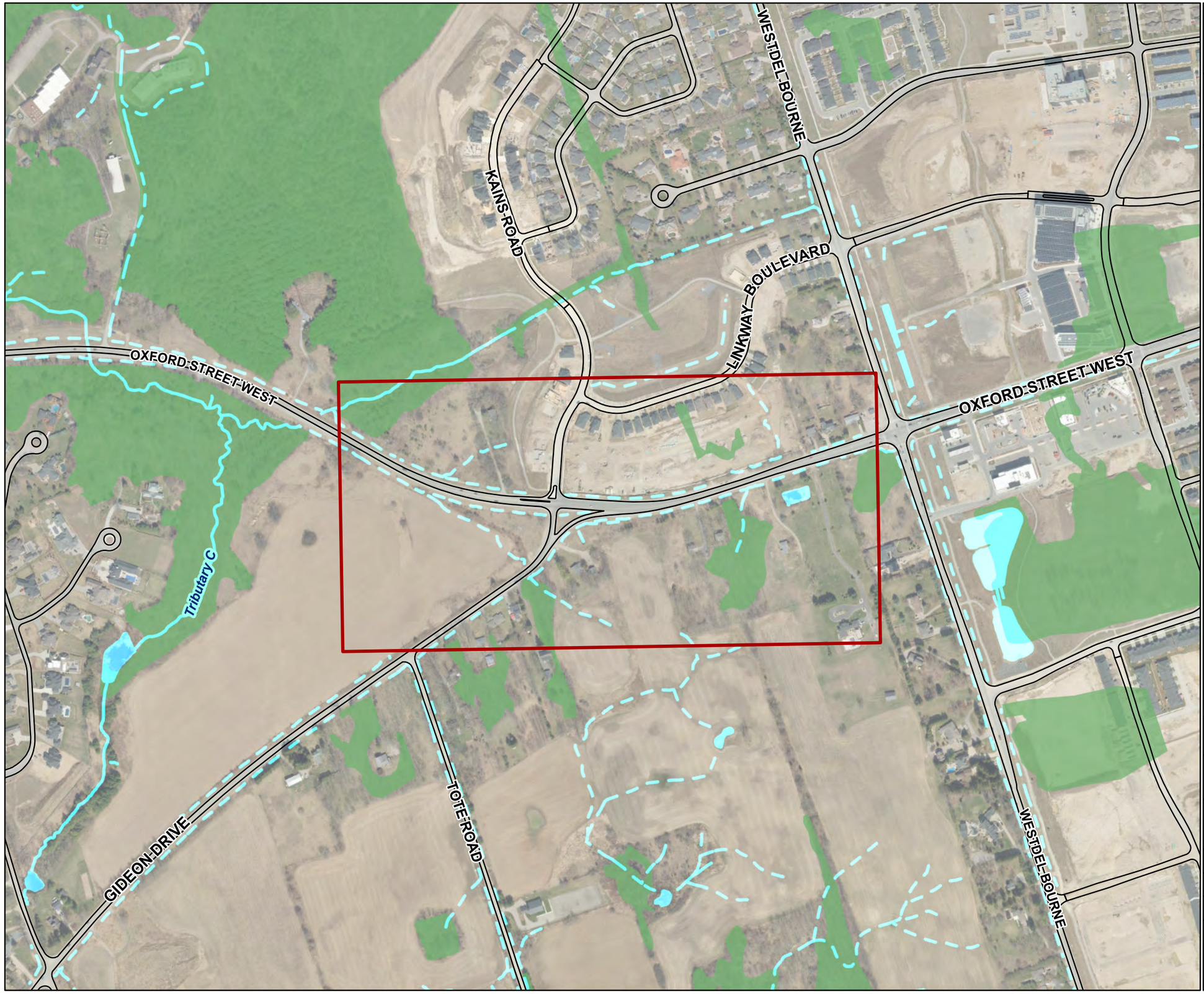
Appendix A

Maps



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Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
Environmental Impact Study (EIS)
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Map 1 - Study Area Overview

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water
- Wooded Area

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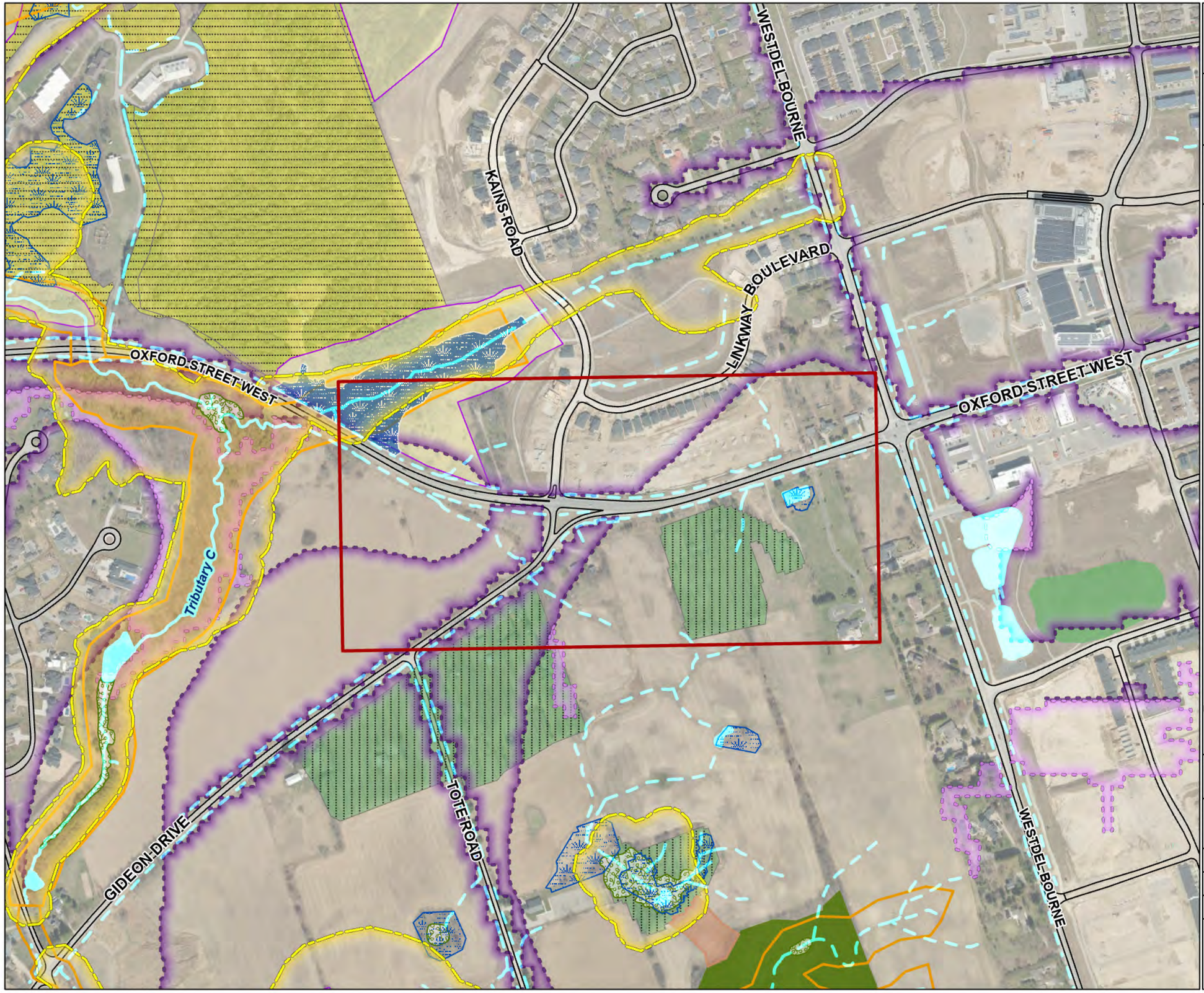

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Environmental Impact Study (EIS)
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Map 2 - Overview of Natural Heritage Features & Conservation Authority Regulated Area

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water
- UTRCA Regulated Area (O. Reg. 157/06)
- Valleylands
- Significant Valleylands
- Provincially Significant Wetlands (PSW)
- Unevaluated Wetlands
- Marshes
- Significant Groundwater Recharge Areas - (2 - 4)
- Significant Groundwater Recharge Areas - (6)
- Environmentally Significant Areas (ESA)
- Potential ESA
- Woodlands
- Unevaluated Vegetation Patches
- Significant Woodlands
- Upland Corridors

NOTE
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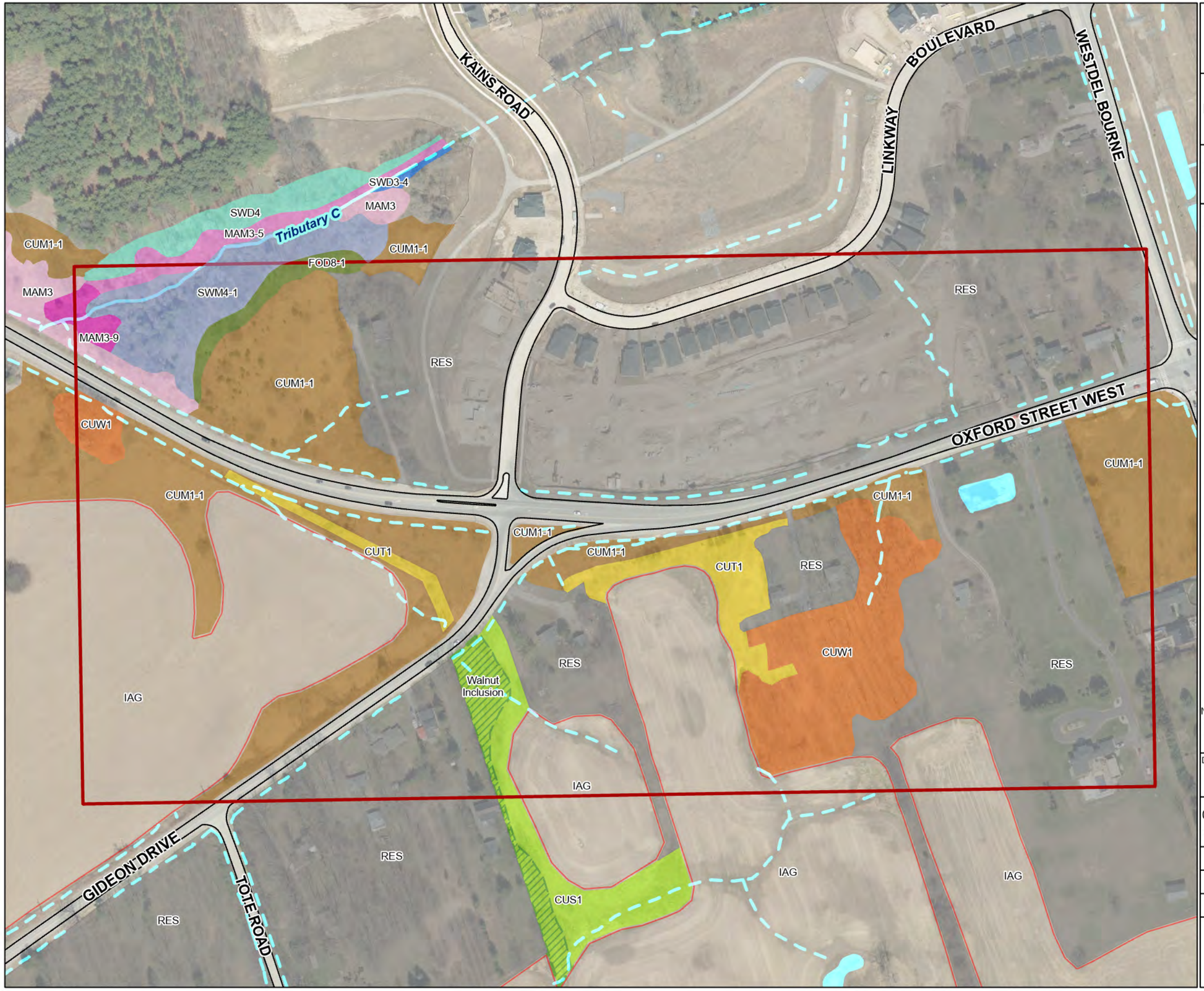

CITY OF LONDON

Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
Environmental Impact Study (EIS)
Draft

Map 3 - Vegetation Communities

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Vegetation Community

- MAM3 - Organic Meadow Marsh Ecosite
- MAM3-5 - Narrow-leaved Sedge Organic Meadow Marsh
- MAM3-9 - Forb Organic Meadow Marsh
- FOD3-1 - Fresh Moist Poplar Deciduous Forest
- SWD3-4 - Manitoba Maple Mineral Deciduous Swamp
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWM4-1 - White Cedar - Hardwood Organic Mixed Swamp
- CUS1 - Mineral Cultural Savannah Ecosite
- CUS1 - CUS1 with Walnut Hedgerow Inclusion
- CUM1-1 - Dry Moist Old Field Meadow
- CUT1 - Mineral Cultural Thicket
- CUW1 - Mineral Cultural Woodland Ecosite
- IAG - Intensive Agriculture
- RES - Residential and Development

NOTE
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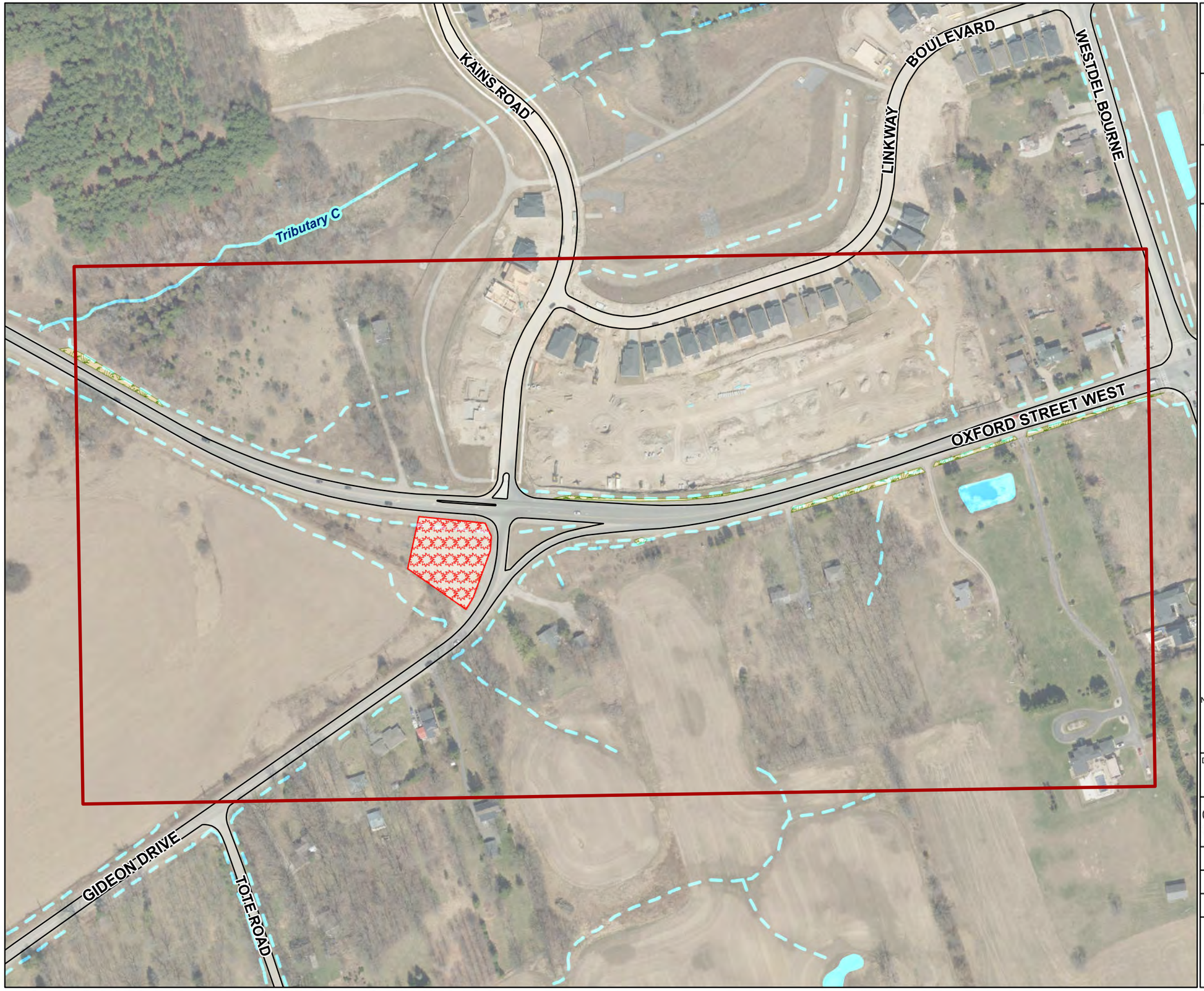

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Map 4 - Invasive Species

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water
- Phragmites
- Autumn Olive

NOTE
Observations were made on site June 16, 2021 by RVA.
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Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
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Map 5 - Aquatic Habitat and Topography

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water
- Contour (2 metre)

UTRCA Sampling Record

- UT.RI105
- UT.RI106

Stream Order

- 1st Order Stream
- 2nd Order Stream

Elevation (metre)

- 290.89 - 300
- 281.78 - 290.89
- 272.67 - 281.78
- 263.56 - 272.67
- 254.44 - 263.56
- 245.33 - 254.44
- 236.22 - 245.33
- 227.11 - 236.22
- 218 - 227.11

Slope (Degree)

70.0
0.0

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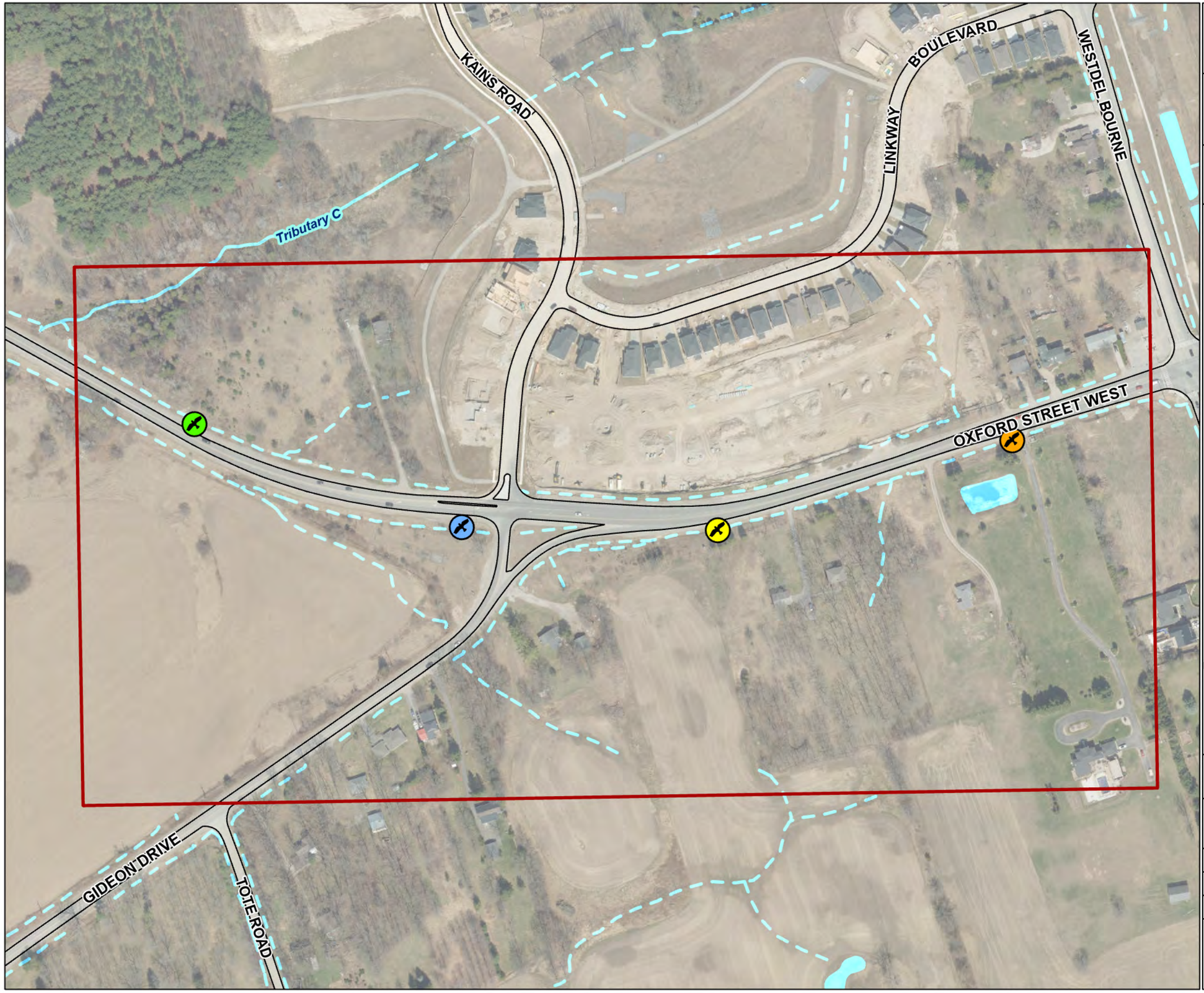

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Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
Environmental Impact Study (EIS)
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Map 6 - Breeding Bird Survey

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water
- Breeding Bird Survey Point
- BB1
- BB2
- BB3
- BB4

NOTE
Breeding Bird surveys conducted on site June 2, 2021 and June 16, 2021 by RVA.
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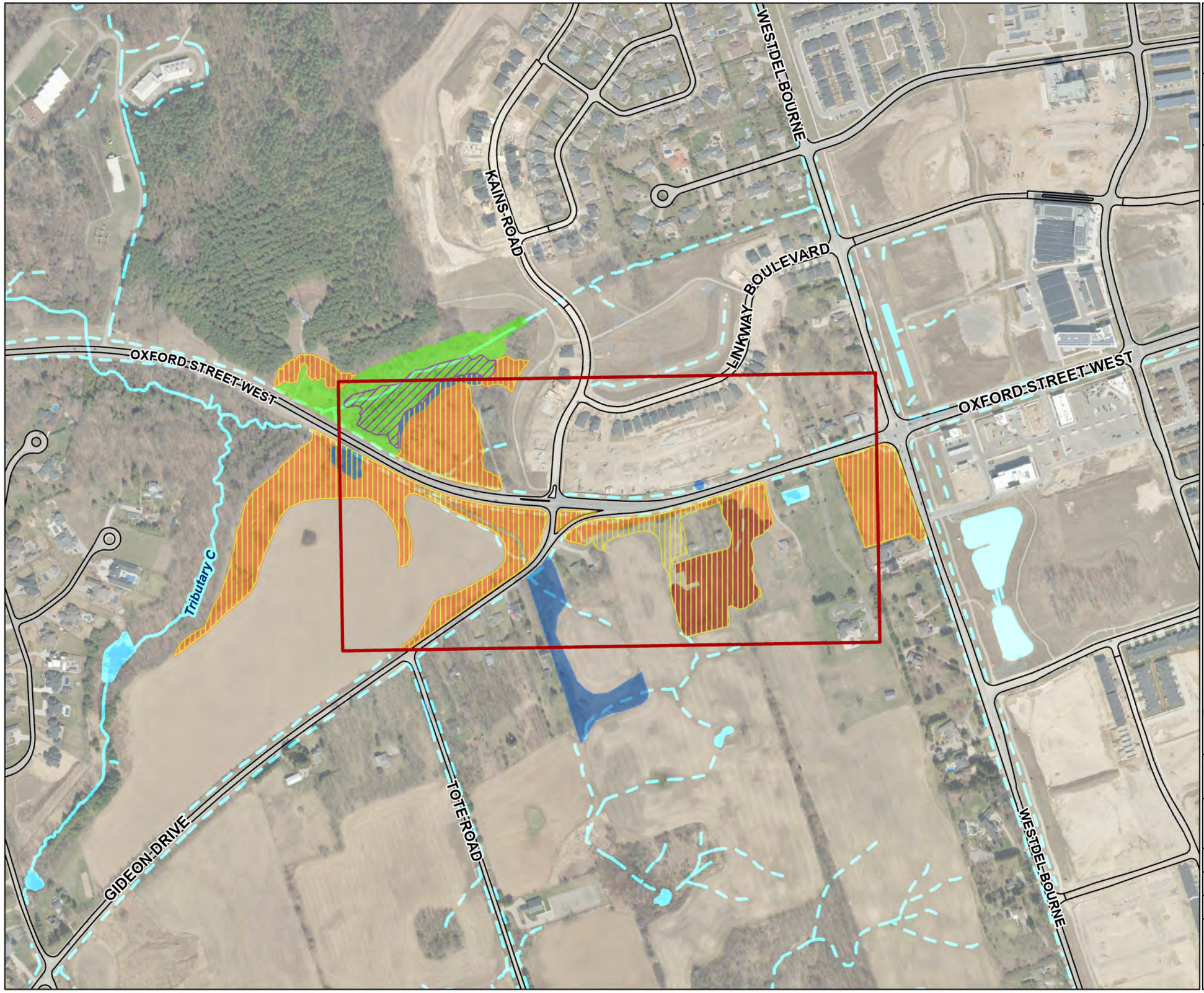

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Map 7 - Significant Wildlife Habitat and Candidate Species At Risk Habitat

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Habitats

- Candidate Bat
- Candidate Eastern Milksnake
- Candidate Eastern Wood-Pewee
- Candidate Snapping Turtle
- Confirmed Amphibian Breeding Habitat
- Confirmed Monarch Butterfly

NOTE
Base mapping referenced from AECOM (January, 2016) and MTE (August, 2020). Assessments were completed on site by RVA June 2 and June 16, 2021. Aerial imagery was also used to supplement field assessments. Publicly available London Open Data modified in agreement with Terms of Use.

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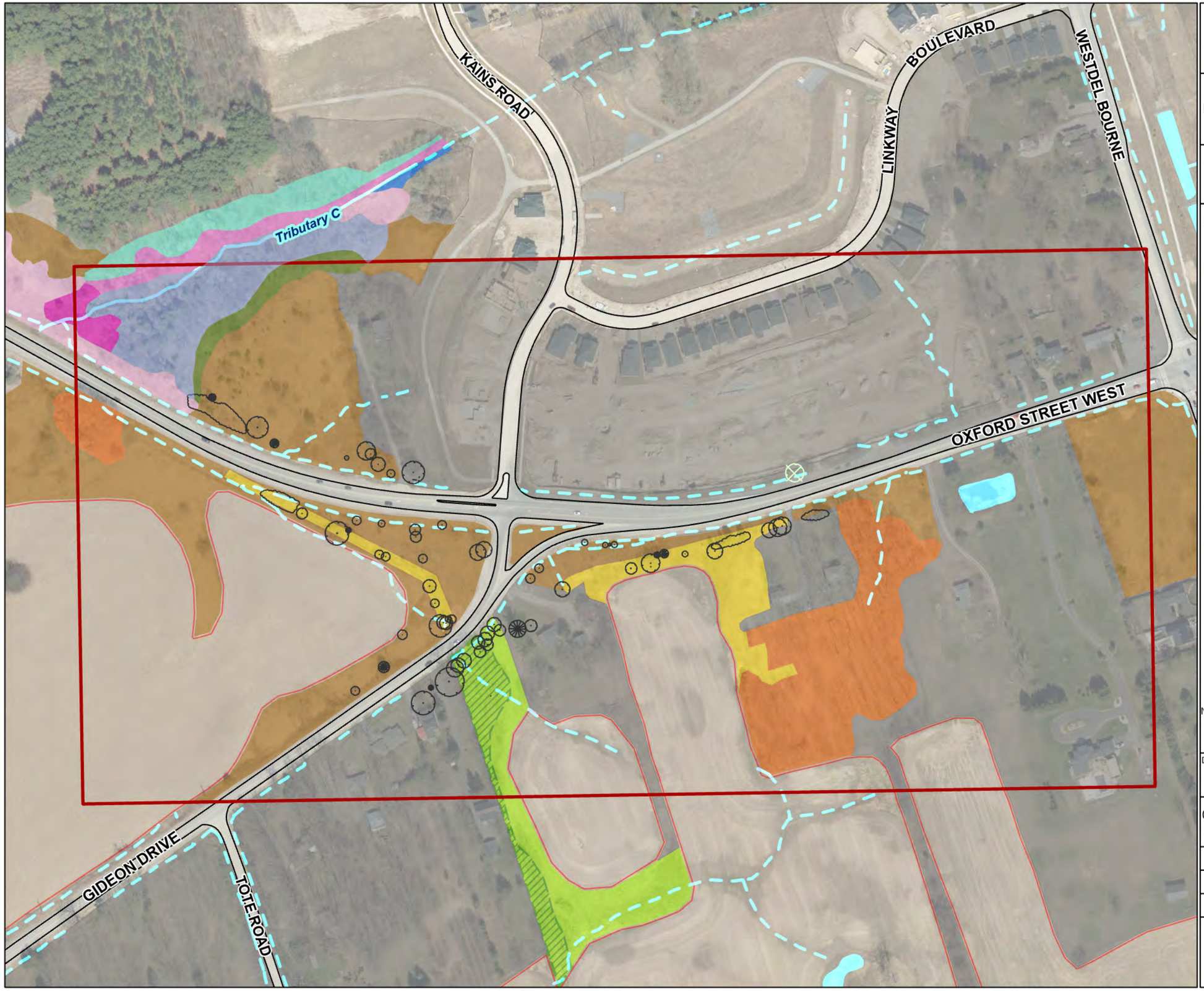

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Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
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Map 8 - Alternative 1 - Do Nothing

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Vegetation Community

- MAM3 - Organic Meadow Marsh Ecosite
- MAM3-5 - Narrow-leaved Sedge Organic Meadow Marsh
- MAM3-9 - Forb Organic Meadow Marsh
- FOD3-1 - Fresh Moist Poplar Deciduous Forest
- SWD3-4 - Manitoba Maple Mineral Deciduous Swamp
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWM4-1 - White Cedar - Hardwood Organic Mixed Swamp
- CUS1 - Mineral Cultural Savannah Ecosite
- CUS1 - CUS1 with Walnut Hedgerow Inclusion
- CUM1-1 - Dry Moist Old Field Meadow
- CUT1 - Mineral Cultural Thicket
- CUW1 - Mineral Cultural Woodland Ecosite
- IAG - Intensive Agriculture
- RES - Residential and Development
- Tree - Deciduous
- Tree - Coniferous
- Tree - Removal

NOTE
Base mapping referenced from AECOM (January, 2016) and MTE (August, 2020). ELC assessments were completed on site by RVA June 16, 2021. Aerial imagery was also used to supplement field assessments. Publicly available London Open Data modified in agreement with Terms of Use.

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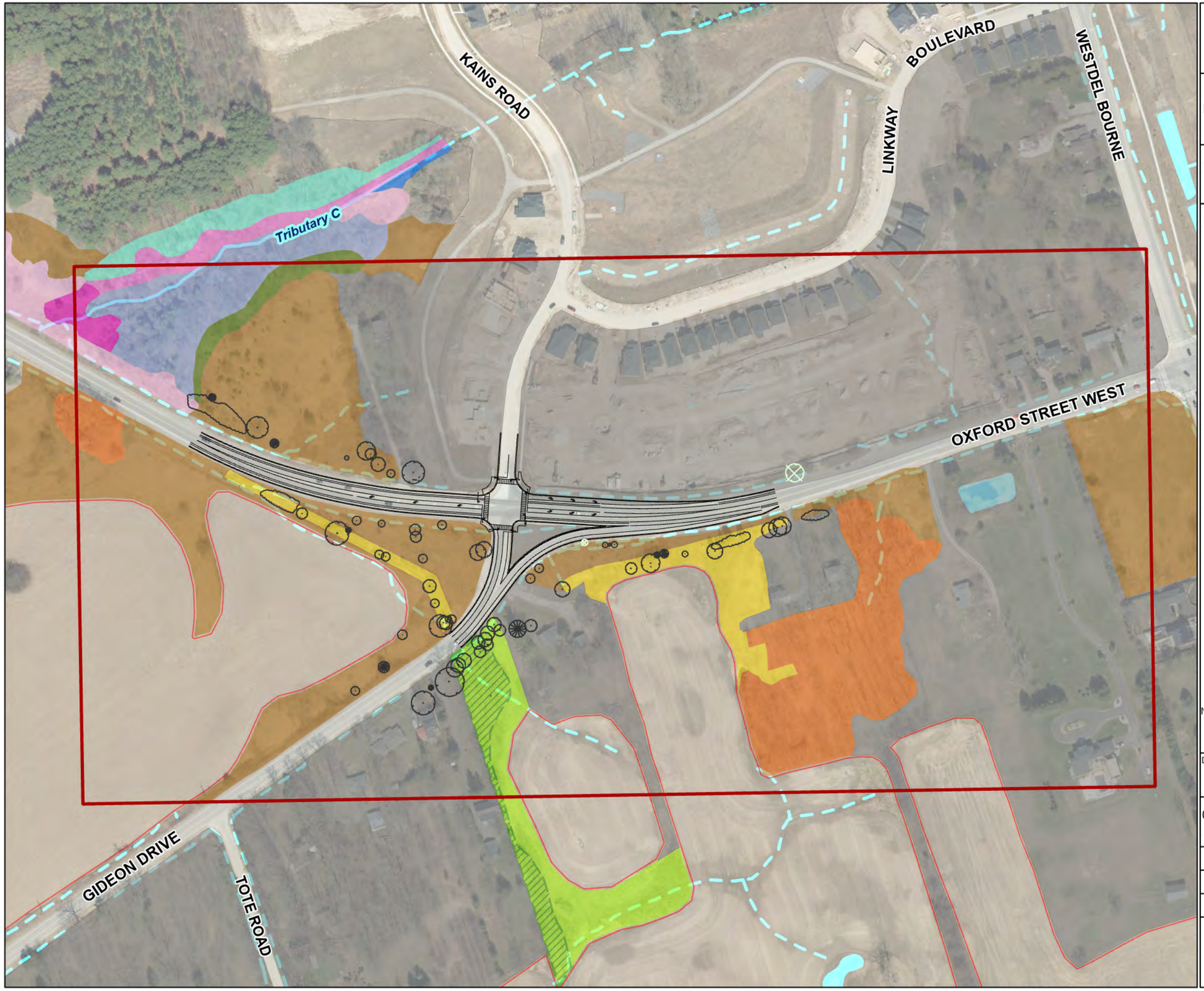

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Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
Environmental Impact Study (EIS)
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Map 9 - Alternative 2 - Signalized Intersection

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Vegetation Community

- MAM3 - Organic Meadow Marsh Ecosite
- MAM3-5 - Narrow-leaved Sedge Organic Meadow Marsh
- MAM3-9 - Forb Organic Meadow Marsh
- FOD3-1 - Fresh Moist Poplar Deciduous Forest
- SWD3-4 - Manitoba Maple Mineral Deciduous Swamp
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWM4-1 - White Cedar - Hardwood Organic Mixed Swamp
- CUS1 - Mineral Cultural Savannah Ecosite
- CUS1 - CUS1 with Walnut Hedgerow Inclusion
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- IAG - Intensive Agriculture
- RES - Residential and Development
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- Tree - Coniferous
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NOTE
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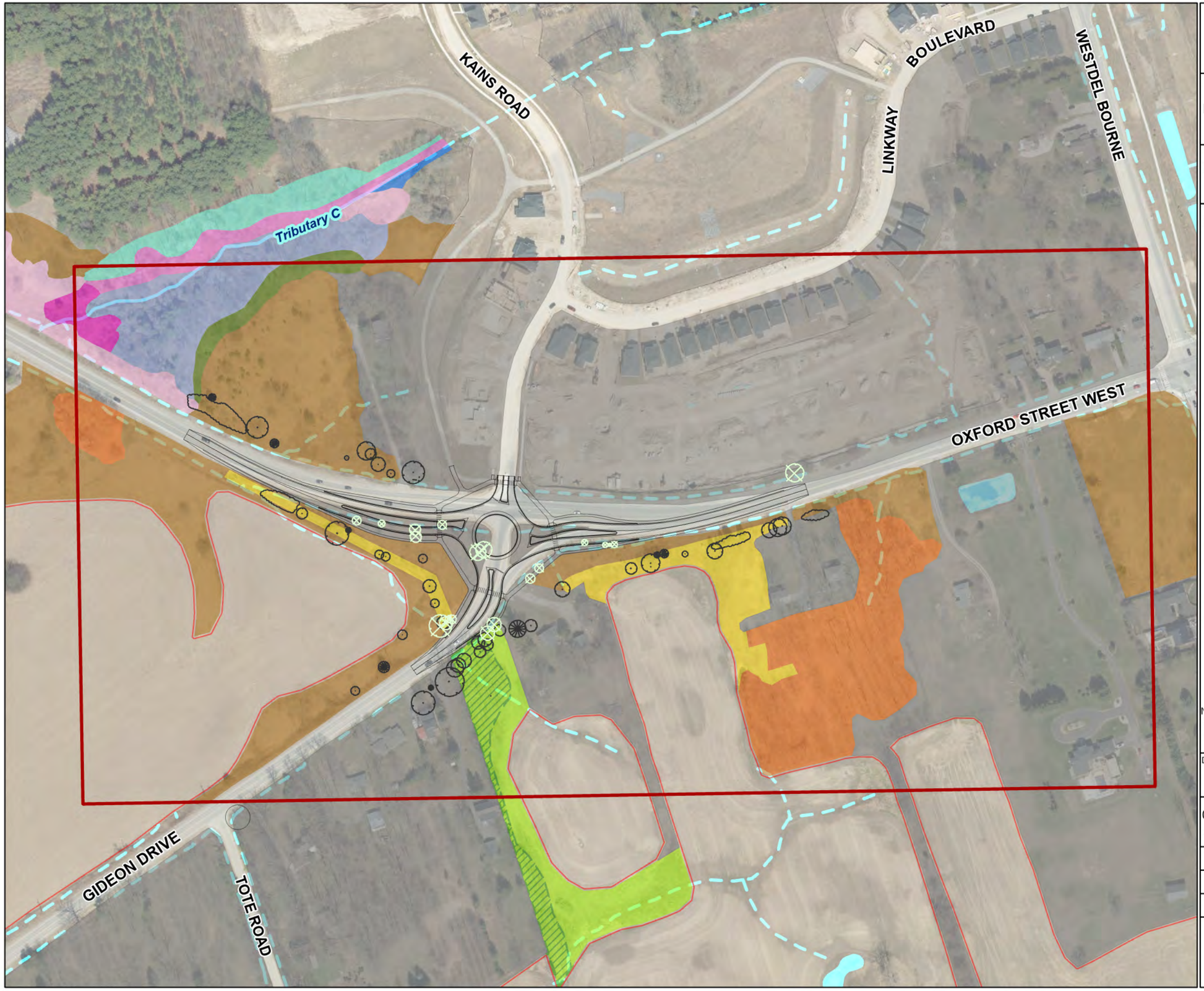

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Oxford Street West and Gideon Drive Intersection Improvements Environmental Assessment (EA) Study
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Map 10 - Alternative 3 - Single-Lane Roundabout

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Vegetation Community

- MAM3 - Organic Meadow Marsh Ecosite
- MAM3-5 - Narrow-leaved Sedge Organic Meadow Marsh
- MAM3-9 - Forb Organic Meadow Marsh
- FOD3-1 - Fresh Moist Poplar Deciduous Forest
- SWD3-4 - Manitoba Maple Mineral Deciduous Swamp
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWM4-1 - White Cedar - Hardwood Organic Mixed Swamp
- CUS1 - Mineral Cultural Savannah Ecosite
- CUS1 - CUS1 with Walnut Hedgerow Inclusion
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NOTE
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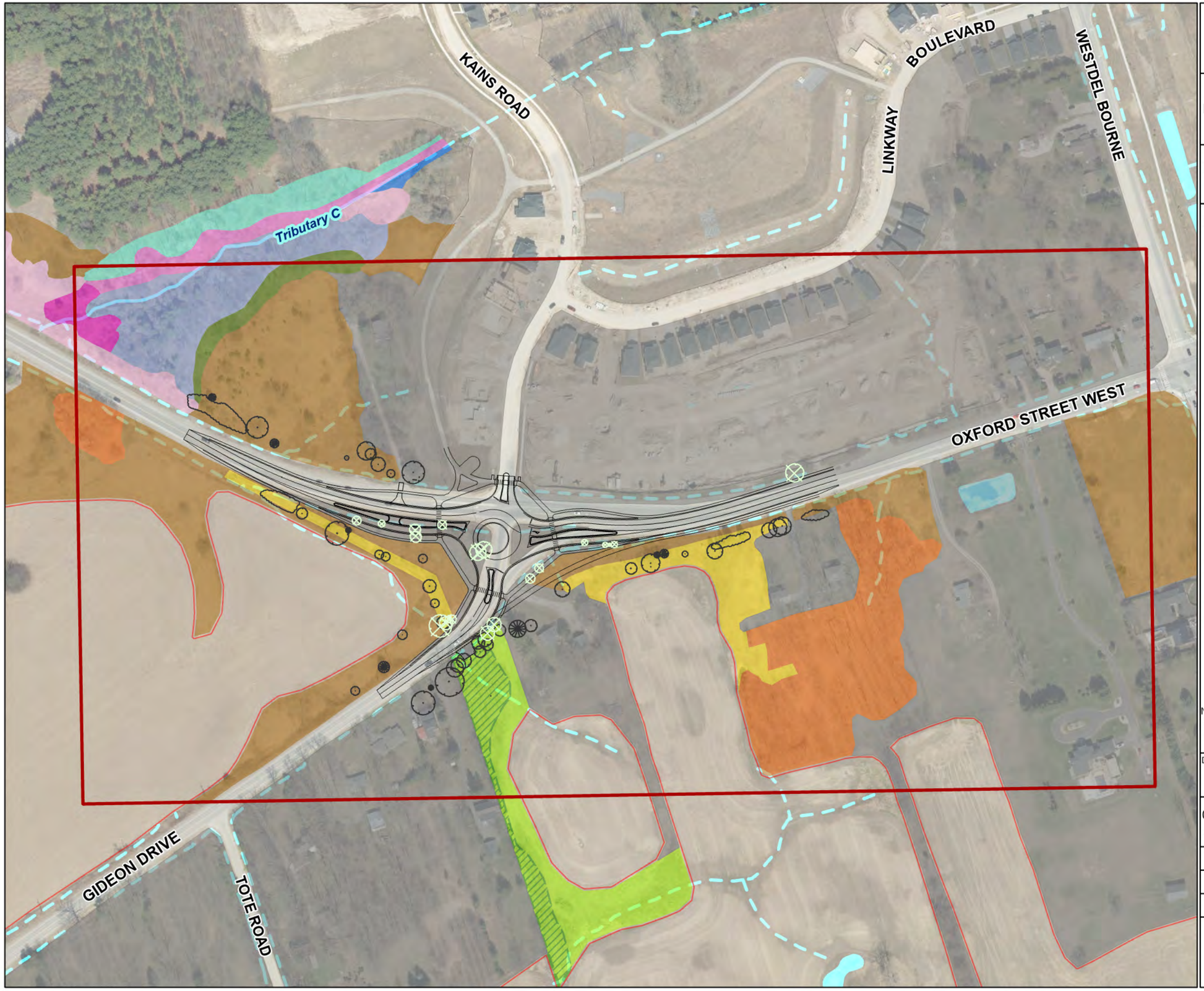

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Environmental Impact Study (EIS)
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Map 11 - Alternative 4 - Multi-Lane Roundabout

Legend

- Study Area and Adjacent Lands
- Road
- Coldwater - Permanent
- Warmwater - Intermittent / Ephemeral
- Water

Vegetation Community

- MAM3 - Organic Meadow Marsh Ecosite
- MAM3-5 - Narrow-leaved Sedge Organic Meadow Marsh
- MAM3-9 - Forb Organic Meadow Marsh
- FOD3-1 - Fresh Moist Poplar Deciduous Forest
- SWD3-4 - Manitoba Maple Mineral Deciduous Swamp
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWM4-1 - White Cedar - Hardwood Organic Mixed Swamp
- CUS1 - Mineral Cultural Savannah Ecosite
- CUS1 - CUS1 with Walnut Hedgerow Inclusion
- CUM1-1 - Dry Moist Old Field Meadow
- CUT1 - Mineral Cultural Thicket
- CUW1 - Mineral Cultural Woodland Ecosite
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- Tree - Deciduous
- Tree - Coniferous
- Tree - Removal

NOTE
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Appendix B

EIS Scoping and Agency Response

Environmental Impact Study
ISSUES SUMMARY CHECKLIST REPORT

Application Title: Oxford Street West and Gideon Drive Intersection Improvements
Date Submitted: March 18, 2021 Date Revised: March 26, 2021
Proponent: City of London

Qualification

Primary Consultant: R.V.Anderson Associates Ltd. (RVA)
Key contact person: Tisha Doucette, Planning Ecologist
Other consultant / field personnel

Hydrogeology / Hydrology: Previous studies
Biological – Flora: RVA
Biological – Fauna: RVA
Other: Archaeology (Stage 1-2) / Cultural Heritage - Golder

Context for Background Information

Subwatershed: Downstream Thames and Dingman Creek
Tributary Fact Sheet Number:
Planning / Policy Area: River Bend

Technical Advisory Review Team

- ☑ Ecologist Planner: Linda McDougall / Emily Williamson
- ☑ Planner for File: Linda McDougall / Emily Williamson
- ☑ EEPAC:
- ☑ Conservation Authority: Upper Thames River Conservation Authority (UTRCA)
- ☐ Ministry of Natural Resources:
- ☐ Ministry of Municipal Affairs and Housing:
- ☐ Ministry of Agriculture and food:
- ☑ Other Review Groups (e.g., Community Associations , Field Naturalists):

Ministry of the Environmental, Conservation and Parks (MECP)

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 Schedule 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.).

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.

Final Report - Functional Design of the Tributary 'C' Storm Drainage and Stormwater Management Servicing Works Downstream Thames River Subwatershed (Matrix, 2015)

Eagle Ridge Subdivision Phase II Scoped Environmental Impact Study and Addendum (AECOM, 2016; AECOM 2017)

Municipal Class Environmental Study Report - Schedule 'C' - Storm/Drainage & Stormwater Management, Transportation & Sanitary Trunk Servicing Works for Tributary 'C', Downstream Thames Subwatershed (AECOM, 2013)

14 Gideon Drive and 2012 Oxford Street West Environmental Impact Study (MTE, 2020)

1.2.1 Terrain Setting

☑	☑	Soils (surface and subsurface)
☑	☑	Glacial geomorphology - landform type
☑	☑	Subwatershed
☑	☑	Topographic features
☐	☐	Ground water discharge
☐	☐	Shallow ground water/baseflo
☑	☑	Ground water discharge/aquifer
☐	☐	Aggregate resources

1.2.2 Hydrology

- ☑ ☑ Hydrological catchment boundary and of wetlands + determine the catchment areas of all wetlands
- ☑ ☑ Surface drainage pattern
- ☑ ☐ Watercourses (Permanent, Intermittent)
- ☑ ☑ Stream order (Headwater, 1st, 2nd, 3rd or higher)
- ☐ ☐ Agricultural Drains
- ☑ ☐ Downstream receiving watercourse (Trib C is a sensitive watercourse)
- ☑ ☑ Hazard Line (Map 6)

1.2.3 Natural Hazards

- ☐ ☐ 100 year Erosion Line
- ☑ ☑ Floodline mapping
- ☑ ☑ Max line mapping – UTRCA mapping + text based regulated areas

1.2.4 Vegetation

- ☑ ☐ Vegetation patch Number - GIS request
- ☑ ☑ 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 Sites (review existing data, update and confirm)
- ☑ ☐ Rare Vegetation Communities

1.2.5 Flora

- ☑ ☐ Flora (Inventory dates, Source)

  2009 - Storm/Drainage & Stormwater Management, Transportation & Sanitary Trunk Servicing Works for Tributary ‘C’, Downstream Thames Subwatershed (AECOM, 2013)

  2018 - 14 Gideon Drive and 2012 Oxford Street West Environmental Impact Study (MTE, 2020)

- ☑ ☐ Rare Flora (National, Provincial, Regional)

  slender leaved mountain mint (Pycnanthemum tenuifolium) (S3; R2),
  marsh goldenrod (Solidago uliginosa) (R1)
  water avens (Geum rivale) (R1),
  marsh horsetail (Equisetum palustre) (R1),
  downy willow herb (Epilobium strictum) (R2)
  larger straw sedge (Carex normalis) (R)

1.2.6 Fauna

☑ ☐ Fauna (Inventory dates; sources) update and confirm with field work, 2021)

2009 - Storm/Drainage & Stormwater Management, Transportation & Sanitary Trunk Servicing Works for Tributary 'C', Downstream Thames Subwatershed (AECOM, 2013)
2018 - 14 Gideon Drive and 2012 Oxford Street West Environmental Impact Study (MTE, 2020)

☑ ☐ Breeding Birds (update with field work, 2021)

☐ ☐ Migratory Birds

☑ ☐ Amphibians - Incidental observations

☑ ☐ Reptiles - Incidental observations

☑ ☐ Mammals - Incidental observations

☑ ☐ Butterflies - Incidental observation

☑ ☐ Odonata - Incidental observation

☐ ☐ Other

☑ ☐ Partners In Flight (PIF) (update with field work, 2021)

Field Sparrow
Northern Flicker
Eastern Wood Pewee
incidental observations will be recorded in 2021

☑ ☐ Rare Fauna

1.2.7 Wildlife Habitat + as per MNRF 2015 Criteria, as amended from time to time, and all applicable Official Plan policies and In-force London Plan polici

☑ ☐ 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 incidental obs.; note potential features during field work 2021

☐ ☐ 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

confirmed / update -to be reviewed during 2021 field work

1.2.8 Aquatic Habitat

(SWS Aquatic Resource Management Reports)

☑ ☐ Fish Communities

☑ ☐ Fish spawning areas

☐ ☐ Fish migration routes

☑ ☐ Thermal refuge for fis

☐ ☐ 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 atercourses (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)

review for potential for wildlife passage/culverts

1.3 Social Values

1.3.1 Human Use Values

- ☑ ☐ Recreational linkages for hiking, walking
- ☑ ☐ Nature appreciation, aesthetics (consider landscaping)
- ☐ ☐ 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 'S'. They also address the protection of environmental quality and ecological function with respect to water quality, fish habitat, groundwater recharge, headwaters and aquifers.

- ☐ **A component of a Subject Lands Status Report that is required to be included in the EIS is the evaluation of significance of all potential natura heritage features and areas recognized by In-force London Plan policies and/ or Official Plan policie**

- ☑ **A component of a Subject Lands Status Report that is required to be included in the EIS is the confirmation and mapping of boundaries of al natural heritage features and areas.**

2.1 Environmentally Significant Areas

- ☑ Identified Environmentally Significan Areas (ESA)
- ☑ Name none; PSW contributes ecologically to Kains Woods to the north
- ☑ Potential ESAs - Expansion of an Existing ESA
- ☐ Name
- ☐ Potential ESA - Area not associated with an existing ESA
- ☐ Name

2.2 Wetlands

- ☑ Provincially Significant etlands (noted in Trib C Report, 2013)
- ☐ Name
- ☐ Wetlands
- ☐ Name
- ☑ Unevaluated Wetlands (dug pond in easternmost section of SA)

2.3 Areas of Natural and Scientific Interes

- ☐ Provincial Life Science ANSI
- ☐ Regional Life Science ANSI

- ☐ Earth Science ANSI

2.4 Habitat of Species-At-Risk (SAR)

- ☑ Endangered
- ☑ Threatened
- ☑ Vulnerable / Special Concern

2.5 Woodlands and Vegetation Patches

- ☐ Significant oodlands
- ☑ Unevaluated Vegetation Patches and/ or other 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 (potential hibernaculum, bat maternity roost, etc)
- ☐ Species life histories (reproduction and dispersal)
- ☐ Habitat guilds
- ☐ Indicator species
- ☐ Keystone species
- ☑ Introduced species (note Phragmites and others during 2021 field work)
- ☐ Predation / parasitism
- ☐ Population dynamics
- ☐ Vegetation structure, density and diversity
- ☐ Food chain support
- ☐ Productivity
- ☐ Diversity
- ☐ Carbon cycle
- ☐ Energy cycling
- ☐ Succession and disturbance processes
- ☐ 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 (considered as part of stormwater)
- ☐ Flood damage reduction
- ☐ Shoreline stabilization / erosion control
- ☐ Sediment trapping
- ☐ Nutrient retention and removal / biochemical cycling
- ☑ Aquatic habitat (fish, macroinvertebrates) (contributing habitat to Trib C

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 alues 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 benefi
- ☐ Providing green space for human activities
- ☑ Aesthetic and quality-of-life benefi
- ☑ Environmental targets and/or environmental management strategies

  consider appropriate native plant species for landscaping and revegetation

4.0 ADDITIONAL COMPONENTS AND NOTES

- EIS to show and demonstrate conformity with the Provincial Policy Statement (2020), in-force London Plan (as of Nov. 2019) policies, and current Official Plan policies (1989), Environmental Management Guidelines (2006).
- EIS reporting to adhere to the reporting standards as outlined on page 38 of the Environmental Management Guidelines document (2007).
- RVA to look for opportunities to include wildlife passage, lighting to be bird friendly, invasive *Phragmites* to be mapped and managed prior to construction.
- London Invasive Plant Management Strategy will be used as a guideline for invasive species management recommendations.
- Aecom 2013 study will be reviewed for hydrogeological input.

Natasha Welch

From: Species at Risk (MECP) <SAROntario@ontario.ca>
Sent: June 18, 2021 2:06 PM
To: Paul Mikoda
Cc: Henry Huotari; Tisha Doucette; Courtney Beneteau; Connor MacIsaac
Subject: RE: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study

[CAUTION EXTERNAL EMAIL] Make Sure that it is legitimate before Replying or Clicking on any links

Hello Paul,

RE: Oxford Street West and Gideon Drive Intersection, City of London and the *Endangered Species Act, 2007*

I apologize for the delay in response. The Ministry of the Environment, Conservation and Parks (MECP) understands that RV Anderson Associates Ltd. is conducting an environmental assessment for improvements to the Oxford Street West and Gideon Drive intersection in the City of London, as identified in the information provided.

As requested, an initial species at risk (SAR) information screening has been completed under the *Endangered Species Act, 2007* (ESA) by MECP's Species at Risk Branch (SARB) for the above-noted project location with respect to endangered and threatened species in Ontario. There are known occurrences of the following SAR (in addition to the list provided by RVA) in the general area with potential to also occur at the project location:

- American Badger (endangered) – receives species and regulated habitat protection
- SAR bats (endangered) – receive species and general habitat protection
- Spiny Softshell (endangered) – receives species and general habitat protection

Please note that this is an initial screening for endangered and threatened 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 Ontario's 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.

The position of SARB is based on the information that has been provided by you on behalf of the proponent. Should information not have been made available and considered in our review, or new information comes to light, or if on-site conditions and circumstances change, please contact SARB as soon as possible (SAROntario@ontario.ca) to discuss next steps.

Regards,

Kathryn Markham
Management Biologist
Permissions and Compliance Section, Species at Risk Branch
Ministry of the Environment, Conservation and Parks

From: Paul Mikoda <pmikoda@rvanderson.com>
Sent: March 8, 2021 5:27 PM
To: Species at Risk (MECP) <SAROntario@ontario.ca>

Cc: Henry Huotari <HHuotari@rvanderson.com>; Tisha Doucette <TDoucette@rvanderson.com>; Courtney Beneteau <cbeneteau@rvanderson.com>
Subject: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study

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

To whom it may concern,

R.V. Anderson Associates (RVA) has been retained by the City of London to review options and complete the detailed design for improvements to the Oxford Street West and Gideon Drive Intersection. A map of the corresponding Study Area is attached (Study Area Map). The project falls within the jurisdiction of the Upper Thames River Conservation Authority (UTRCA) as well as the Ministry of the Environment, Conservation and Parks (MECP) London District, and the Ministry of Natural Resources and Forestry (MNRF) Aylmer District.

RVA has undertaken a desktop review of the following information sources as pertains to the Study Area, as per the Client's Guide to Preliminary Screening for SAR (MECP, May 2019) including:

- Natural Heritage Information Center database (accessed via MNRF's Make-a-Map: Natural Heritage Areas application (NAD83 Atlas 1km squares within the Study Area: 17MH6956, 17MH6957, 17MH7056, 17MH7057);
- Ontario Breeding Bird Atlas (OBBA) Archives (Atlas square: 17MH75; 17MH65);
- Ontario Reptile and Amphibian Atlas (ORAA) (Atlas square: 17MH75; 17MH65);
- Ontario Butterfly Atlas; Moth Atlas (Atlas square: 17MH75; 17MH65);
- Aquatic resource area (ARA) data (segments, points and polygons) (Ontario GeoHub);
- Department of Fisheries and Oceans Aquatic Species at Risk Map;
- eBird – Warbler Woods Hot Spot (2011-present); and
- iNaturalist.

Details regarding the records of Species at Risk (SAR) and rare species noted in the vicinity of the Study Area, including their associated S-ranks and status under the Endangered Species Act, are shown in Table 1 (attached).

The NHIC database indicated at least one Restricted Species in the vicinity of the Study Area. Based on a comparison of recognized Restricted Species, those in the general area and the local habitat, we suspect that some of these records are attributable to various at-risk reptile species known in the local area. If possible, can you please provide clarification on these Restricted Records?

At this time, we would like to request any additional/supplemental SAR information that may be available in addition to those sources, as well as any concerns with the proposed project as pertains to SAR and their habitats. RVA Staff have completed NHIC Data Sensitivity Training.

Please feel free to contact me if you have any questions or concerns with this request. A response to acknowledge your receipt of this email would be greatly appreciated.

Best regards,

Paul

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Paul Mikoda, B.Sc.
Terrestrial Ecologist

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Figure 1 – Oxford Street West and Gideon Drive – Study Area

Table 1: Rare and At-Risk Species Potentially Present in the Vicinity of the Study Area

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
FLORA					
Hairy-fruited Sedge	*Carex trichocarpa*	S3	-/-	NHIC	-
Green Dragon	*Arisaema dracontium*	S3	SC/-	NHIC	-
American Chestnut	*Castanea dentata*	S1S2	END/END	NHIC	-
Eastern False Rue-anemone	*Enemion biternatum*	S2	THR/THR	NHIC	-
Striped Cream Violet	*Viola striata*	S3	-/-	NHIC	-
Blue Ash	*Fraxinus quadrangulata*	S2?	THR/SC	NHIC	-
Orange Coneflower	*Rudbeckia fulgida*	S1	-/-	INAT	2018
Trumpet Creeper	*Campsis radicans*	S2?	-/-	INAT	2020
Large Yellow Pond Lily	*Nuphar advena*	S3	-/-	INAT	2019
FUNGI AND LICHENS					
-					
BIRDS					
Bald Eagle	*Haliaeetus leucocephalus*	S2N, S4B	SC/-	OBBA; INAT	2021
Common Nighthawk	*Chordeiles minor*	S4B	SC/THR	OBBA	2005
Eastern Wood-pewee	*Contopus virens*	S4B	SC/SC	OBBA; eBird	2020
Wood Thrush	*Hylocichla mustelina*	S4B	SC/THR	OBBA; eBird	2016
Yellow-breasted Chat	*Icteria virens*	S1B	END/END	NHIC	-
Chimney Swift	*Chaetura pelagica*	S4B,S4N	THR/THR	OBBA; eBird	2020
Bank Swallow	*Riparia riparia*	S4B	THR/THR	OBBA; eBird	2016
Barn Swallow	*Hirundo rustica*	S5B	THR/THR	OBBA; eBird	2020
Bobolink	*Dolichonyx oryzivorus*	S4B	THR/THR	OBBA; NHIC	2005
Eastern Meadowlark	*Sturnella magna*	S4B	THR/THR	OBBA; NHIC; eBird	2016
Grasshopper Sparrow	*Ammodramus savannarum*	S4B	SC/SC	eBird	2011
Purple Martin	*Progne subis*	S3S4B	-/-	OBBA; eBird; INAT	2020
REPTILES AND AMPHIBIANS					
Snapping Turtle	*Chelydra serpentina*	S4	SC/SC	ORAA	2019
Blanding's Turtle	*Emydoidea blandingii*	S3	THR/THR	ORAA	2007
Northern Map Turtle	*Graptemys geographica*	S3	SC/SC	ORAA; NHIC	2018
Queensnake	*Regina septemvittata*	S2	END/END	ORAA	2004
Eastern Foxsnake	*Pantherophis gloydi*	S2	END/END	ORAA	2011

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
Eastern Hog-nosed Snake	*Heterodon platirhinos*	S3	THR/THR	ORAA	2019
Eastern Milksnake	*Lampropeltis Triangulum*	S4	-/SC	NHIC	-
INVERTEBRATES (excludes mussels)					
Monarch	*Danaus plexippus*	S2N,S4B	SC	INAT, OBA	2019
Sleepy Duskywing	*Erynnis brizo*	S1	-/-	OBA	1971
Hackberry Emperor	*Asterocampa celtis*	S3	-/-	OBA	2019
Tawny Emperor	*Asterocampa clyton*	S3	-/-	OBA	2018
Reversed Haploa	*Haploa reversa*	S1?	-/END	OMA	2019
Fraternal Potter Wasp	*Eumenes fraternus*	S3	-/-	INAT	2019
Differentiated Grasshopper	*Melanoplus differentialis*	S3	-/-	INAT	2020
FISH AND MUSSELS					
Eastern Sand Darter	*Ammocrypta pellucida*	S2	END/THR	ARA Poly DFO NHIC	-
Gravel Chub	*Erimystax x-punctatus*	SX	EXP/EXP	ARA Poly	-
Greenside Darter	*Etheostoma blennioides*	G4	-/SC	ARA Polygon	-
Silver Shiner	*Notropis photogenis*	S2S3	THR/-	ARA Polygon	-
Black Redhorse	*Moxostoma duquesnei*	S2	THR/THR	DFO	-
Fawnsfoot	*Truncilla donaciformis*	S2	END/END	DFO	-
Mapleleaf	*Quadrula quadrula*	S2	THR/SC	DFO NHIC	-
Pugnose Minnow	*Opsopoeodus emiliae*	S2	THR/THR	DFO	-
Spotted Sucker	*Minytrema melanops*	S2	SC/SC	DFO	-
Threehorn Wartyback	*Obliquaria reflexa*	S1	THR/THR	DFO	-
Purple Wartyback	*Cyclonaias tuberculata*	S3	-/-	NHIC	-
Lake Sturgeon (Great Lakes – Upper St. Lawrence River population)	*Acipenser fulvescens* pop. 3	S2	THR/-	NHIC	-

*Source Abbreviations:
INAT – iNaturalist.ca (filtered for Research Grade and Threatened)
NHIC – Natural Heritage Information Center
ARA – Aquatic Resource Area (OntarioGeoHub)
ORAA – Ontario Reptile and Amphibian Atlas (Ontario Nature)
OBA – Ontario Butterfly Atlas (Toronto Entomological Society)
OMA – Ontario Moth Atlas (Toronto Entomological Society)
OBBA – Ontario Breeding Bird Atlas (Birds Canada)
DFO – Department of Fisheries and Oceans Species at Risk Mapping Application
eBird – Warbler Woods Hot Spot (2021-2011)

Natasha Welch

From:	Webb, Jason (MNRF) <Jason.Webb@ontario.ca>
Sent:	April 13, 2021 9:14 AM
To:	Paul Mikoda
Subject:	FW: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study
Attachments:	Study Area Map - Oxford And Gideon Drive EA - 205505.pdf; Table 1 - Oxford and Gideon EA- 205505.pdf
Categories:	Filed by Newforma

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Hi Paul,

Apologies for missing this one earlier. Hope all is well with you.

The Ministry of Natural Resources and Forestry has reviewed the attached and has no additional supplemental information to provide.

Thanks,

Jason Webb
Management Biologist
Ministry of Natural Resources and Forestry
Aylmer District
226-559-4906
Jason.webb@ontario.ca

Please Note: As part of providing accessible customer service, please let me know if you have any accommodation needs or require communication supports or alternate formats.

From: Paul Mikoda <pmikoda@rvanderson.com>
Sent: April-01-21 4:08 PM
To: MNRF Ayl Planners (MNRF) <MNRF.Ayl.Planners@ontario.ca>
Cc: Tisha Doucette <TDoucette@rvanderson.com>; Courtney Beneteau <cbeneteau@rvanderson.com>; Henry Huotari <HHuotari@rvanderson.com>
Subject: FW: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study

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Hello Karina,

I was forwarded your response to the Notice of Commencement for this project by Henry. I did submit material to MNRF (Jason Webb), and I have included that content here for your review.

R.V. Anderson Associates (RVA) has been retained by the City of London to review options and complete the detailed design for improvements to the Oxford Street West and Gideon Drive Intersection. A map of the corresponding Study Area is attached (Study Area Map). The project falls within the jurisdiction of the Upper Thames River Conservation Authority (UTRCA) as well as the Ministry of the Environment, Conservation and Parks (MECP) London District, and the Ministry of Natural Resources and Forestry (MNRF) Aylmer District.

RVA has undertaken a desktop review of the following information sources as pertains to the Study Area, as per the Client's Guide to Preliminary Screening for SAR (MECP, May 2019) including:

- Natural Heritage Information Center database (accessed via MNRF's Make-a-Map: Natural Heritage Areas application (NAD83 Atlas 1km squares within the Study Area: 17MH6956, 17MH6957, 17MH7056, 17MH7057);
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- iNaturalist.

Details regarding the records of Species at Risk (SAR) and rare species noted in the vicinity of the Study Area, including their associated S-ranks and status under the Endangered Species Act, are shown in Table 1 (attached).

The NHIC database indicates two Natural Areas within the squares reviewed, including the Dingman Creek Fen Wetland Complex (UT 2) and the Thames River.

At this time, we would like to request any additional/supplemental natural heritage information that may be available in addition to those sources, as well as any concerns with the proposed project as related to natural heritage.

In the future, for Natural Heritage Information Requests for projects in Aylmer District, should MNRF.Ayl.Planners@ontario.ca be my first point of contact?

Best regards,

Paul

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Paul Mikoda, B.Sc.
Terrestrial Ecologist

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C: (905) 516-3132

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Natasha Welch

From:	Paul Mikoda
Sent:	March 8, 2021 5:27 PM
To:	Webb, Jason (MNRF)
Cc:	Henry Huotari; Courtney Beneteau; Tisha Doucette
Subject:	205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study
Attachments:	Study Area Map - Oxford And Gideon Drive EA - 205505.pdf; Table 1 - Oxford and Gideon EA- 205505.pdf
Categories:	Filed by Newforma

Hello Jason,

I hope this email finds you well. R.V. Anderson Associates (RVA) has been retained by the City of London to review options and complete the detailed design for improvements to the Oxford Street West and Gideon Drive Intersection. A map of the corresponding Study Area is attached (Study Area Map). The project falls within the jurisdiction of the Upper Thames River Conservation Authority (UTRCA) as well as the Ministry of the Environment, Conservation and Parks (MECP) London District, and the Ministry of Natural Resources and Forestry (MNRF) Aylmer District.

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Details regarding the records of Species at Risk (SAR) and rare species noted in the vicinity of the Study Area, including their associated S-ranks and status under the Endangered Species Act, are shown in Table 1 (attached).

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At this time, we would like to request any additional/supplemental natural heritage information that may be available in addition to those sources, as well as any concerns with the proposed project as related to natural heritage.

Please feel free to contact me if you have any questions or concerns with this request. A response to acknowledge your receipt of this email would be greatly appreciated.

Best regards,

Paul

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Figure 1 – Oxford Street West and Gideon Drive – Study Area

Table 1: Rare and At-Risk Species Potentially Present in the Vicinity of the Study Area

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
FLORA					
Hairy-fruited Sedge	*Carex trichocarpa*	S3	-/-	NHIC	-
Green Dragon	*Arisaema dracontium*	S3	SC/-	NHIC	-
American Chestnut	*Castanea dentata*	S1S2	END/END	NHIC	-
Eastern False Rue-anemone	*Enemion biternatum*	S2	THR/THR	NHIC	-
Striped Cream Violet	*Viola striata*	S3	-/-	NHIC	-
Blue Ash	*Fraxinus quadrangulata*	S2?	THR/SC	NHIC	-
Orange Coneflower	*Rudbeckia fulgida*	S1	-/-	INAT	2018
Trumpet Creeper	*Campsis radicans*	S2?	-/-	INAT	2020
Large Yellow Pond Lily	*Nuphar advena*	S3	-/-	INAT	2019
FUNGI AND LICHENS					
-					
BIRDS					
Bald Eagle	*Haliaeetus leucocephalus*	S2N, S4B	SC/-	OBBA; INAT	2021
Common Nighthawk	*Chordeiles minor*	S4B	SC/THR	OBBA	2005
Eastern Wood-pewee	*Contopus virens*	S4B	SC/SC	OBBA; eBird	2020
Wood Thrush	*Hylocichla mustelina*	S4B	SC/THR	OBBA; eBird	2016
Yellow-breasted Chat	*Icteria virens*	S1B	END/END	NHIC	-
Chimney Swift	*Chaetura pelagica*	S4B,S4N	THR/THR	OBBA; eBird	2020
Bank Swallow	*Riparia riparia*	S4B	THR/THR	OBBA; eBird	2016
Barn Swallow	*Hirundo rustica*	S5B	THR/THR	OBBA; eBird	2020
Bobolink	*Dolichonyx oryzivorus*	S4B	THR/THR	OBBA; NHIC	2005
Eastern Meadowlark	*Sturnella magna*	S4B	THR/THR	OBBA; NHIC; eBird	2016
Grasshopper Sparrow	*Ammodramus savannarum*	S4B	SC/SC	eBird	2011
Purple Martin	*Progne subis*	S3S4B	-/-	OBBA; eBird; INAT	2020
REPTILES AND AMPHIBIANS					
Snapping Turtle	*Chelydra serpentina*	S4	SC/SC	ORAA	2019
Blanding's Turtle	*Emydoidea blandingii*	S3	THR/THR	ORAA	2007
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Queensnake	*Regina septemvittata*	S2	END/END	ORAA	2004
Eastern Foxsnake	*Pantherophis gloydi*	S2	END/END	ORAA	2011

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
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Eastern Milksnake	*Lampropeltis Triangulum*	S4	-/SC	NHIC	-
INVERTEBRATES (excludes mussels)					
Monarch	*Danaus plexippus*	S2N,S4B	SC	INAT, OBA	2019
Sleepy Duskywing	*Erynnis brizo*	S1	-/-	OBA	1971
Hackberry Emperor	*Asterocampa celtis*	S3	-/-	OBA	2019
Tawny Emperor	*Asterocampa clyton*	S3	-/-	OBA	2018
Reversed Haploa	*Haploa reversa*	S1?	-/END	OMA	2019
Fraternal Potter Wasp	*Eumenes fraternus*	S3	-/-	INAT	2019
Differentiated Grasshopper	*Melanoplus differentialis*	S3	-/-	INAT	2020
FISH AND MUSSELS					
Eastern Sand Darter	*Ammocrypta pellucida*	S2	END/THR	ARA Poly DFO NHIC	-
Gravel Chub	*Erimystax x-punctatus*	SX	EXP/EXP	ARA Poly	-
Greenside Darter	*Etheostoma blennioides*	G4	-/SC	ARA Polygon	-
Silver Shiner	*Notropis photogenis*	S2S3	THR/-	ARA Polygon	-
Black Redhorse	*Moxostoma duquesnei*	S2	THR/THR	DFO	-
Fawnsfoot	*Truncilla donaciformis*	S2	END/END	DFO	-
Mapleleaf	*Quadrula quadrula*	S2	THR/SC	DFO NHIC	-
Pugnose Minnow	*Opsopoeodus emiliae*	S2	THR/THR	DFO	-
Spotted Sucker	*Minytrema melanops*	S2	SC/SC	DFO	-
Threehorn Wartyback	*Obliquaria reflexa*	S1	THR/THR	DFO	-
Purple Wartyback	*Cyclonaias tuberculata*	S3	-/-	NHIC	-
Lake Sturgeon (Great Lakes – Upper St. Lawrence River population)	*Acipenser fulvescens* pop. 3	S2	THR/-	NHIC	-

*Source Abbreviations:
INAT – iNaturalist.ca (filtered for Research Grade and Threatened)
NHIC – Natural Heritage Information Center
ARA – Aquatic Resource Area (OntarioGeoHub)
ORAA – Ontario Reptile and Amphibian Atlas (Ontario Nature)
OBA – Ontario Butterfly Atlas (Toronto Entomological Society)
OMA – Ontario Moth Atlas (Toronto Entomological Society)
OBBA – Ontario Breeding Bird Atlas (Birds Canada)
DFO – Department of Fisheries and Oceans Species at Risk Mapping Application
eBird – Warbler Woods Hot Spot (2021-2011)

Natasha Welch

From:	Cari Ramsey <ramseyc@thamesriver.on.ca>
Sent:	September 2, 2021 2:05 PM
To:	Paul Mikoda
Cc:	Jessica Schnaithmann
Subject:	Information request - Oxford and Gideon Drive
Attachments:	Oxford and Gideon MNHS.pdf; Oxford and Gideon.pdf; Fish Report - Oxford and Gideon.pdf; Benthic Report - Oxford and Gideon.pdf

[CAUTION EXTERNAL EMAIL] Make Sure that it is legitimate before Replying or Clicking on any links

Hi Paul;

Attached is the mapping for the subject area at Oxford and Gideon. One is all of our regulation mapping and the other is just the Middlesex Natural Heritage woodlots. The only additional information we have is the following:

1. There are ESA species within 1 km so you should contact MNRF for the most up to date information regarding that.
2. Fish and benthic data is attached…we do not have any mussel information for that area.

If you need anything else I may be able to assist with just let me know.

Thanks!
Cari

Cari Ramsey
Land Use Regulations Assistant
UTRCA
1424 Clarke Side Road
London, ON
N5V 5B9
(519)451-2800 ext. 289
ramseyc@thamesriver.on.ca

<The contents of this e-mail and any attachments are intended for the named recipient(s). This e-mail may contain information that is privileged, confidential and/or exempt from disclosure under applicable law. If you have received this message in error, are not the named recipient(s), or believe that you are not the intended recipient immediately notify the sender and permanently delete this message without reviewing, copying, forwarding, disclosing or otherwise using it or any part of it in any form whatsoever.>

Notes:
Oxford Street and Gideon Drive

Created By: cr March 26, 2021

* 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.

0 300 600 1,201
metres
1:15,000

N

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

- UTRCA Watershed (1:10K)
- Assessment Parcel (MPAC)
- Watercourse (UTRCA, 2015)
  - Open
  - Tiled
- Wetland Hazard
- London Hazard
  - FLD250
  - Remnant Valley
  - Stable Slope
  - Toe Erosion - Stable Slope
  - Top of Slope
- Flooding Hazard
- Erosion Hazard
- 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.

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UPPER THAMES RIVER CONSERVATION AUTHORITY

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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

- UTRCA Watershed (1:10K)
- Assessment Parcel (MPAC)
- Watercourse (UTRCA, 2015)
  - Open
  - Tiled
- Middlesex NHSS Vegetation Patch (2
  - No Patch Criteria Met
  - 1+ Patch Criteria Met

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.

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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.

UPPER THAMES RIVER CONSERVATION AUTHORITY

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Notes:
Oxford and Gideon MNHS

Created By: cr March 26, 2021

* 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.

0 200 400 800
metres
1:10,000

N

UTRCA (DFO, ROM, MNRF) Fish Sampling Records

Thames River Tributary

Sampled: 29/09/1999 **Site Code: UT.RI106** Latitude: 42.964222

Agency: UTRCA Location: Thames River Tributary Commissioners Rd W Longitude: -81.375179

			Species at Risk (SAR) Status				Status in the Thames River Watershed	
			Provincial		Federal			
Common Name	Scientific Name	# Observed	ESA2017	Srank	SARA	COSEWIC	Abundance	Distribution
Brook Trout	Salvelinus fontinalis	Many	---	S5	---	---	Uncommon	localized

UTRCA (DFO, ROM, MNRF) Fish Sampling Records

Thames River Tributary

Sampled: 24/08/2010 **Site Code: UT.RI106** Latitude: 42.964222

Agency: UTRCA Location: Thames River Tributary Commissioners Rd W Longitude: -81.375179

			Species at Risk (SAR) Status				Status in the Thames River Watershed	
			Provincial		Federal			
Common Name	Scientific Name	# Observed	ESA2017	Srank	SARA	COSEWIC	Abundance	Distribution
Brook Trout	Salvelinus fontinalis	Abundant	---	S5	---	---	Uncommon	localized

COSEWIC Status: The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) asseses species for their consideration for legal protection and recover (or management) under the Species at Risk Act (SARA).

Extinct: A wildife species that no longer exists.

Extirpated: A wildlife species no longer existing in the wild in Canada, but exists elsewhere.

Endangered: A wildlife species facing imminent extirpation or extinction.

Threatened: A wildlife species likely to become endangered if limiting factors are not reversed.

Special Concern: A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

Not at Risk: A wildlife species that has been evaulated and found to be not at risk of extinction given the current cirumstances.

Data Deficient: A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.

Reference: www.cosewic.gc.ca (current to November 2011)

SARA Status: The federal at risk designation for species under the Species at Risk Act (SARA)

Reference: www.sararegistry.gc.ca (current to December 2011)

ESA 2007 / SARO Status: Species at Risk in Ontario (SARO) are designated be the Ontario Ministry of Natural Resources and Forestry (OMNRF) in accordance with the provincial Endangered Species Act (ESA) through the Committee on the Status of Species at Risk in Ontario (COSSARO).

Extirpated: A native species that no longer exists in the wild in Ontario but still occurs elsewhere.

Endangered: A native species facing imminent extirpation or extinction in Ontario.

Threatened: A native species that is at risk of becoming endangered in Ontario.

Special Concern: A native species that is sensitive to human activities or natural events which may cause it to become endangered or thereatened.

Reference: www.ontario.ca/speciesatrisk (current to Janurary 2012)

Provincial Rank (SRANK): Privincial (or Subnational) ranks are used by the Natural Hertiage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are assigned to consider only those factors within the political boundaries of Onatio.

SX Presumed Extirpated: Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and vitually no likelihood that it will be rediscovered.

SH Possibly Extirpated (Historical): Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurences.

S1 Critically imperiled: Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled: Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable: Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure: Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure: Common, widespread, and abundant in the nation or state/province.

SNR Unranked: Nation or state/province conservation status not yet assessed.

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

SNA Not Applicable: A conservation stutus rank is not applicable because the species is not a suitable target for conservation activities.

S#S# Range Rank: A numeric range rank (e.g. S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g. SU is used rather than S1S4).

Reference: http://nhci.mnr.gov.on.ca/MNR/nhic/nhic.cfm (current to March 2012)

Abundance: Referes to the relative abundance of the species found wihtin the waters of the Upper Thames River watershed based on sampling results. Some species may be underrepresented as they are difficult to capture with commonly used sampling methods.

Abundant: Occurred in >25% of the sampling records.

Common: Occurred in 10-25% of the sampling records.

Uncommon: Occurred in <10% of the sampling records.

Distribution: Based on the number of Upper Thames Watershed Report Card subwatersheds in which a species has been recorded.

Throughout: Recorded in >20 subwatersheds.

Widespread: Recorded in 10-20 subwatersheds.

Localized: Recorded in <10 subwatersheds.

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 23/06/1999 **Location: Thames River Tributary Woodeden Camp** **Stream Health:** Fairly Poor

Site Code: UT.RI105 Latitude: 42.965794 Longitude: -81.381908 **Family Biotic Index:** 5.926470588

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Oligochaeta		ADULT	7	8
Gammaridae	Sideswimmer	ADULT	3	6
Elmidae	Riffle Beetle	ADULT	1	5
Elmidae	Riffle Beetle	LARVAE	4	5
Chironomidae	Midge	LARVAE	97	6
Chironomidae	Midge	PUPA	10	6
Simuliidae	Black Fly	LARVAE	3	5
Hydropsychidae	Net-spinning Caddisfly	LARVAE	2	5
Philopotamidae	Finger-net Caddisfly	LARVAE	7	4
Pisidiidae		ADULT	2	8

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 05/11/2002 **Location: Thames River Tributary Woodeden Camp** **Stream Health:** Fair

Site Code: UT.RI105 Latitude: 42.965794 Longitude: -81.381908 **Family Biotic Index:** 5.13

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Physidae	Pouch Snail	ADULT	4	8
Acariformes		ADULT	1	4
Elmidae	Riffle Beetle	LARVAE	6	5
Hydrophilidae	Water Scavenger Beetle	LARVAE	1	5
Chrysomelidae	Leaf Beetle	ADULT	1	
Chironomidae	Midge	LARVAE	22	6
Hydropsychidae	Net-spinning Caddisfly	LARVAE	139	5
Empididae	Dance Fly	LARVAE	1	6
Limnephilidae	Northern Caddisfly	LARVAE	1	4
Philopotamidae	Finger-net Caddisfly	LARVAE	12	4
Stratiomyidae	Soldier Fly	LARVAE	1	7

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 23/06/1999 **Location: Thames River Tributary Woodeden Camp** **Stream Health:** Fairly Poor

Site Code: UT.RI105 Latitude: 42.965794 Longitude: -81.381908 **Family Biotic Index:** 5.900990099

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Oligochaeta		ADULT	5	8
Gammaridae	Sideswimmer	ADULT	2	6
Elmidae	Riffle Beetle	LARVAE	4	5
Corixidae	Water Boatmen	ADULT	1	5
Chironomidae	Midge	LARVAE	64	6
Chironomidae	Midge	PUPA	14	6
Ceratopogonidae	Biting Midge	LARVAE	1	6
Hydropsychidae	Net-spinning Caddisfly	LARVAE	2	5
Philopotamidae	Finger-net Caddisfly	LARVAE	4	4
Tipulidae	Crane Fly	LARVAE	1	4
Baetidae	Small Mayfly	NYMPH	1	6
Capniidae	Stonefly	NYMPH	1	3
Pisidiidae		ADULT	1	8

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 23/06/1999 **Location: Thames River Tributary Commissioners Rd W** **Stream Health:** Fair

Site Code: UT.RI106 Latitude: 42.964222 Longitude: -81.375179 **Family Biotic Index:** 5.661016949

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Gammaridae	Sideswimmer	ADULT	14	6
Acariformes		ADULT	2	4
Hydrophilidae	Water Scavenger Beetle	LARVAE	1	5
Chironomidae	Midge	LARVAE	46	6
Simuliidae	Black Fly	LARVAE	9	5
Empididae	Dance Fly	LARVAE	1	6
Limnephilidae	Northern Caddisfly	LARVAE	1	4
Polycentropodidae	Caddisfly	LARVAE	8	6
Baetidae	Small Mayfly	NYMPH	20	6
Capniidae	Stonefly	NYMPH	9	3
Nematoda		ADULT	1	---
Pisidiidae		ADULT	6	8

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 20/06/2000 **Location: Thames River Tributary Commissioners Rd W** **Stream Health:** Fairly Poor

Site Code: UT.RI106 Latitude: 42.964222 Longitude: -81.375179 **Family Biotic Index:** 5.87

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Erpobdellidae	Leech	ADULT	1	8
Oligochaeta		ADULT	1	8
Gammaridae	Sideswimmer	ADULT	76	6
Acariformes		ADULT	1	4
Elmidae	Riffle Beetle	ADULT	2	5
Chironomidae	Midge	LARVAE	17	6
Simuliidae	Black Fly	LARVAE	3	5
Empididae	Dance Fly	LARVAE	1	6
Limnephilidae	Northern Caddisfly	LARVAE	1	4
Tipulidae	Crane Fly	LARVAE	2	4
Baetidae	Small Mayfly	NYMPH	3	6
Leuctridae	Stonefly	NYMPH	1	0
Nematoda		ADULT	1	---

UTRCA Benthic Sampling Data

Thames River Tributary

Sampled: 05/11/2002 **Location: Thames River Tributary Commissioners Rd W** **Stream Health:** Good

Site Code: UT.RI106 Latitude: 42.964222 Longitude: -81.375179 **Family Biotic Index:** 4.99

Scientific Name	Common Name (family/order)	Life Stage	# in Subsample	Biotic Index
Glossiphoniidae	Leech	ADULT	1	8
Oligochaeta		ADULT	1	8
Gammaridae	Sideswimmer	ADULT	100	6
Acariformes		ADULT	1	4
Elmidae	Riffle Beetle	ADULT	1	5
Elmidae	Riffle Beetle	LARVAE	7	5
Turbellaria		ADULT	4	4
Dytiscidae	Predacious Diving Beetle	LARVAE	1	5
Chironomidae	Midge	LARVAE	17	6
Ceratopogonidae	Biting Midge	LARVAE	1	6
Hydropsychidae	Net-spinning Caddisfly	LARVAE	20	5
Limnephilidae	Northern Caddisfly	LARVAE	1	4
Philopotamidae	Finger-net Caddisfly	LARVAE	2	4
Lepidostomatidae	Lepistomatid Caddisfly	LARVAE	1	1
Rhyacophilidae	Primative Caddisfly	LARVAE	1	1
Nemouridae	Stonefly	NYMPH	41	2
Pisidiidae		ADULT	2	8

Benthic samples were obtained using Rapid Bioassessment Protocol developed by the United States Environmental Protection Agency and modified by Dr. Robert Bailey of the University of Western Ontario Zoology Department. A representative section of stream is selected, incorporating a riffle if present, and sampled by oving upstream along a diagonal transect, dislodging and capturing invertebrates with a .5 mm mesh "D" - frame net. Samples are preserved in the field and analyzed in the lab to randomly select a 100 bug subsample which is identified to the Family taxonomic level.

The biotic index is a value assigned to benthic invertebrate taxa indicating their pollution sensitivity and tolerance on a scale from 10 to 10. Lower numbers indicate pollution sensitivity and high numbers tolerance. A value of -1 indicates that no biotic index value has been assigned to these taxa.

The Family Biotic Index is the weighted average of the biotic index and nuber of bugs in each taxa in the sample. The water quality ranges for the FBI values are as follows: <4.25 = Excellent; 4.25 - 5.00 = Good; 5.00 - 5.75 = Fair; 5.75 - 6.50 = Fairly Poor; 6.50 - 7.25 = Poor; and <7.25 = Very Poor.

Natasha Welch

From:	Paul Mikoda
Sent:	September 1, 2021 10:53 AM
To:	planning@thamesriver.on.ca; allainj@thamesriver.on.ca
Cc:	Tisha Doucette; Henry Huotari; Courtney Beneteau
Subject:	FW: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study
Attachments:	Study Area Map - Oxford And Gideon Drive EA - 205505.pdf; Table 1 - Oxford and Gideon EA- 205505.pdf
Categories:	Filed by Newforma

To whom it may concern,

As per the prior request below, we would like to confirm if the Upper Thames River Conservation Authority would like to provide any additional/supplemental natural heritage information or has any concerns with the proposed project as related to natural heritage or O.Reg 157/06.

Best regards,

Paul

rva

Paul Mikoda, B.Sc., CAN-CISEC
TERRESTRIAL ECOLOGIST

t 519 681 9916 ext. 5040 | m 905 516 3132
a 557 Southdale Road East, Suite 200, London, ON N6E 1A2

rvanderson.com

SUMMER HOURS: RVA celebrates the summer season from June 4th to September 3rd. Our offices will be closed at 2 PM each Friday.

From: Paul Mikoda
Sent: Monday, March 8, 2021 5:27 PM
To: planning@thamesriver.on.ca
Cc: Annett@thamesriver.on.ca; Henry Huotari <HHuotari@rvanderson.com>; Tisha Doucette <TDoucette@rvanderson.com>; Courtney Beneteau <CBeneteau@rvanderson.com>
Subject: 205505 - Information Request - City of London - Oxford St. W and Gideon Dr. Intersection Improvements Class EA Study

To whom it may concern,

R.V. Anderson Associates (RVA) has been retained by the City of London to review options and complete the detailed design for improvements to the Oxford Street West and Gideon Drive Intersection. A map of the corresponding Study Area is attached (Study Area Map). The project falls within the jurisdiction of the Upper Thames River Conservation

Authority (UTRCA) as well as the Ministry of the Environment, Conservation and Parks (MECP) London District, and the Ministry of Natural Resources and Forestry (MNRF) Aylmer District.

RVA has undertaken a desktop review of the following information sources as pertains to the Study Area, as per the Client's Guide to Preliminary Screening for SAR (MECP, May 2019) including:

- Natural Heritage Information Center database (accessed via MNRF's Make-a-Map: Natural Heritage Areas application (NAD83 Atlas 1km squares within the Study Area: 17MH6956, 17MH6957, 17MH7056, 17MH7057);
- Ontario Breeding Bird Atlas (OBBA) Archives (Atlas square: 17MH75; 17MH65);
- Ontario Reptile and Amphibian Atlas (ORAA) (Atlas square: 17MH75; 17MH65);
- Ontario Butterfly Atlas; Moth Atlas (Atlas square: 17MH75; 17MH65);
- Aquatic resource area (ARA) data (segments, points and polygons) (Ontario GeoHub);
- Department of Fisheries and Oceans Aquatic Species at Risk Map;
- eBird – Warbler Woods Hot Spot (2011-present); and
- iNaturalist.

Details regarding the records of Species at Risk (SAR) and rare species noted in the vicinity of the Study Area, including their associated S-ranks and status under the Endangered Species Act, are shown in Table 1 (attached).

The NHIC database indicates two Natural Areas within the squares reviewed, including the Dingman Creek Fen Wetland Complex (UT 2) and the Thames River. City of London notes an Environmentally Significant Area (ESA – Kains Woods), two unevaluated vegetation patches (south of the intersection), and an unevaluated wetland and significant valley lands (associated with Tributary 'C' – a locally rare coldwater stream which flows to the Thames River). Portions of the Study Area in the vicinity of Tributary 'C' are regulated under Ontario Regulation 157/06.

At this time, we would like to request any additional/supplemental natural heritage information that may be available in addition to those sources, as well as any concerns with the proposed project as related to natural heritage or O.Reg 157/06.

Please feel free to contact me if you have any questions or concerns with this request. A response to acknowledge your receipt of this email would be greatly appreciated.

Best regards,

Paul

RVA IS GROWING!
Our NEW Halton and Halifax offices are now open.

Paul Mikoda, B.Sc.
Terrestrial Ecologist

P: (519) 681-9916 ext. 5040
C: (905) 516-3132

R.V. Anderson Associates Limited
557 Southdale Road East, Suite 200, London, ON N6E 1A2

rvanderson.com

Figure 1 – Oxford Street West and Gideon Drive – Study Area

Table 1: Rare and At-Risk Species Potentially Present in the Vicinity of the Study Area

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
FLORA					
Hairy-fruited Sedge	*Carex trichocarpa*	S3	-/-	NHIC	-
Green Dragon	*Arisaema dracontium*	S3	SC/-	NHIC	-
American Chestnut	*Castanea dentata*	S1S2	END/END	NHIC	-
Eastern False Rue-anemone	*Enemion biternatum*	S2	THR/THR	NHIC	-
Striped Cream Violet	*Viola striata*	S3	-/-	NHIC	-
Blue Ash	*Fraxinus quadrangulata*	S2?	THR/SC	NHIC	-
Orange Coneflower	*Rudbeckia fulgida*	S1	-/-	INAT	2018
Trumpet Creeper	*Campsis radicans*	S2?	-/-	INAT	2020
Large Yellow Pond Lily	*Nuphar advena*	S3	-/-	INAT	2019
FUNGI AND LICHENS					
-					
BIRDS					
Bald Eagle	*Haliaeetus leucocephalus*	S2N, S4B	SC/-	OBBA; INAT	2021
Common Nighthawk	*Chordeiles minor*	S4B	SC/THR	OBBA	2005
Eastern Wood-pewee	*Contopus virens*	S4B	SC/SC	OBBA; eBird	2020
Wood Thrush	*Hylocichla mustelina*	S4B	SC/THR	OBBA; eBird	2016
Yellow-breasted Chat	*Icteria virens*	S1B	END/END	NHIC	-
Chimney Swift	*Chaetura pelagica*	S4B,S4N	THR/THR	OBBA; eBird	2020
Bank Swallow	*Riparia riparia*	S4B	THR/THR	OBBA; eBird	2016
Barn Swallow	*Hirundo rustica*	S5B	THR/THR	OBBA; eBird	2020
Bobolink	*Dolichonyx oryzivorus*	S4B	THR/THR	OBBA; NHIC	2005
Eastern Meadowlark	*Sturnella magna*	S4B	THR/THR	OBBA; NHIC; eBird	2016
Grasshopper Sparrow	*Ammodramus savannarum*	S4B	SC/SC	eBird	2011
Purple Martin	*Progne subis*	S3S4B	-/-	OBBA; eBird; INAT	2020
REPTILES AND AMPHIBIANS					
Snapping Turtle	*Chelydra serpentina*	S4	SC/SC	ORAA	2019
Blanding's Turtle	*Emydoidea blandingii*	S3	THR/THR	ORAA	2007
Northern Map Turtle	*Graptemys geographica*	S3	SC/SC	ORAA; NHIC	2018
Queensnake	*Regina septemvittata*	S2	END/END	ORAA	2004
Eastern Foxsnake	*Pantherophis gloydi*	S2	END/END	ORAA	2011

Common Name	Scientific Name	S-Rank	ESA/SARA Status	Source*	Last Observed (Year)
Eastern Hog-nosed Snake	*Heterodon platirhinos*	S3	THR/THR	ORAA	2019
Eastern Milksnake	*Lampropeltis Triangulum*	S4	-/SC	NHIC	-
INVERTEBRATES (excludes mussels)					
Monarch	*Danaus plexippus*	S2N,S4B	SC	INAT, OBA	2019
Sleepy Duskywing	*Erynnis brizo*	S1	-/-	OBA	1971
Hackberry Emperor	*Asterocampa celtis*	S3	-/-	OBA	2019
Tawny Emperor	*Asterocampa clyton*	S3	-/-	OBA	2018
Reversed Haploa	*Haploa reversa*	S1?	-/END	OMA	2019
Fraternal Potter Wasp	*Eumenes fraternus*	S3	-/-	INAT	2019
Differentiated Grasshopper	*Melanoplus differentialis*	S3	-/-	INAT	2020
FISH AND MUSSELS					
Eastern Sand Darter	*Ammocrypta pellucida*	S2	END/THR	ARA Poly DFO NHIC	-
Gravel Chub	*Erimystax x-punctatus*	SX	EXP/EXP	ARA Poly	-
Greenside Darter	*Etheostoma blennioides*	G4	-/SC	ARA Polygon	-
Silver Shiner	*Notropis photogenis*	S2S3	THR/-	ARA Polygon	-
Black Redhorse	*Moxostoma duquesnei*	S2	THR/THR	DFO	-
Fawnsfoot	*Truncilla donaciformis*	S2	END/END	DFO	-
Mapleleaf	*Quadrula quadrula*	S2	THR/SC	DFO NHIC	-
Pugnose Minnow	*Opsopoeodus emiliae*	S2	THR/THR	DFO	-
Spotted Sucker	*Minytrema melanops*	S2	SC/SC	DFO	-
Threehorn Wartyback	*Obliquaria reflexa*	S1	THR/THR	DFO	-
Purple Wartyback	*Cyclonaias tuberculata*	S3	-/-	NHIC	-
Lake Sturgeon (Great Lakes – Upper St. Lawrence River population)	*Acipenser fulvescens* pop. 3	S2	THR/-	NHIC	-

*Source Abbreviations:
INAT – iNaturalist.ca (filtered for Research Grade and Threatened)
NHIC – Natural Heritage Information Center
ARA – Aquatic Resource Area (OntarioGeoHub)
ORAA – Ontario Reptile and Amphibian Atlas (Ontario Nature)
OBA – Ontario Butterfly Atlas (Toronto Entomological Society)
OMA – Ontario Moth Atlas (Toronto Entomological Society)
OBBA – Ontario Breeding Bird Atlas (Birds Canada)
DFO – Department of Fisheries and Oceans Species at Risk Mapping Application
eBird – Warbler Woods Hot Spot (2021-2011)

Appendix C

Photographic Record

Photo 1 - June 16, 2021
Trib. C, N of Gideon Dr., looking N (upstream). Creek flowing through MAM3-9 with view of MAM3-5 and SWD4 in background.

Photo 2 - June 16, 2021
Trib. C, N of Gideon Dr., looking S towards culvert inlet.

Photo 3 - September 8, 2021
Trib. C, N of Gideon Dr., looking S towards culvert inlet. Inlet is perched.

Photo 4 - September 8, 2021
Trib. C, S of Gideon Dr., looking S (downstream). Creek flowing through

Photo 5 - September 8, 2021
Trib. C, S of Gideon Dr., looking N towards culvert outlet. Outlet is perched and discharging into pool.

Photo 6 - June 16, 2021
N of Gideon Dr., looking NW, MAM3-9 and MAM3 vegetation communities within view.

Photo 7 - June 16, 2021
N side of Gideon Dr., looking NE, just E of culvert. MAM3-9 and SWM4-1 vegetation communities within view.

Photo 8 - June 16, 2021
N of Gideon Dr., looking E, CUM1-1 vegetation community within view.

Photo 9 - June 16, 2021
S of Gideon Dr., within ditch, looking SE. CUM1-1 vegetation community within view.

Photo 10 - June 2, 2021
Partial deer skeleton on S side of Oxford Street West, W of the intersection.

Photo 11 - June 16, 2021
Deer tracks in the E ditch along Oxford Street West, immediately S of Tributary C.

Photo 12 - June 16, 2021
Near NW limit of roundabout, looking N across Oxford Street West at 2085 Oxford Street West.

Photo 13 - June 16, 2021
Oxford Street West S roadside, looking W at CUM1 vegetation community, W of intersection.

Photo 14 - June 16, 2021
Oxford Street West S roadside, looking E at CUM1-1 vegetation community towards intersection.

Photo 15 - June 16, 2021
N side of Gideon Dr., looking S across road at CUM1-1 vegetation community.

Photo 16 - June 2, 2021
Recent re-vegetation of N Oxford Street West shoulder beside Eagle Ridge Subdivision.

Photo 17 - June 2, 2021
CUM1-1 community in SW corner of intersection, facing N from Gideon Drive shoulder.

Photo 18 - June 2, 2021
Oxford Street West and Gideon Drive intersection, looking N from Gideon Drive.

Photo 19 - June 2, 2021
Oxford Street West and Gideon Drive intersection, looking NE from W shoulder of Gideon Drive.

Photo 20 - June 16, 2021
Oxford Street West right-of-way E of intersection, facing W. Note Phragmites in ditch.

Photo 21 - June 16, 2021
Eagle Ridge Subdivision and right-of-way, looking NW from S side of Oxford Street West.

Photo 22 - June 16, 2021
E right-of-way, facing west from frontage of 1976 Oxford Street West. Note Phragmites in ditch.

Photo 23 -June 16, 2021
Eagle Ridge Subdivision and right-of-way, looking NE from S side of Oxford Street West.

Photo 24 - June 16, 2021
Monarch on milkweed E of the intersection, S roadside of Oxford Street West.

Appendix D

Field Sheets

ELC COMMUNITY DESCRIPTION & CLASSIFICATION	SITE: OXFORD GIDEON 20555	POLYGON: CUM1-1
	SURVEYOR(S): P.M	DATE: JUNE 16/21
	TIME: start 10:00 finish 10.10	
	UTMZ:	UTME:
	UTMN:	

POLYGON DESCRIPTION

SYSTEM	SUBSTRATE	TOPOGRAPHIC FEATURE	HISTORY	PLANT FORM	COMMUNITY
☑ TERRESTRIAL	☐ ORGANIC	☐ LACUSTRINE	☐ NATURAL	☐ PLANKTON	☐ LAKE
☐ WETLAND	☑ MINERAL SOIL	☐ RIVERINE	☑ CULTURAL	☐ SUBMERGED	☐ POND
☐ AQUATIC	☐ PARENT MIN.	☐ BOTTOMLAND		☐ FLOATING-LVD.	☐ RIVER
	☐ ACIDIC BEDRK.	☐ TERRACE		☑ GRAMINOID	☐ STREAM
	☐ BASIC BEDRK.	☐ VALLEY SLOPE		☐ FORB	☐ MARSH
	☐ CARB. BEDRK.	☑ TABLELAND		☐ LICHEN	☐ SWAMP
		☐ ROLL. UPLAND		☐ BRYOPHYTE	☐ FEN
		☐ CLIFF		☐ DECIDUOUS	☐ BOG
		☐ TALUS		☐ CONIFEROUS	☐ BARREN
		☐ CREVICE / CAVE		☐ MIXED	☑ MEADOW
		☐ ALVAR			☐ PRAIRIE
		☐ ROCKLAND			☐ THICKET
		☐ BEACH / BAR			☐ SAVANNAH
		☐ SAND DUNE			☐ WOODLAND
		☐ BLUFF			☐ FOREST
					☐ PLANTATION

SITE	COVER
☐ OPEN WATER	☑ OPEN
☐ SHALLOW WATER	☐ SHRUB
☑ SURFICIAL DEP.	☐ TREED
☐ BEDROCK	

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	1	PIPdeH = ACEnegu = JUNvirg
2	SUB-CANOPY	3	1	RHAcath > MORalba > JUGnigr > ACEnegu
3	UNDERSTOREY	4.5	2	ELAumbe = JUNvirg > MORalba = RHAtyph
4	GRD. LAYER	6.7	4	FESrubr > LOLarun > DACglom > SOLalti

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:

SIZE CLASS ANALYSIS:	O	< 10	O	10 - 24	R	25 - 50	N	> 50
STANDING SNAGS:	R	< 10	N	10 - 24	N	25 - 50	N	> 50
DEADFALL / LOGS:	R	< 10	N	10 - 24	N	25 - 50	N	> 50

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

COMM. AGE :	✓	PIONEER		YOUNG		MID-AGE		MATURE		OLD GROWTH

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:	CULTURAL MEADOW	CUM
ECOSITE:	MINERAL CULTURAL MEADOW	CUM1
VEGETATION TYPE:	DRY-MOIST OLD FIELD MEADOW TYPE	CUM1-1
☐ INCLUSION		
☐ COMPLEX		

Notes:

BREEDING BIRD FIELD SHEET

arva

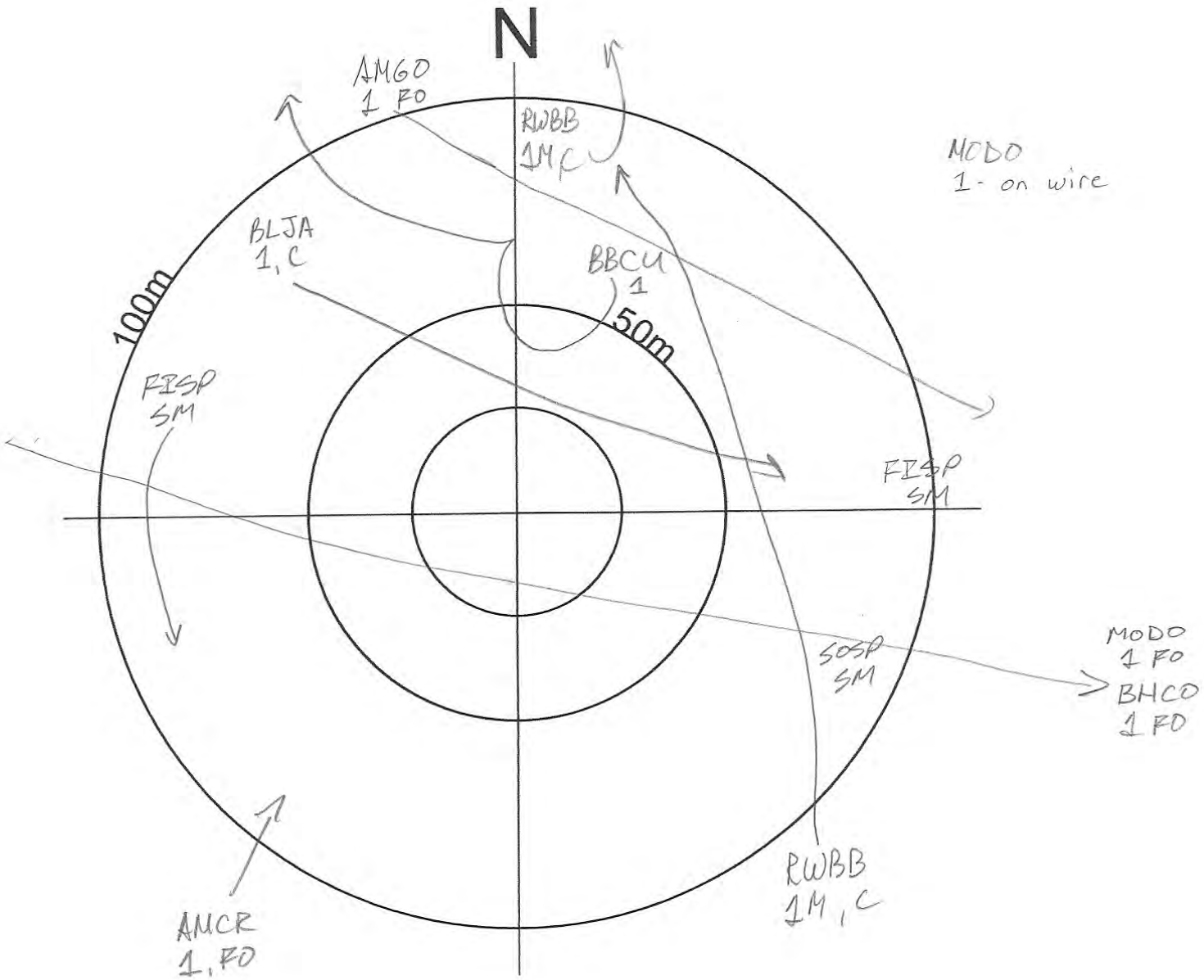
Project OXFORD GIDEON Date JUNE 2/21

Collector(s): P.M. Start: 6 : 39 End: 6 : 44 Total: 5 min

Temp: 9 Wind Direction & Speed: 5-8km/h NE Clouds (%): 60

Noise: 3 Location: BB1 Community: —

General Conditions: COOL, CALM



NOTES: _____

BREEDING BIRD FIELD SHEET

arva

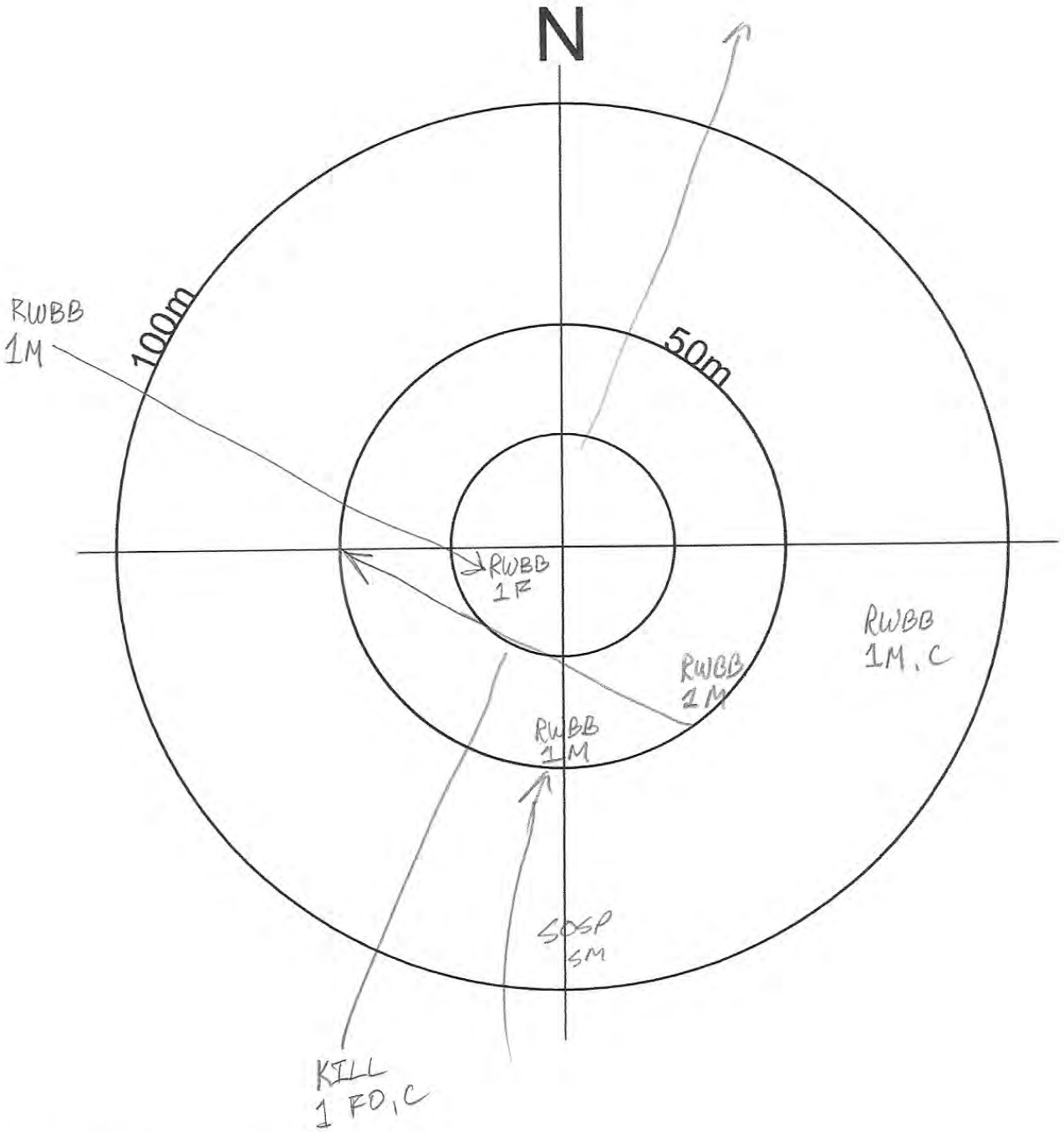
Project OXFORD GIDEON Date JUNE 2/21

Collector(s): P.M. Start: 6 : 51 End: 6 : 56 Total: 5min

Temp: 9 Wind Direction & Speed: 5-8km/h NE Clouds (%): 60

Noise: 3 Location: BB2 Community: /

General Conditions: COOL CALM



NOTES: RWBB - agitated

BREEDING BIRD FIELD SHEET

arva

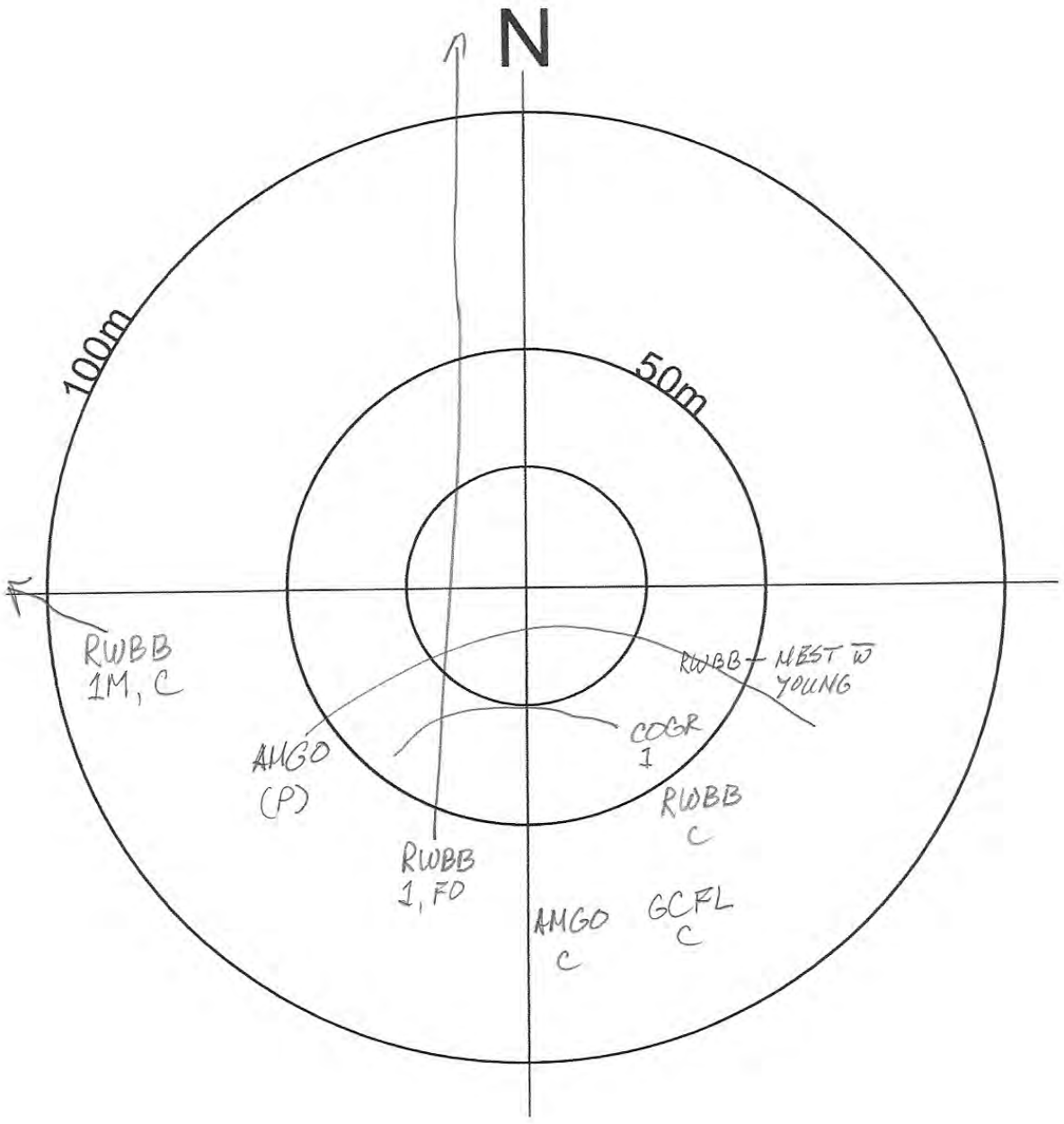
Project OXFORD GIDEON Date JUNE 2/21

Collector(s): P.M. Start: 7 : 00 End: 7 : 05 Total: 5min

Temp: 10 Wind Direction & Speed: 5-8km/h NE Clouds (%): 75

Noise: 3 Location: BB3 Community: /

General Conditions: COOL, CALM



NOTES: GCFC - walnut woodland
HOSP - roadside prior to survey

BREEDING BIRD FIELD SHEET

arva

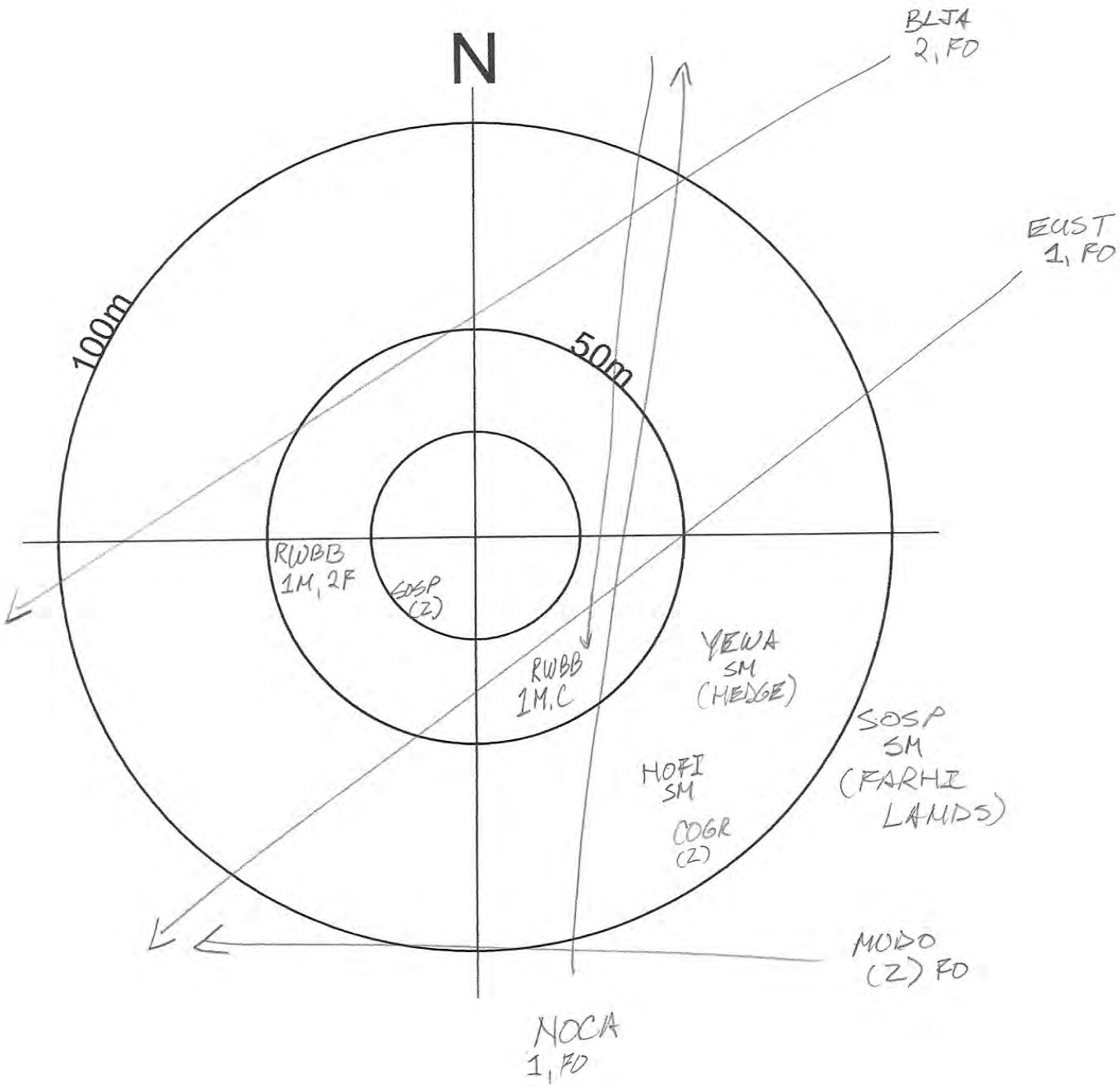
Project OXFORD GIDEON **Date** JUNE 2/21

Collector(s): F.M. **Start:** 7 : 10 **End:** 7 : 15 **Total:** 5min

Temp: 10 **Wind Direction & Speed:** 5-8km/h NE **Clouds (%):** 75

Noise: 3 **Location:** BB4 **Community:** -

General Conditions: COOL, CALM



NOTES:

BREEDING BIRD FIELD SHEET

arva

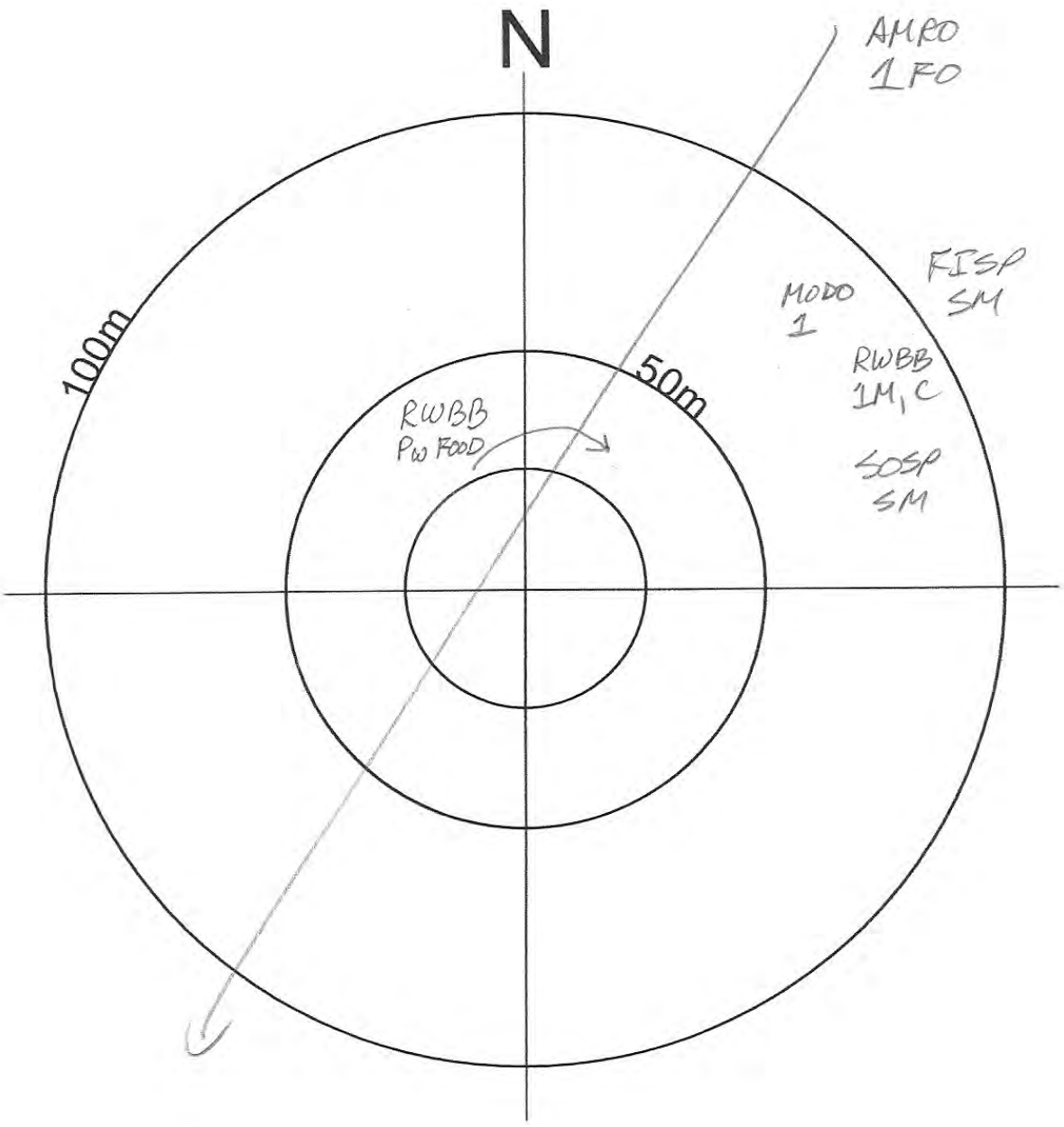
Project OXFORD GIDEON **Date** JUNE 16/21

Collector(s): P.M. **Start:** 8 : 20 **End:** 8 : 25 **Total:** 5min

Temp: 10 **Wind Direction & Speed:** 3-5km/h N **Clouds (%):** 5%

Noise: 3 **Location:** BB1 **Community:** —

General Conditions: CLEAR, CALM



NOTES:

BREEDING BIRD FIELD SHEET

arva

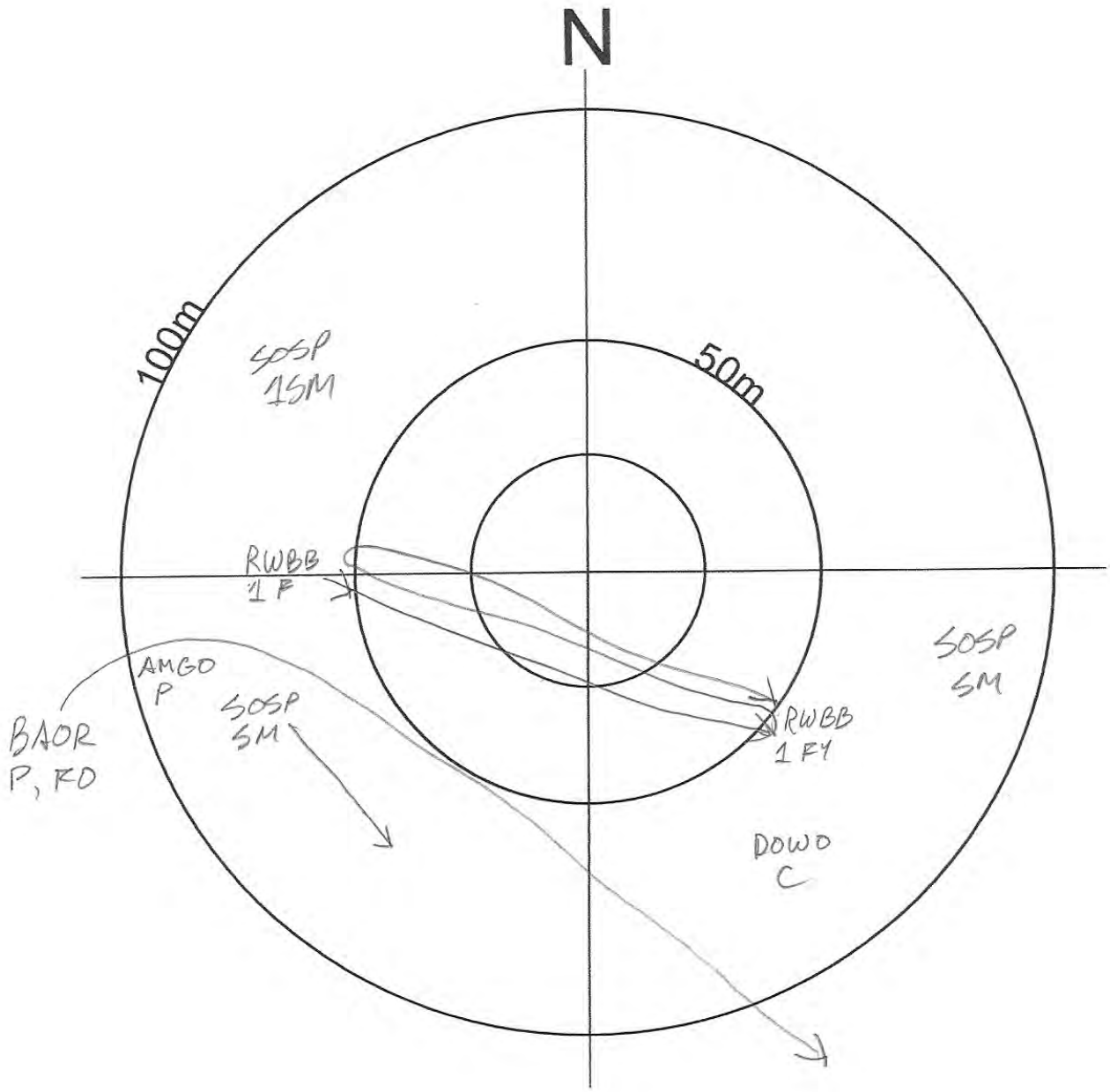
Project OXFORD GIDEON Date JUNE 16/21

Collector(s): P.M Start: 8 : 30 End: 8 : 35 Total: 5min

Temp: 11 Wind Direction & Speed: 2-12km/h NE Clouds (%): 10

Noise: 3 Location: BB2 Community: —

General Conditions: CLEAR, CALM



NOTES: HOFI - SM - Residence

RWBB - FEEDING YOUNG

BREEDING BIRD FIELD SHEET

arva

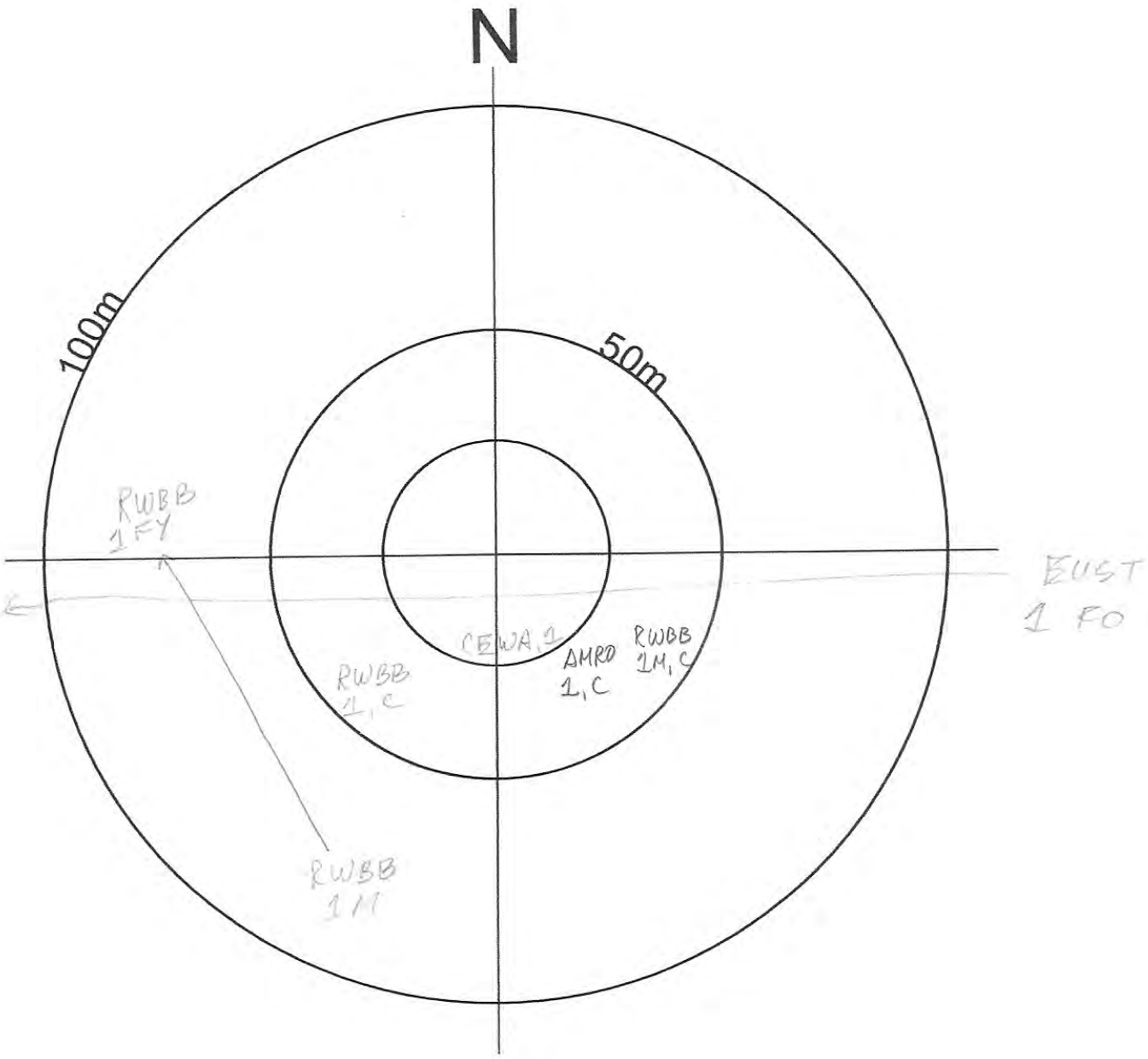
Project OXFORD GIDEON Date JUNE 16/21

Collector(s): P.M. Start: 8 : 41 End: 8 : 46 Total: 5 min

Temp: 13 Wind Direction & Speed: 2-12 km/h NE Clouds (%): 10

Noise: 3 Location: BB3 Community: —

General Conditions: CLEAR, CALM



NOTES:

BREEDING BIRD FIELD SHEET

arva

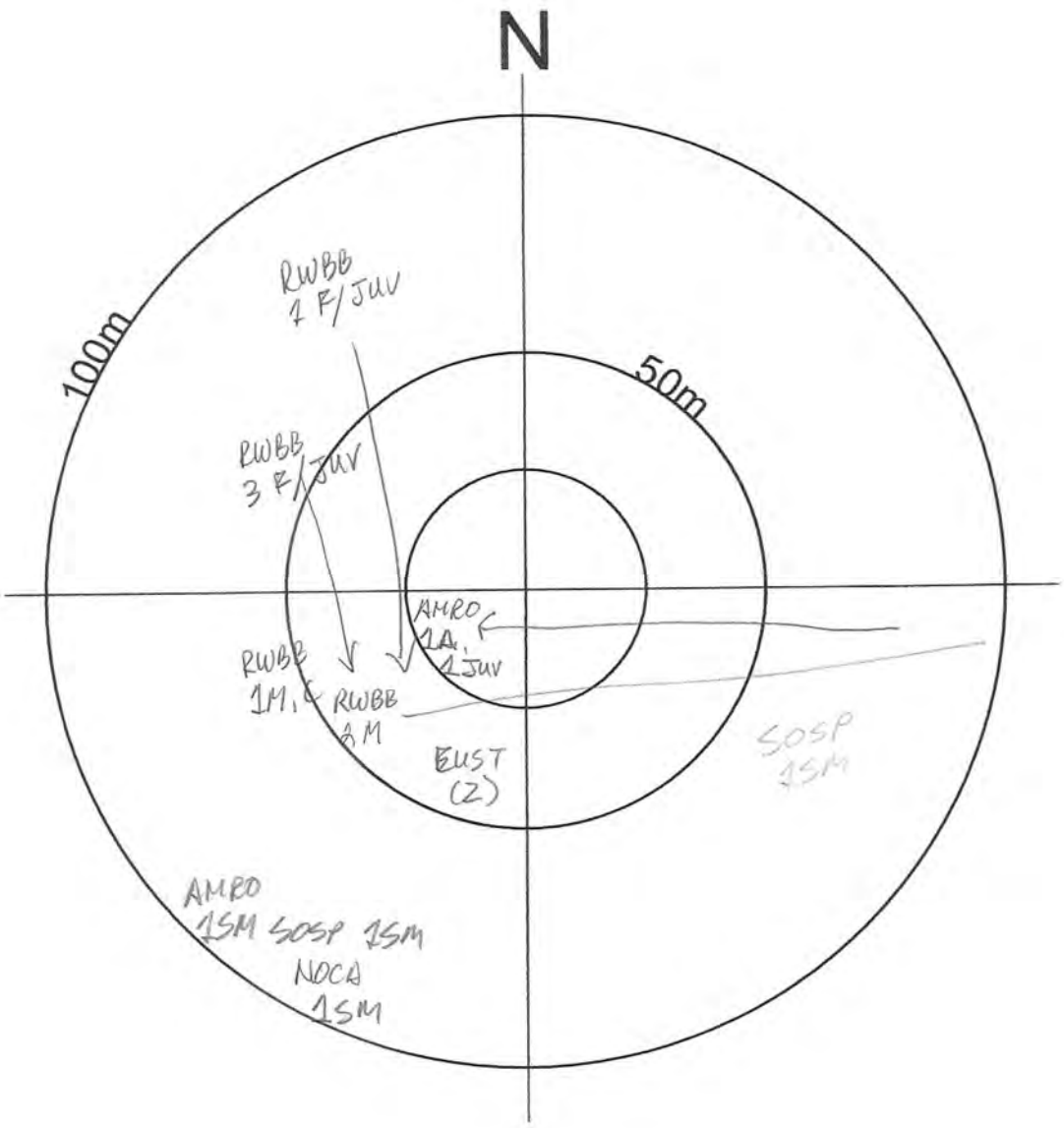
Project OXFORD GIDEON Date JUNE 16/21

Collector(s): P.M. Start: 8 : 53 End: 8 : 58 Total: 5 MIN

Temp: 13 Wind Direction & Speed: 2-12 KM/H NE Clouds (%): 10

Noise: 3 Location: BB4 Community: -

General Conditions: CLEAR CALM



NOTES: 1 RED SQU. DOR

Appendix E

Species Lists

Table 1 – Floral Inventory

Common Name	Scientific Name	Provincial Status (S Rank)*	Middlesex County Rank**
Manitoba Maple	*Acer negundo*	C	C
Common Yarrow	*Achillea millefolium*	SE5?	
Creeping Bentgrass	*Agrostis stolonifera*	SE5	IC
Garlic Mustard	*Alliaria petiolata*	SE5	IC
Grey Alder	*Alnus incana*	S5	U
Great Ragweed	*Ambrosia trifida*	S5	C
Hemp Dogbane	*Apocynum cannabinum*	S5	
Common Burdock	*Arctium minus*	SE5	IC
Common Milkweed	*Asclepias syriaca*	S5	C
Bitter Wintercress	*Barbarea vulgaris*	SE5	IC
Smooth Brome	*Bromus inermis*	SE5	IC
Yellow Marsh Marigold	*Caltha palustris*	S5	C
Pennsylvania Bittercress	*Cardamine pensylvanica*	S5	X
Woodland Sedge	*Carex blanda*	S5	C
Spiked Sedge	*Carex spicata*	SE5	IC
Fox Sedge	*Carex vulpinoidea*	S5	C
Bitternut Hickory	*Carya cordiformis*	S5	X
Spotted Knapweed	*Centaurea stoebe*	SE5	IX
Wild Chicory	*Cichorium intybus*	SE5	IC
Canada Thistle	*Cirsium arvense*	SE5	IC
Bull Thistle	*Cirsium vulgare*	SE5	IX
European Lily-of-the-valley	*Convallaria majalis*	SE5	IR
Field Bindweed	*Convolvulus arvensis*	SE5	IX
Alternate-leaved Dogwood	*Cornus alternifolia*	S5	X
Grey Dogwood	*Cornus racemosa*	S5	X
Red-osier Dogwood	*Cornus sericea*	S5	C
Dotted Hawthorn	*Crataegus punctata*	S5	C
Orchard Grass	*Dactylis glomerata*	SE5	IC
Wild Carrot	*Daucus carota*	SE5	IC
Common Teasel	*Dipsacus fullonum*	SE5	IC
Autumn Olive	*Elaeagnus umbellata*	SE3	IR
Red-stemmed Spikerush	*Eleocharis erythropoda*	S5	C
Slender Wildrye	*Elymus trachycaulus*	S5	
Meadow Horsetail	*Equisetum pratense*	S5	R

Common Name	Scientific Name	Provincial Status (S Rank)*	Middlesex County Rank**
Philadelphia Fleabane	*Erigeron philadelphicus*	S5	C
Robin's-plantain Fleabane	*Erigeron pulchellus*	S5	X
Red Fescue	*Festuca rubra*	S5	
Hard Fescue	*Festuca trachyphylla*	SE4	IX
Glossy Buckthorn	*Frangula alnus*	SE5	IU
White Ash	*Fraxinus americana*	S4	C
Canada Avens	*Geum canadense*	S5	X
Ground-ivy	*Glechoma hederacea*	SE5	IX
Honey Locust	*Gleditsia triacanthos*	S2?	IR
Fowl Mannagrass	*Glyceria striata*	S5	X
Orange Daylily	*Hemerocallis fulva*	SE5	IX
Spotted St. John's-wort	*Hypericum punctatum*	S5	X
Yellow Iris	*Iris pseudacorus*	SE4	IR
Harlequin Blue Flag	*Iris versicolor*	S5	X
Black Walnut	*Juglans nigra*	S4?	X
Soft Rush	*Juncus effusus*	S5	
Path Rush	*Juncus tenuis*	S5	X
Common Juniper	*Juniperus communis*	S5	R
Eastern Red Cedar	*Juniperus virginiana*	S5	X
Tamarack	*Larix laricina*	S5	X
Common Motherwort	*Leonurus cardiaca*	SE5	IC
Oxeye Daisy	*Leucanthemum vulgare*	SE5	IC
Butter-and-eggs	*Linaria vulgaris*	SE5	IC
Perennial Ryegrass	*Lolium perenne*	SE4	IX
Tatarian Honeysuckle	*Lonicera tatarica*	SE5	IX
Garden Bird's-foot Trefoil	*Lotus corniculatus*	SE5	IX
Purple Loosestrife	*Lythrum salicaria*	SE5	IC
Common Apple	*Malus pumila*	SE4	IX
Black Medick	*Medicago lupulina*	SE5	IC
Alfalfa	*Medicago sativa*	SE5	
White Sweet-clover	*Melilotus albus*	SE5	IC
Wild Bergamot	*Monarda fistulosa*	S5	
White Mulberry	*Morus alba*	SE5	IX
Mexican Muhly	*Muhlenbergia mexicana*	S5	C
Watercress	*Nasturtium officinale*	SE	IX
Common Evening-primrose	*Oenothera biennis*	S5	X

Common Name	Scientific Name	Provincial Status (S Rank)*	Middlesex County Rank**
Fall Panicgrass	*Panicum dichotomiflorum*	SE5	IC
Virginia Creeper	*Parthenocissus quinquefolia*	S4?	X
Reed Canarygrass	*Phalaris arundinacea*	S5	X
Common Timothy	*Phleum pratense*	SE5	IC
Common Reed	*Phragmites australis*	S4?	
Eastern Ninebark	*Physocarpus opulifolius*	S5	X
White Spruce	*Picea glauca*	S5	IR
Meadow Hawkweed	*Pilosella caespitosa*	SE5	IX
Eastern White Pine	*Pinus strobus*	S5	X
Scots Pine	*Pinus sylvestris*	SE5	IR
English Plantain	*Plantago lanceolata*	SE5	IC
Common Plantain	*Plantago major*	SE5	IC
Kentucky Bluegrass	*Poa pratensis*	S5	
Eastern Cottonwood	*Populus deltoides*	S5	
Trembling Aspen	*Populus tremuloides*	S5	X
Common Self-heal	*Prunella vulgaris*	S5	
Chokecherry	*Prunus virginiana*	S5	C
Common Pear	*Pyrus communis*	SE4	IX
Common Buttercup	*Ranunculus acris*	SE5	IC
European Buckthorn	*Rhamnus cathartica*	SE5	IC
Staghorn Sumac	*Rhus typhina*	S5	C
Black Locust	*Robinia pseudoacacia*	SE5	IC
Smooth Rose	*Rosa blanda*	S5	X
Multiflora Rose	*Rosa multiflora*	SE5	IX
Black Raspberry	*Rubus occidentalis*	S5	C
Curled Dock	*Rumex crispus*	SE5	IC
Sandbar Willow	*Salix interior*	S5	C
Black Willow	*Salix nigra*	S4	X
(Salix alba X Salix euxina)	*Salix x fragilis*	SNA	hyb
Common Elderberry	*Sambucus canadensis*	S5	X
Dark-green Bulrush	*Scirpus atrovirens*	S5	C
Purple Crown-vetch	*Securigera varia*	SE5	IX
Bladder Campion	*Silene vulgaris*	SE5	IX
Bittersweet Nightshade	*Solanum dulcamara*	SE5	IC
Tall Goldenrod	*Solidago altissima*	S5	
Canada Goldenrod	*Solidago canadensis*	S5	

Common Name	Scientific Name	Provincial Status (S Rank)*	Middlesex County Rank**
Field Sow-thistle	*Sonchus arvensis*	SE5	IX
Common Chickweed	*Stellaria media*	SE5	IC
White Heath Aster	*Symphyotrichum ericoides*	S5	
Panicled Aster	*Symphyotrichum lanceolatum*	S5	C
New England Aster	*Symphyotrichum novae-angliae*	S5	C
Old Field Aster	*Symphyotrichum pilosum*	S5	
Eastern Skunk Cabbage	*Symplocarpus foetidus*	S5	C
Common Dandelion	*Taraxacum officinale*	SE5	IC
Eastern White Cedar	*Thuja occidentalis*	S5	X
Basswood	*Tilia americana*	S5	C
Meadow Goatsbeard	*Tragopogon pratensis*	SE5	IX
White Clover	*Trifolium repens*	SE5	IX
Narrow-leaved Cattail	*Typha angustifolia*	SE5	IX
Broad-leaved Cattail	*Typha latifolia*	S5	X
Siberian Elm	*Ulmus pumila*	SE3	IR
Cranberry Viburnum	*Viburnum opulus*	S5	
Tufted Vetch	*Vicia cracca*	SE5	IX
Riverbank Grape	*Vitis riparia*	S5	C

** S Rank: S5 – Secure, S4 – Apparently secure, S3 – Vulnerable, S2 – Imperiled, S1 – Critically imperiled*
*** County Rank: I – Introduced, C – Common, U – Uncommon, R – Rare, H – Historic, X – Present, ? – Unconfirmed report, hyb - Hybrid*

Table 2 – Breeding Bird Data (Right-of-Way and Surrounding Area)

Common Name	Scientific Name	STATUS			Survey Point and Replicate								Max Breeding Potential
		S Rank	ESA	PIF	BB1		BB2		BB3		BB4		
				VISIT	1	2	1	2	1	2	1	2	
Mourning Dove	*Zenaida macroura*	S5B, SZN	-	-	1 FO 1 OB	1 OB	-	-	-	-	1 FO	-	Possible throughout site.
Black-billed Cuckoo	*Coccyzus erythropthalmus*	S4B, SZN	-	Reverse decline	1 OB	-	-	-	-	-	-	-	Possible in SWM4-1 and wooded habitats outside of the Study Area
Killdeer	*Charadrius vociferus*	S5B, SZN	-	-	-	-	1 FO	-	-	-	-	-	No breeding evidence
Belted Kingfisher	*Megaceryle alcyon*	S5B, SZN	-	-	-	1 OB º	-	-	-	-	-	-	Associated with Trib. C; possible.
Downy Woodpecker	*Dryobates pubescens*	S5	-	-	-	-	-	1 OB	-	-	-	-	Possible in treed habitats both within and outside of the Study Area.
Great Crested Flycatcher	*Myiarchus crinitus*	S5B, SZN	-	-	-	-	-	-	1 SM	-	-	-	Possible in the Cultural Woodland south of Oxford Street.
Eastern Kingbird	*Tyrannus tyrannus*	S5B, SZN	-	-	1 SM º	-	-	-	-	-	-	-	Possible in all treed habitats in the vicinity of Trib C.
Red-eyed Vireo	*Vireo olivaceus*	S5B, SZN	-	-		1 OB º	-	-	-	-		-	Possible in SWM4-1 and wooded habitats outside of the Study Area.
Blue Jay	*Cyanocitta cristata*	S5	-	-	1 OB	-	-	-	-	-	1 FO	-	Possible in treed habitats both within and outside of the Study Area.
American Crow	*Corvus brachyrhynchos*	S5B, SZN	-	-	1 FO	-	-	-	-	-		-	No breeding evidence.
Barn Swallow	*Hirundo rustica*	S5B, SZN	THR	-	-	-	-	-	-	1 OB º	-	-	No breeding evidence, though nesting is possible on nearby buildings.
House Wren	*Troglodytes aedon*	S5B, SZN	-	-	-	-	-	-	1 SM º	-	-	-	Possible in treed habitats or nest boxes throughout Study Area
American Robin	*Turdus migratorius*	S5B, SZN	-	-	-	1 FO	-	-	-	-	-	1 SM	Probable throughout Study Area; confirmed (fledgling).

Common Name	Scientific Name	STATUS			Survey Point and Replicate								Max Breeding Potential
		S Rank	ESA	PIF	BB1		BB2		BB3		BB4		
				VISIT	1	2	1	2	1	2	1	2	
												1 OB 1 FY	
European Starling	*Sturnus vulgaris*	SE	-	-	-	-	-	-	1 FO	1 FO	1 FO	2 OB	Probable throughout Study Area.
Cedar Waxwing	*Bombycilla cedrorum*	S5B, SZN	-	-	-	-	-	-	-	1 OB	-	-	Possible throughout Study Area.
House Sparrow	*Passer domesticus*	SE	-	-	-	-	-	-	1 OB	-	-	-	Possible throughout Study Area.
House Finch	*Haemorhous mexicanus*	SE	-	-	-	-	-	1SM	-	-	1SM	-	Possible throughout Study Area.
American Goldfinch	*Spinus tristis*	S5B, SZN	-	-	1 OB	-	-	1 P OB	1 P 1 OB	-	-	-	Probable in CUM1 and other open habitats throughout the Study Area.
Field Sparrow	*Spizella pusilla*	S5B, SZN	-	-	2 SM	1 SM	-	-	-	-	-	-	Probable in CUM1-1 east of Trib C.
Song Sparrow	*Melospiza melodia*	S5B, SZN	-	-	1 SM	1 SM	1 SM	3 SM	-	-	2 OB	2 SM	Probable in CUM1 and other open habitats throughout the Study Area.
Common Grackle	*Quiscalus quiscula*	S5B, SZN	-	-	-	-	-	-	1 OB	-	1 OB	-	Possible in treed habitats throughout Study Area.
Brown-headed Cowbird	*Molothrus ater*	S5B, SZN	-	-	1 FO	-	-	-	-	-	-	-	No breeding evidence.
Baltimore Oriole	*Icterus galbula*	S5B, SZN	-	-	-	-	-	1 P FO	-	-	-	-	Possible in treed habitats throughout Study Area.
Red-winged Blackbird	*Agelaius phoeniceus*	S5B, SZN	-	-	2 SM	P, CF 1 SM	3 SM 2 OB, A	1 OB 1 FY	NY 2 SM 1 OB	1 FY 2 SM 1 OB	1 SM 3 OB	1 SM 6 OB	Confirmed breeding in SWD4-1 and CUT1 habitats within Study Area.
Blue-winged Warbler	*Vermivora cyanoptera*	S4B, SZN	-	-	-	-	1 SM º	-	-	-	-	-	Possible in CUM1-1 east of Trib C.
Common Yellowthroat	*Geothlypis trichas*	S5B, SZN	-	-	1 SM º	-	-	-	-	-	-	-	Probable in wetland communities associated with Trib C.

Common Name	Scientific Name	STATUS			Survey Point and Replicate								Max Breeding Potential
		S Rank	ESA	PIF	BB1		BB2		BB3		BB4		
				VISIT	1	2	1	2	1	2	1	2	
Yellow Warbler	*Setophaga petechia*	S5B, SZN	-	-		-	-	-	-	-	1 SM	-	Possible in residential hedgerow at the eastern edge of Study Area
Northern Cardinal	*Cardinalis cardinalis*	S5	-	-	1 OB°	-	-	-	-	-	1 FO	1 SM	Possible throughout Study Area.

Visit 1 – June 2, 2021 – 9-10 °C, 5-8 km/hr NE wind, partly cloudy
Visit 2 – June 16, 2021 – 10-13 °C, 2-12 km/hr N/NE wind, mainly clear

PIF – Partners in Flight (2008)

OB – observed in habitat (called or visual)
SM – singing male
P – male/female pair
A – agitated behaviour
FY – fledged young
NY – nest with young
FO – fly over, foraging or moving
* – birds likely observed at a previous point
° – observation outside of dedicated survey

Table 3 – Incidental Terrestrial Wildlife

Common Name	Scientific Name	Provincial Status (S Rank)*
Mammals		
Red Squirrel	*Tamiasciurus hudsonicus*	S5
White-tailed Deer	*Odocoileus virginianus*	S5
Insects		
Monarch	*Danaus plexippus*	S2
Two-spotted bumblebee	*Bombus bimaculatus*	S5

** S Rank: S5 – Secure, S4 – Apparently secure, S3 – Vulnerable, S2 – Imperiled, S1 – Critically imperiled, SNA – Non-native*

Appendix F

Significant Wildlife Habitat Assessment

SWH Ecoregion 7E Criterion Schedule

Table 1.1 Seasonal Concentration Areas of Animals.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Waterfowl Stopover and Staging Areas (Terrestrial) **Rationale**: 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 grains in the Long Point, Rondeau, Lk. 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. Information Sources • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities (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” • Any mixed species aggregations of 100 or more individuals required. • The area of the flooded field ecosite habitat plus a 100-300m radius buffer 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). • SWH MIST Index #7 provides development effects and mitigation measures.	**No** Habitats within and adjacent to the Study Area are unlikely to experience suitable flooding conditions.	**No** Candidate habitat was not identified.
Waterfowl Stopover and Staging Areas (Aquatic) **Rationale**: Important for local and migrant waterfowl populations during the spring	Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5	• 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	Studies carried out and verified presence of” • Aggregations of 100 or more of listed species for 7 days, results in >700 waterfowl use days • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH. • The combined area of the ELC ecosites and a 100m radius area is the SWH.	**No** No candidate communities were identified within the Study Area. Suitable communities on adjacent lands are not large enough to support large	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
or fall migration or	White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck Red-breasted Merganser Brant Canvasback Ruddy Duck	SWD6	aquatic invertebrates and vegetation in shallow water) Information Sources • 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	• Wetland area and shorelines associated with sites identified within the SWHTG Appendix K are significant wildlife habitat. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • 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 Index #7 provides development effects and mitigation measures.	numbers of waterfowl.	
Shorebird Migratory Stopover Area **Rationale**: High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	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	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	• Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. • Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. Information Sources • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey. • Bird Studies Canada.	Studies confirming: • Presence of 3 or more of listed species and > 1000[1] 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[1] 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” • SWH MIST Index #8 provides development effects	**No** No shoreline habitat is present within the Study Area.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
			• Ontario Nature. • Local birders and naturalist clubs. • NHIC Shorebird Migratory Concentration Area	and mitigation measures.		
Raptor Wintering Area **<u>Rationale</u>:** Sites used by multiple species, a high number of individuals and used annually are most significant.	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl **Special Concern:** Short-eared Owl Bald Eagle	**Hawks/Owls** Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM; CUT; CUS; CUW. **Bald Eagle:** Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or lakes with open water (hunting areas).	• The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Raptor wintering(hawk/owl) sites need to be > 20 ha with a combination of forest and upland. • Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent Woodlands. • Field area of the habitat is to be wind swept with limited snow depth or accumulation. • Eagle sites have open water and large trees and snags available for roosting. <u>Information Sources</u>: • OMNR Ecologist or Biologist. • Naturalist club. • Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area. • Data from Bird Studies Canada, most notably for Short-eared Owls. • Results of Christmas Bird Counts. • Reports and other information available from Conservation Authorities.	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; One of more Bald Eagles or; At least 10 individuals and two of 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” • SWH MIST Index #10 and #11 provides development effects and mitigation measures.	**Yes** Candidate ecosites are present within and beyond the Study Area. The Study Area composes a small fraction of qualifying CUM habitat, with the majority of the candidate habitat located to the north.	**No** Candidate habitat has not been confirmed and the vast majority is located on adjacent lands.
Bat Hibernacula **<u>Rationale</u>:** Bat hibernacula are rare habitats in all Ontario landscapes.	Big Brown Bat Tri-colored Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as	• All sites with confirmed hibernating bats are SWH. • The area includes 200m radius around the entrance of the hibernaculum for most development types.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
		(Note: buildings are not considered to be SWH)	SWH. • The locations of bat hibernacula are relatively poorly known. <u>Information Sources</u> • OMNR for possible locations and contact for local experts. • Natural Heritage Information Center (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.	and 1000m for wind farms. • 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”. • SWH MIST Index #1 provides development effect and mitigation measures.		
Bat Maternity Colonies **<u>Rationale</u>:** Known locations of forested bat maternity colonies is extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	• Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario • Maternity colonies located in Mature deciduous or mixed forest stands with >10/ha large diameter (>25cm dbh) wildlife trees. • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred. <u>Information Sources</u> • OMNR for possible locations and contact for local experts. • University Biology Departments with bat experts.	• Maternity Colonies with confirmed use by; – >10 Big Brown Bats – >5 Adult Female Silver-haired Bats • The area of the habitat includes the entire woodland or the forest stand ELC Ecosite 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”. • SWH MIST Index #12 provides development effects and mitigation measures.	**No** Candidate ecosites are present within the Study Area but occupy very small areas and are not expected to meet the habitat criteria thresholds.	**No** Candidate habitat was not confirmed.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Turtle Wintering Areas **Rationale:** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Midland Painted Turtle **Special Concern:** Northern Map Turtle Snapping Turtle	Snapping and Midland Painted turtles; ELC Community Classes; SW, MA, OA and SA. ELC Community Series; FEO and BOO Northern Map; Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering	• For most turtles, wintering areas are in the same general area as their core habitat. • Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen. • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. • EIS studies carried out by Conservation Authorities. • Field Naturalists Clubs. • OMNRF Ecologist or Biologist. • Natural Heritage Information Centre (NHIC).	• Presence of 5 over-wintering Midland Painted Turtles is significant • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant[i]. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over-wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May). Congregation of turtles is more common where wintering areas are limited and therefore significant. • SWH MIST Index #28 provides development effects and mitigation measures for turtle wintering habitat.	**Yes** Candidate habitat is present within the Study Area in the form of Tributary C, a cold-water, permanent watercourse.	**No** Candidate habitat was not confirmed.
Reptile Hibernaculum **Rationale:** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	**Snakes:** Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake Milksnake **Special Concern:** Eastern Ribbonsnake	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations of congregations of snakes on sunny warm days in the spring or fall is a	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line.	Studies confirming: • 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.	**No** Candidate habitat was not identified within the Study Area.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
		good indicator.	• 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. Information Sources • In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g.old dug wells). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs. • University herpetologists. • Natural Heritage Information Center (NHIC).	• 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 30 m buffer is the SWH· • SWH MIST Index #13 provides development effects and mitigation measures for snake hibernacula.		
Colonially - Nesting Bird Breeding Habitat (Bank and Cliff) **Rationale:** 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.	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies).	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles, cliff faces, bridge abutments, silos, barns (Cliff Swallows). Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation.	Studies confirming: • Presence of 1 or more nesting sites with 8 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 (May-June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWH MIST Index #4 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs) **<u>Rationale</u>:** Large colonies are important to local bird population, typically sites are only known.	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree. <u>Information Sources</u> • Ontario Breeding Bird Atlas, colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). • Natural Heritage Information Center (NHIC) Mixed Wader Nesting Colony. • Aerial photographs can help identify large heronries. • Reports and other information available from Conservation Authorities. • MNRF District Offices. • Local naturalist clubs.	Studies confirming: • 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 300 m radius or extend of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH. • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells. • SWH MIST Index #5 provides development effects and mitigation measures.	**Yes** A small area of candidate ecosite is present within the Study Area.	**No** Candidate habitat was not confirmed.
Colonially - Nesting Bird Breeding Habitat (Ground) **<u>Rationale</u>:** Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird). MAM1 – 6; MAS1 – 3; CUM CUT	• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands. <u>Information Sources</u> • Brewers Blackbird colonies • Ontario Breeding Bird Atlas, rare/colonial species records. • Canadian Wildlife Service. • Reports and other information available from Conservation	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	**No** Candidate habitat is not present within the Study Area.	**No** No candidate habitat was identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
		CUS	Authorities. • Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area. • MNRF District Offices. • Field Naturalist Clubs.	May/June when actively nesting. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWH MIST Index #6 provides development effects and mitigation measures.		
Migratory Butterfly Stopover Areas **<u>Rationale</u>:** Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Painted Lady Red Admiral <u>Special Concern</u> Monarch	Combination of ELC Community Series; need to have present one Community Series from each landclass Field: CUM CUT CUS Forest: FOC FOD FOM CUP Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.	• A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Erie and Ontario. • 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. • Stopover areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes. <u>Information Sources</u> • MNRF district Offices. • Natural Heritage Information Center (NHIC). • Agriculture Canada in Ottawa may have list of butterfly experts. • Field Naturalist Clubs. • Toronto Entomologists Association. • Conservation Authorities	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct). 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. • SWH MIST Index #16 provides development effects and mitigation measures.	**No** Candidate ecosites are present within and adjacent to the Study Area, however, it is > 5km from Lake Ontario or Erie.	**No** No candidate habitat was identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH		CONFIRMED SWH	Candidate Habitat Present Within the Study Area	Confirmed Habitat Found Within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Landbird Migratory Stopover Areas **<u>Rationale</u>:** Sites with a high diversity of species as well as high numbers are most significant.	All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1 All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds.	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	• Woodlots need to be >5 ha in size and within 5 km of Lake Ontario and Erie. If woodlands are rare in an area of shoreline, woodland fragments 2-5ha can be considered for this habitat. • If multiple woodlands are located along the shoreline those Woodlands <2km from Lake Erie and Lake Ontario are more significant. • Sites have a variety of habitats; forest, grassland and wetland complexes. • The largest sites are more significant. • Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and located within 5km of Lake Erie and Lake Ontario are Candidate SWH.	Studies confirm: • Use of the woodlot by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (March to May) and fall (Aug to Oct) migration using standardized assessment techniques. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • SWH MIST Index #9 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** No candidate habitat was identified.
Deer Winter Congregation Areas **<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.	White-tailed Deer	All Forested Ecosites with these ELC Community Series; FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50 ha may also be used.	• Woodlots >100 ha in size or if large woodlots are rare in a planning area woodlots>50ha. • Deer movement during winter in the southern areas Ecoregion 7E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands. • Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha. • Woodlots with high densities of deer due to artificial feeding are not significant. <u>Information Sources</u> • MNRF District Offices. • LIO/NRVIS.	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. • 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 • 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. • SWH MIST Index #2 provides development effects and mitigation measures.	**No** Candidate habitat was not identified within the Study Area.	**No** No candidate habitat was identified.

Table 1.2.1 Rare Vegetation Communities.

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

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Detailed Information and Sources	Defining Criteria		
Alvar **<u>Rationale</u>:** Alvars are extremely rare habitats in Ecoregion 7E.	ALO1 ALS1 ALT1 FOC1 CUW2 **Five Alvar Indicator Species:** 1)*Carex crawei* 2)*Panicum philadelphicum* 3)*Elocharis compressa* 4)*Scutellaria parvula* 5)*Trichostema brachiatum* These indicator species are very specific to Alvars within Ecoregion 7E.	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 animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover.	An Alvar site > 0.5 ha in size Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie. <u>Information Sources</u> • Alvars of Ontario (2000), Federation of Ontario Naturalists. • Ontario Nature – Conserving Great Lakes Alvars. • Natural Heritage Information Center (NHIC) has location information available on their website • OMNRF Staff. • Field Naturalist Clubs. • Conservation Authorities.	Field studies identify four of the five **Alvar Indicator Species** at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses. • SWH MIST Index #17 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.
Old Growth Forest **<u>Rationale</u>:** Due to historic logging practices and land clearance for agriculture, old growth forest is rare in Ecoregion 7E.	Forest Community Series: FOD FOC FOM SWD SWC SWM	Old-growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in mosaic of gaps that encourage development of multi- layered canopy and an abundance of snags and downed woody debris.	• Woodland area is >0.5 ha. <u>Information Sources</u> • OMNRF Forest Resource Inventory mapping. • OMNRF Districts. • Field Naturalist Clubs. • Conservation Authorities. • Sustainable Forestry Licence (SFL) companies. will possibly know locations through field operations. • Municipal forestry departments.	Field Studies will determine: • If dominant trees species of the ecosite are >140 years old, then area containing these trees is Significant Wildlife Habitat . • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut steps 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. • SWH MIST Index #23 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Rare Vegetation Community	CANDIDATE SWH			CONFIRMED SWH	Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
	ELC Ecosite Codes	Habitat Criteria and Information Sources	Detailed Information and Sources	Defining Criteria		
Savannah **Rationale:** Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. 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).	No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • Natural Heritage Information Center (NHIC) has location data available on their website. • OMNRF Districts. • Field Naturalists Clubs. • Conservation Authorities.	Field studies confirm one or more of the Savannah indicator species listed in 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 or introduced species (<50% vegetative cover exotics). • SWH MISTcxlix Index #18 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.
Tallgrass Prairie **Rationale:** Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. 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).	No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • OMNRF Districts. • Natural Heritage Information Center (NHIC) has location data available on their website. • Field Naturalists Clubs. • Conservation Authorities.	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 or introduced species (<50% vegetative cover exotics). • SWH MIST Index #19 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Table 1.2.2 Specialized Habitats For Wildlife considered SWH.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
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 120 m cxdix from a wetland (> 0.5 ha) or a wetland (>0.5 ha) with small wetlands (<0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. • Upland areas should be at least 120m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites. Information Sources • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from Conservation Authorities.	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, 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. • SWH MIST Index #25 provides development effects and mitigation measures.	**Yes** Candidate ecosites are present within the Study Area but are likely too small to support defining wildlife species.	**No** Candidate habitat was not identified.
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat **Rationale:** Nest sites are fairly uncommon in Ecoregion 7E and are used annually by these species. Many suitable nesting locations may be lost due to	Osprey Special Concern Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands,	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree’s canopy. • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles	Studies confirm the use of these nests by: • 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	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
increasing shoreline development pressures and scarcity of habitat.			and constructed nesting platforms). <u>Information Sources</u> • Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario. • MNRF values information (LIO/NRVIS) will list know nesting locations, Note: data from NRVIS is provided as a point and does not represent all the habitat. • Nature Counts, Ontario Nest Records Scheme data. • OMNRF Districts. • Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented. • Reports and other information available from Conservation Authorities. • Field naturalist Clubs.	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 mid March to mid August. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWH MIST Index #26 provides development effects and mitigation measures.		

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Woodland Raptor Nesting Habitat **<u>Rationale</u>:** Nests sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3.	All natural or conifer plantation woodland/forest stands combined >30ha or with >4 ha of interior habitat. Interior habitat determined with a 200m buffer. • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. <u>Information Sources</u> • OMNRF Districts. • Check the Ontario Breeding Bird Atlas or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada. • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of 1 or more active nests from species list is considered significant. • Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 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 the SWH. • Sharp-Shinned Hawk – A 50m radius around the nest is the SWH. • Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWH MIST Index #27 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Turtle Nesting Areas **<u>Rationale</u>:** These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	Midland Painted Turtle <u>Special Concern Species</u> Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m) cxlviii or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. <u>Information Sources</u> • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal 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.	Studies confirm: • 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 turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH. • Travel routes from wetland to nesting area are to be considered within the SWH as a 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. • SWH MIST Index #28 provides development effects and mitigation measures for turtle nesting habitat.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.
Seeps and Springs **<u>Rationale</u>:** 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. • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species. <u>Information Sources</u> • Topographical Map.	Field Studies confirm: • Presence of a site with 2 or more seeps/springs should be considered SWH. • The area of a ELC forest ecosite or 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	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
			• Thermography. • Hydrological surveys conducted by Conservation Authorities and MOE. • Field Naturalists Clubs and landowners. • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped.	condition need to be considered in delineation the habitat. • SWH MIST Index #30 provides development effects and mitigation measures.		
Amphibian Breeding Habitat (Woodland). **<u>Rationale</u>:** These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	• Presence of a wetland, pond woodland pool (including vernal pools) >500m^2 within or adjacent (within 120m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat. <u>Information Sources</u> • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records. • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF Districts and wetland Evaluations. • Field Naturalist Clubs • Canadian Wildlife Service Amphibian Road Call Survey. • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Studies confirm; • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults juveniles, larva or eggs masses) or 2 or more of the listed frog species with Call Level Codes of 3. • A combination of observation study and call count survey 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 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. • SWH MIST Index #14 provides development effects and mitigation measures.	**Yes** Candidate habitat is present within the Study Area.	**Yes** Candidate habitat was confirmed in ecosites within Study Area during prior investigations (AECOM, 2016).

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Amphibian Breeding Habitat (Wetlands) **<u>Rationale</u>:** 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.	• Wetlands>500m^2 (about 25m diameter), supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats. • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanent water bodies with abundant emergent vegetation. <u>Information Sources</u> • Ontario Herpetofaunal Summary Atlas (or other similar atlases). • Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. • OMNRF Districts and wetland evaluations. • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3 or; Wetland with confirmed breeding Bullfrogs are significant. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWH MIST Index #15 provides development effects and mitigation measures.	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.
Woodland Area-Sensitive Bird Breeding Habitat **<u>Rationale</u>:** Large, natural blocks of mature woodland habitat within the settled areas of	Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha. • Interior forest habitat is at least 200 m from forest edge habitat. <u>Information Sources</u>	Studies confirm: • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. • Note: any site with breeding Cerulean Warblers or Canada Warbler is to be considered SWH. • Conduct field investigations	**No** Candidate habitat is not present within the Study Area.	**No** Candidate habitat was not identified.

Specialized Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Southern Ontario are important habitats for area sensitive interior forest song birds.	Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren Pileated Woodpecker <u>Special Concern:</u> Cerulean Warbler Canada Warbler	SWD	• Local birder clubs. • Canadian Wildlife Service (CWS) for the location of forest bird monitoring . • Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species. • Reports and other information available from Conservation Authorities.	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” • SWH MIST Index #34 provides development effects and mitigation measures.		

Table 1.3. Habitats of Species of Conservation Concern considered SWH

Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Marsh Breeding Bird Habitat **Rationale:** Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Green Heron Trumpeter Swan **Special Concern:** Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	• Nesting occurs in wetlands. • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present. • 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. Information Sources • OMNRF District and wetland evaluations. • Field Naturalist clubs. • Natural Heritage Information Centre (NHIC) Records. • Reports and other information available from Conservation Authorities. • Ontario Breeding Bird Atlas.	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 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”. • SWH MIST Index #35 Provides development effects and mitigation measures.	**Yes** Candidate ecosites are present within the Study Area.	**No** Candidate habitat was not identified.
Open Country Bird Breeding Habitat **Rationale:** This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow **Special Concern** Short-eared Owl	CUM1 CUM2	• Large grassland areas (includes natural and cultural fields and meadows) >30 ha. • Grasslands not Class 1 or Class 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). • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. • The Indicator bird species are area sensitive requiring larger	Field Studies confirm: • 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	**No** Candidate ecosites are present within the Study Area however do not meet the size criteria.	**No** Candidate habitat was not confirmed; no defining wildlife species were observed during field investigations.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
			grassland areas than the common grassland species. Information Sources • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs. • Ontario Breeding Bird Atlas • EIS Reports and other information available from Conservation Authorities.	Habitats: Guidelines for Wind Power Projects". • SWH MIST Index #32 provides development effects and mitigation measures.		
Shrub/Early Successional Bird Breeding Habitat **Rationale** This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS.	Indicator Spp: Brown Thrasher Clay-coloured Sparrow Common Spp. Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher **Special Concern:** Yellow-breasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	Large field areas succeeding to shrub and thicket habitats >10ha in size. • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years). • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species. • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Information Sources • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs. • Ontario Breeding Bird Atlas • Reports and other information available from Conservation Authorities.	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species. • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat. • 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". • SWH MIST Index #33 provides development effects and mitigation measures.	**No** Candidate ecosites are present within the Study Area however do not meet the size criteria.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Terrestrial Crayfish; **Rationale:** Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare.	Chimney or Digger Crayfish; (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish; (*Cambarus Diogenes*)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM	Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for terrestrial crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can't found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed. Information Sources • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998.	Studies Confirm: • 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 Habitat ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult. • SWH MIST Index #36 provides development effects and mitigation measures.	**Yes** Candidate ecosites are present within the Study Areas.	**No** Candidate habitat was not identified.

Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
Special Concern and Rare Wildlife Species **<u>Rationale</u>:** These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre (NHIC).	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	• When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites. • <u>Information Sources</u> • Natural Heritage Information Centre (NHIC) will have Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data. • NHIC Website “Get Information” : http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas• • Expert advice should be sought as many of the rare spp. have little information available about their requirements.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. • SWH MIST Index #37 provides development effects and mitigation measures.	**Yes** Both this and prior studies within the Study Area (AECOM, 2013, MTE, 2020) have identified candidate habitats within and adjacent to the Study Area.	**Yes** Monarch (Special Concern), as well as forage and host plant species were recorded within the Study Area during 2021 field investigations. MTE (2020) confirmed Eastern Wood Pewee breeding within the Study Area in 2018 and as that habitat appears present in 2021, we assume this habitat is also present.

Table 1.4.1 Animal Movement Corridors

Wildlife Habitat	Wildlife Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
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 Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	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 • Movement corridors must determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule. <u>Information Sources</u> • MNRF District Office. • Natural Heritage Information Centre (NHIC). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs.	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant. • 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. • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat. • SWH MIST Index #40 provides development effects and mitigation measures.	**Yes** Breeding of multiple amphibian species was confirmed in prior studies (AECOM, 2016) in ecosites within and adjacent to the Study Area.	**No** Candidate habitat was identified, however the breeding habitat abuts summer habitat, so travel between the habitats is not limited and no specific corridors are present.

Table 1.5.1 Significant Wildlife Habitat Exceptions for Ecodistricts within EcoRegion 7E

EcoDistrict	Wildlife Habitat and Species	CANDIDATE SWH			Candidate Habitat within the Study Area	Confirmed Habitat within the Study Area
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria		
7E-2	**Bat Migratory Stopover Area** **Rationale**: Stopover areas for long distance migrant bats are important during fall migration. Hoary Bat Eastern Red Bat Silver-haired Bat	No specific ELC types	• Long distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. Their annual fall migration may concentrate these species of bats at stopover areas. • This is the only known bat migratory stopover habitats based on current information. Information Sources • OMNRF for possible locations and contact for local experts. • Western University Biology Department.	• Long Point (42°35'N, 80°30'E, to 42°33'N, 80°03'E) has been identified as a significant stop-over habitat for fall migrating Silver-haired Bats, due to significant increases in abundance, activity and feeding that was documented during fall migration. • The confirmation criteria and habitat areas for this SWH are still being determined. • SWH MIST Index #38 provides development effects and mitigation measures.	**No** The Study Areas are not within the region considered for SWH.	**No** Candidate habitat was not identified.

Appendix G

Tree Assessment Reports

RON KOUDYS LANDSCAPE ARCHITECTS INC

GIDEON DRIVE & OXFORD STREET WEST INTERSECTION IMPROVEMENTS LONDON ONTARIO

TREE ASSESSMENT REPORT

PREPARED BY:	RON KOUDYS LANDSCAPE ARCHITECTS INC
DATE:	SEPTEMBER 2021
RKLA PROJECT #:	21-117

CERTIFIED ARBORIST ISA TM

Michelle Peeters
ON 2129A

MICHELLE PEETERS
LANDSCAPE ARCHITECT
BLA, DIP. HORT. TECH, OALA, ISA CERTIFIED ARBORIST

368 OXFORD STREET EAST, LONDON, ONTARIO, CANADA N6A 1V7 | T: 519-667-3322 | F: 519-645-2474 | E: MAIL@RKLA.CA | W: RKLA.CA

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1.0 Introduction and Executive Summary

1.1 Introduction

Ron Koudys Landscape Architects Inc. (RKLA) was retained RV Anderson Associates Ltd. to conduct a tree inventory and assessment in conjunction with the proposed intersection improvements at Gideon Drive and Oxford Street West in London Ontario. The proposed improvements will include a new round about and associated sidewalks, street lights, etc. This report outlines the expected impacts of the proposed work on trees within or in proximity to the limits of disturbance and makes recommendations for tree removal and preservation based both tree health and construction impacts.

1.2 Executive Summary

The inventory captured 64 individual trees. Trees were identified within the City ROW and on private properties adjacent to the proposed construction. No tree species listed as endangered or threatened under O. Reg. 230/08: Species at Risk in Ontario List under Endangered Species Act, 2007, S.O. 2007, c. 6 were observed during the tree inventory. The construction limits do not conflict with a City of London Tree Protection Area. All trees observed are common and typical of the current land uses.

1.2.1 Tree Species Composition

The following chart outlines the breakdown of tree species included in this inventory.

%	Qty	Common Name
39%	25	Black Walnut
9%	6	Manitoba Maple
8%	5	Juniper
8%	5	Mulberry
6%	4	Trembling Aspen
5%	3	Basswood
5%	3	Bitternut Hickory
3%	2	Cottonwood
3%	2	Freeman Maple

%	Qty	Common Name
2%	1	Hawthorn
2%	1	Honeylocust
2%	1	Maple
2%	1	Royal Red Norway Maple
2%	1	Scotch Pine
2%	1	Unknown deciduous tree
2%	1	White Pine
2%	1	White Spruce
2%	1	Willow
100%	64	Total

1.2.2 Tree Removal and Preservation Recommendation Summary

The following chart summarizes trees recommended for removal and preservation categorized by location/ownership.

	City Right-of-Way		Privately Owned Land		TOTAL
	Quantity	Tree ID #'s	Quantity	Tree ID #'s	
Trees to be removed	19	13, 14, 17, 18, 20, 21, 22, 25, 26, 27, 43, 45, 48, 49, 51, 52, 53, 54 & 64	0		19
Trees to be preserved	20	10, 12, 15, 16, 19, 23, 24, 28, 29, 31, 32, 40, 42, 44, 50, 55, 56, 57, 58 & 59	25	1 - 9, 11, 30, 33 - 39, 41, 46, 47, 60, 61, 62 & 63	45

1.2.3 Tree Removal and Preservation Recommendations.

1. 19 trees are recommended for removal from the City ROW due to conflict with the proposed road construction.
2. Tree preservation fencing is to be installed as noted on the tree preservation drawings and as per the tree preservation barrier detail.
3. Follow the pre-construction, construction process, and post construction recommendations listed in this report.
4. Follow all City of London tree protection guidelines and by-laws.

2.0 Scope of Tree Inventory

Trees within the City ROW of Oxford Street West and Gideon Drive and approximately 3m beyond the ROW were included in the tree inventory and assessment. See Figure 1 for scope of tree inventory.

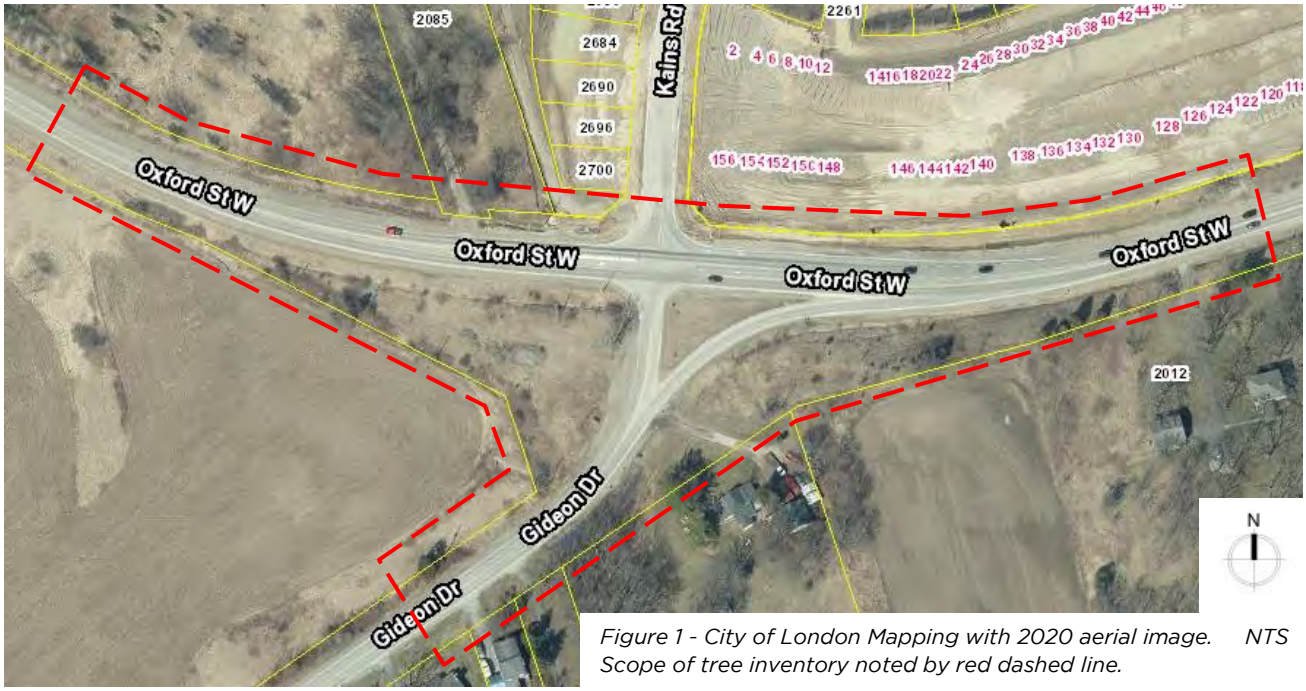

Figure 1 - City of London Mapping with 2020 aerial image. NTS
Scope of tree inventory noted by red dashed line.

3.0 Methodology

Field work was completed on August 12, 2021 by RKLA staff member Michelle Peeters, ISA certified arborist ON 2129A. A topographic survey supplied by RV Anderson was used as a base for the field work. Trees within the given scope with a diameter at breast height (DBH) of ≥10cm were identified and assessed as individuals. Significant hedges or groups of immature trees were not assessed, but their locations are noted on the tree preservation drawing. Trees were NOT tagged in the field. Each tree was assigned a number which are identified on the tree data table and on the tree preservation drawings. Individual tree identification numbers include 1 - 64.

The following information was recorded for each individual tree:

Genus + specific epithet (tree species)
Diameter at breast height (DBH) (centimetres)
Crown radius (metres)
Crown Condition (overall general vigour of crown)
Structural Form (excellent, good, fair, poor)
Structural Condition (good, fair, poor, hazard)
General Comments

3.1 Health Assessment

Trees were assessed following accepted arboricultural techniques and best practices using a limited visual inspection. The inspection included a 360 degree (where possible) visual examination of the above-ground parts of each tree for structural defects including cavities, wounds, scars, external indicators of internal decay, evidence of insect presence, discoloured or deformed foliage, canopy and root distribution, and the overall condition of the tree. Evaluation of tree health was based on visible tree health indicators including live buds, foliage condition, deadwood, structural defects, form, and signs of disease or insect infestation. Field observations were reviewed against available online imagery of the trees to assist in determining tree canopy health. Quantified health assessments included in the inventory are explained here:

Crown Condition Assessment

5 Healthy: less than 10% crown decline
4 Slight decline: 11% - 30% crown decline
3 Moderate decline: 31% - 60% crown decline
2 Severe decline: 61% - 90% crown decline
1 Dead - No visible indication of living foliage or buds in crown

Structural Form Assessment

Excellent: An ideal expression of a specific tree species, true to form, balanced canopy, good flare, typical internode length, full crown, etc.
Good: A satisfactory and generally expected expression of a specific tree species, with only minor or typical variances from an ideal form.
Fair: Nearly satisfactory, with defects or a combination of defects such as codominant leaders, unbalanced crown, poor/no flare, shortened internodes, has been poorly pruned, etc.
Poor: Significantly flawed expression of a specific tree species

Structural Integrity Assessment

Good: Defects if present are minor (e.g. twig dieback, small wounds); defective tree part is small (e.g. 5-8 cm diameter limb) providing little, if any risk.
Fair: Defects are numerous or significant (e.g. dead scaffold limbs); defective parts are moderate in size (e.g. limb greater than 5-8 cm in diameter).
Poor: Defects are severe (trunk cavity in excess of 50%); defective parts are large (e.g. majority of crown).
Hazard: Defects are severe and acute; defective part or collective defective parts render the tree a high risk threat to potential targets.

3.2 Critical Root Zones and Tree Preservation Barriers

The critical root zone of a tree is the portion of the root system that is the minimum necessary to maintain tree vitality and stability. Critical root zones are commonly prescribed by municipal bylaws based solely on DBH and/or drip line, and are typically expressed as a circular shape around the tree. There are a number of other factors, however, that should be considered when establishing a critical root zone, particularly in a streetscape setting where there are physical barriers such as sidewalks and curbs that have shaped and limited typical root development patterns.

Factors that inform location and extent of a tree preservation barriers to protect the critical root zone include: species tolerance to root loss and other construction impacts (as established by authoritative resources and professional experience), tree trunk size (DBH), tree health and vigour, structural condition, landscape context, soil type, moisture availability, topography, ground cover, crown size and balance (drip line), current physical root restrictions, visible root arrangement, relationship to neighbouring trees, relationship between tree and proposed construction, type of proposed construction, etc.

Critical root zones will be protected in the field with tree preservation barriers.

4.0 Tree Inventory Data and Recommendations

The following recommendations are based on a combination of tree species tree health/condition and requirements of the proposed street reconstruction.

4.1 Tree Data Table

Grey indicates recommended removal.

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
1	*Carya cordiformis*	Bitternut Hickory	2085 Oxford St. W	89	7	4	fair	fair	Codominant leaders with included bark and bulging seam, gall through crown, Buckthorn understory, grapevine through bottom third of canopy	none	preserve
2	*Juglans nigra*	Black Walnut	2085 Oxford St. W	8	2.5	5	good	good	Low branched, on slope	none	preserve
3	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	32	5	4	fair	good	Buckthorn understory, grapevine through crown	none	preserve
4	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	19	4	4	good	good	Dense Buckthorn understory, canopy heavy with grapevine	none	preserve
5	*Acer negundo*	Manitoba Maple	2265 Oxford St. W	23, 22	6	4	fair	poor	Multistem 2, supressed, large branch cavities, grapevine, 1 stem bend and lean SW	none	preserve
6	*Juglans nigra*	Black Walnut	2265 Oxford St. W	11	1.5	5	fair	good	Low crown, several Black Walnut saplings nearby	none	preserve
7	*Juniperus spp*	Juniper	2265 Oxford St. W	11	3	4	fair	good	Unbalanced crown, limbed up approx. 2m	none	preserve
8	*Crataegus spp*	Hawthorn	2265 Oxford St. W	~25, 20, 20, 10	7	4	fair	fair	Multistem 4, minor dead wood	none	preserve
9	*Pinus*	Scotch Pine	2265 Oxford St. W	15	2.5	1	good	fair	Dead	none	preserve

	sylvestris										
10	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	~13	3.5	5	fair	good	Low branched, scrubby form, grapevine through crown	adjacent to proposed s/w,	preserve, tree protection barrier
11	*Acer negundo*	Manitoba Maple	2166 Oxford St. W	~70, 65	8	5	poor	poor	Multistem 2, included bark at primary union and seam to base	adjacent to proposed s/w,	preserve, tree protection barrier
12	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	2	4	good	good	Canopy covered in grapevine	adjacent to proposed s/w,	preserve, tree protection barrier
13	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 9, 6	2.5	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
14	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 5, 4	2	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
15	*Unknown deciduous tree*	*Unknown deciduous tree*	City ROW Oxford St. W	~15	3	-	fair	fair	Canopy completely covered in grapevine and virginia creeper	none	preserve
16	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	3	5	fair	good	Low branched	none	preserve
17	*Morus alba*	Mulberry	City ROW Oxford St. W	19	4	5	fair	fair	Included bark at primary union, oozing seam, squat form	direct conflict with proposed road construction	remove
18	*Morus alba*	Mulberry	City ROW Oxford St. W	20	4	4	fair	fair	Dead lower branches, squat form	direct conflict with proposed road construction	remove
19	*Morus alba*	Mulberry	City ROW Oxford St. W	11	3	4	poor	fair	Disfigured form, leader bends and twists, dead wood	none	preserve
20	*Morus alba*	Mulberry	City ROW Oxford St. W	8, 8, 7	3	5	fair	fair	Multistem 3, primary union at grade, dead lower branches	direct conflict with proposed road construction	remove
21	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	42	6	5	good	good	Low branched	direct conflict with proposed road construction	remove
22	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	46, 35	6	5	fair	fair	Multistem 2, included bark and seam at primary union, low branched	direct conflict with proposed road construction	remove
23	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Canopy heavy with grapevine	none	preserve
24	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	15	3	5	good	good	Grapevine into lower half of crown	none	preserve
25	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	3	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed road construction	remove
26	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	12	2	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed road construction	remove
27	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Supressed	direct conflict with proposed road construction	remove
28	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	4	5	good	good	Supressed	no conflict with critical root zone	preserve, tree protection barrier
29	*Morus alba*	Mulberry	City ROW Gideon Dr.	18, 17	7	4	fair	fair	Multistem 2, tight unions, scrubby form, grapevine into crown	no conflict with critical root zone	preserve, tree protection barrier
30	*Juglans nigra*	Black Walnut	2166 Oxford St. W	12	3	5	good	good	Low branched, full form	none	preserve
31	*Juniperus spp*	Juniper	City ROW Gideon Dr.	~30	4	3	good	good	Covered in vines, dense understory	none	preserve
32	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	~15	3	3	good	good	Covered in vines	none	preserve
33	*Gleditsia triacanthos var. inermis*	Honeylocust	44 Gideon Dr.	~40	8	5	good	good	Minor hydro line clearance pruning, otherwise full form	none	preserve

34	*Picea glauca*	White Spruce	36 Gideon Dr.	~15	2	5	good	good	Branched to grade	none	preserve
35	*Juglans nigra*	Black Walnut	36 Gideon Dr.	85, 79	9	5	good	good	Multistem 2, large lovely specimen, supressed on East side, elevated at base, tight unions	none	preserve
36	*Tilia americana*	Basswood	14 Gideon Dr.	26, 18	6	5	good	good	Multistem 2, in wooded area, low branched	none	preserve
37	*Tilia americana*	Basswood	14 Gideon Dr.	19, 13, 9	5	5	good	good	Multistem 3, in wooded area, metal tag #s 200 &201	none	preserve
38	*Tilia americana*	Basswood	14 Gideon Dr.	31, 30, 13	5	5	good	fair	Multistem 3, in wooded area, metal tag #277, included bark at primary union	none	preserve
39	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	In wooded area, metal tag #270, low branches, on slope, supressed, grapevine into crown	none	preserve
40	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	19	4.5	5	good	good	Metal tag #269, grapevine into crown, on slope	no conflict with critical root zone	preserve, tree protection barrier
41	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	Metal tag #267, supressed	none	preserve
42	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	25	5	5	good	good	Metal tag #268, minor vines into crown	no conflict with critical root zone	preserve, tree protection barrier
43	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	32	5	5	good	good	Metal tag #266, low branched, on slope	adjacent to proposed s/w, impact to critical root zone expected	remove
44	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	13, 11, 7	4	5	good	fair	Multistem 3, metal tag #265, included bark at primary union	no conflict with critical root zone	preserve, tree protection barrier
45	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	20	4.5	5	good	good	Metal tag #264, branched to grade, dead lower branches	direct conflict with proposed s/w construction	remove
46	*Pinus strobus*	White Pine	14 Gideon Dr.	39	5.5	5	good	good	Metal tag #259, limbed up approx. 4m, Northern edge of loose hedge row	none	preserve
47	*Acer platanoides 'Royal Red'*	Royal Red Norway Maple	14 Gideon Dr.	~60	4.5	5	good	good	Significant prune cuts	none	preserve
48	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	15	3	5	good	fair	Significant vertical trunk wounds, full crown	direct conflict with proposed s/w construction	remove
49	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	13	3	5	good	good	Full form	direct conflict with proposed s/w construction	remove
50	*Salix spp*	Willow	City ROW Gideon Dr.	48, 11	5	3	poor	poor	Multistem 2, significant dead wood and trunk rot, loose open crown	none	preserve
51	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
52	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	1.5	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
53	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	1	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
54	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
55	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	26	4	5	good	good	Metal tag #213, thin crown	none	preserve
56	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	42	6.5	5	good	good	Metal tag #212, low branched, large broad crown	none	preserve
57	*Juniperus spp*	Juniper	City ROW Oxford St. W	10	2	5	good	good	Branched to grade	none	preserve

58	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	3	5	good	good	Branched to grade	none	preserve
59	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	2	5	good	good	At fence line	none	preserve
60	*Juglans nigra*	Black Walnut	2012 Oxford St. W	~30	5	5	good	good	Branched to grade	none	preserve
61	*Acer spp*	Maple	2012 Oxford St. W	~30, 30	5	3	poor	poor	Multistem 2, rot at base, significant dead wood	none	preserve
62	*Juglans nigra*	Black Walnut	2012 Oxford St. W	32	6	5	good	good	Under hydro lines	none	preserve
63	*Juglans nigra*	Black Walnut	2012 Oxford St. W	30	6	5	good	good	Metal tag #198, under hydro lines	none	preserve
64	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	58	6	3	poor	hazard	North half of tree torn off, leaving large wound, canopy heavy south, dead wood	Indirect conflict with proposed road construction & hazardous tree condition	remove

5.0 Potential Construction Impacts on Trees

Some trees have been recommended for preservation. Trees to be preserved may be affected by the construction process, or by the construction itself. It is imperative that the design team and the construction crew understand the potential for, and the causes of tree damage. Trees recommended for preservation may experience some or all of the following potential construction impacts. Strategies and methods to avoid these impacts are outlined in the Construction Impact Mitigation Recommendations section of this report.

5.1 Soil Compaction

Soil compaction is caused by heavy or repeated compression or vibration of the soil around the tree. Soil compaction reduces the amount and size of macro and micro pore space that is vital for subsurface movement of air and water. The harmful effects of soil compaction include, but are not limited to: slower water infiltration, poor aeration, reduced root growth and an overall increased susceptibility to biotic and abiotic stressors.

5.2 Root Loss

Root loss occurs when roots are severed. The majority of roots are typically located within the top 60cm of soil and can extend outward up to three times the extent of the tree drip line. Excavation of any kind within the critical root zone* can sever roots. Two categories of roots need to be considered when evaluating impacts of root loss - small, fibrous absorbing roots, and large structural roots. Significant loss of either or both of these functions can cause stress and/or affect the structural stability of the tree. Note, however, that it is commonly accepted that healthy trees can typically tolerate and recover from the removal of approximately 33% (up to a maximum of 50%) of their root mass. Thorough consideration regarding extent of acceptable root removal is dependent on individual species characteristics, root loss distribution, and site specific conditions *(ref. Trees and Development: A Technical Guide to Preservation of Trees During Land Development by Nelda Matheny and James R. Clark, 1998. Pg 72)*.

* Refer to 'Critical Root Zones and Tree Preservation Barriers" in this report for definition.

5.3 Grade Changes

Lowering of the grade around trees has immediate and long term effects on trees. Lowering of grade requires immediate root loss from cutting the roots which results in water stress from the root removal and potential reduced structural stability.

Raising the grade around a tree can be equally damaging. The addition of fill over the root zone of a tree alters the roots' ability for normal water and gas exchange that is necessary for healthy root growth and stability. Fill essentially suffocates the roots and can lead to the slow and eventual decline of the tree.

5.4 Mechanical Damage

Mechanical damage is caused by physical contact with a tree that damages the tree to any degree. During land development and construction activities, there is an increased risk of both minor and fatal mechanical damage to trees from construction equipment. Minor damage can create entry points for insects and pathogens, and fatal damage can cause irreparable structural damage.

5.5 Changes to Exposure - Sun and Wind

Trees can be negatively affected by increased exposure to sun or wind when neighbouring trees are removed. This can be of particular concern when 'interior trees' (trees that have developed surrounded by other trees) are suddenly exposed to forest edge conditions. These trees may experience higher intensity of direct sunlight resulting in leaf scald, and instability due to increased wind and snow loads.

Trees can be negatively affected by decreased exposure to sunlight. Proposed development that includes tall buildings located to the south and west of mature existing trees can greatly reduce the amount of daily direct sunlight. While this change in environment may not cause the immediate or eventual death of a tree, it can certainly slow development and alter growing habits and patterns, and must therefore be a consideration when evaluating trees for potential preservation.

5.6 Soil Contamination

Soil health around a tree can be compromised by contamination from spills or leaks of fuels, solvents, or other construction related fluids.

5.7 Water Availability

Grading and servicing requirements for development can affect water availability for trees. Trees may experience a loss of available water due to a lowered water table or the capture or redirection of subsurface and/or overland flow. Conversely, trees may experience an increase of available water due to changes in site grading and storm water retention efforts.

The successful survival of the trees to be preserved is largely dependent on adhering to the construction impact mitigation recommendations that follow.

6.0 Construction Impact Mitigation Recommendations

The following recommendations are provided to guide the removal process, mitigate construction impacts, and ensure compliance with provincial, federal, and municipal regulatory requirements. Some of the recommendations listed below are noted to be undertaken by an ISA certified arborist.

6.1 Pre-construction recommendations

a) Prior to any construction activity, tree preservation fencing is to be installed as per the attached tree preservation drawings and details and to be reviewed/accepted by the consulting arborist PRIOR to the commencement of construction.
b) Trees to be removed must be clearly marked via spray paint or other agreed upon method prior to removal. Tree marking can be completed by project arborist, City of London construction administrator, or approved appointee.
c) Where high quality specimens to be preserved are adjacent to areas subject to intensive construction activities, these trees are to have additional protection measures implemented to protect their trunks from mechanical damage. These measures may include surrounding the trunk with wood planks (trunk armour). Trees that require additional protection will be clearly identified on the tree preservation plan with detailed information on specific protection measures.
d) In accordance with the Migratory Birds Convention Act, 1994, all removals must take place between September 1st and March 31st to avoid disturbing nesting migratory birds. If tree removal occurs between April 1st and August 31st, a biologist is required to complete a search for nests. Once cleared, the contractor has 48 hours to remove. If removal does not occur within 48 hours, another search will be required.
e) Care should be taken during the felling operation to avoid damaging the branches, stems, trunks, and roots of nearby trees to be preserved. Where possible, all trees are to be felled towards the construction zone to minimize impacts on adjacent vegetation. All removals to be undertaken by an ISA certified arborist.
f) Final site grading plans should ensure that the existing soil moisture conditions are maintained.
g) Some trees may be candidates for pre-construction root pruning to help reduce stress and prepare the tree for nearby construction activity. These trees are to be identified on the tree preservation plan along with root pruning specifications. To be undertaken by an ISA certified arborist.

6.2 Recommendations related to the construction process

a) Tree preservation fencing is to be maintained in good condition and effective for the duration of construction until all construction activity is complete or as per the project arborist or contract administrator.

b) Tree preservation fencing is to remain intact as per the tree preservation drawings. Should tree preservation fencing need to be temporarily relocated or moved to facilitate construction, the project arborist and City of London Forestry Operations are to be immediately informed. Fencing is to be reinstated as per the tree preservation plans as soon as possible.
c) No construction, excavation, adding of fill, stockpiling of construction material, or heavy equipment is permitted within the tree protection zone.
d) When excavation near a tree is required, and it is anticipated that roots will be severed and exposed, duration of exposure is to be minimized to prevent root desiccation.
e) During the excavation process, roots 25mm or larger that are severed and exposed should be hand pruned to leave a clean-cut surface. To be undertaken by an ISA certified arborist. Exposed severed roots that cannot be covered in soil on the same day as the cuts are made are to be kept moist. Exposed roots are to be kept moist by covering them with water soaked burlap or any other means available to prevent them from drying out. Adequate moisture levels are to be maintained until such time as topsoil has been replaced satisfactorily or as otherwise directed by the contract administrator.
f) Avoid idling heavy equipment under or within close proximity to trees to be preserved to prevent canopy damage from exposure to the heat of the exhaust.
g) Should branches on City owned trees be damaged by or during construction, the contractor is to notify City of London Forestry Operations as soon as possible. No person(s) other than City staff or the City's designated contractor may perform work on any City tree.
h) Open trenching within a critical root zone is prohibited. Alternative excavation methods such as horizontal boring and vacuum excavation are required where proposed services or installation requirements conflict with critical root zones.
i) The existing ground-layer vegetation at the base of trees MUST remain intact within the critical root zone so as not to disturb the soil around the base of the existing trees. This includes the practice of NOT replacing existing turf with new sod. A heavy application of seed in these instances is preferred.
j) Regular communication with the site supervisor and regular monitoring of the site by the project arborist or landscape architect is recommended to ensure proper procedures are followed and protection barriers are maintained.
It is the responsibility of the site supervisor to promptly contact the project arborist if any concerns or questions arise regarding trees.

6.3 POST-CONSTRUCTION RECOMMENDATIONS

a) Avoid discharging rain water leaders adjacent to retained trees, as this may result in an overly moist environment which can cause root rot.
b) After all work is completed, tree preservation fences and any other impact mitigation paraphernalia must be removed under the direction of the consulting arborist or construction administrator.

c) A final review must be undertaken by the project arborist to ensure that all mitigation measures as described above have been met.
d) Post construction monitoring of trees may be required. Monitoring schedule to be determined with design team and City consensus.

7.0 City of London Tree Protection By-laws & Specifications

Note that this project is located in the City of London. It follows therefore, that all applicable City of London rules, regulations, and by laws are to be respected. The City of London has several by-laws and specifications related to trees that must be understood and followed by the design team, the contractor, and all sub-contractors working on projects within the City.

All project parties to be aware of and familiar with the following City of London documents in their entirety and potential penalties noted therein for noncompliance:

City of London - Boulevard Tree Protection By-law
CP-22 - in force and effect March 5, 2019

City of London 2019 Design Specifications and Requirements Manual (updated August 2019) Section 12 - Tree Planting and Protection Guidelines

Standard Contract Documents for Municipal Construction (2020 Edition)
Section B - Part 5 - Tree Planting and Protection Guidelines (TPP)

8.0 Disclaimer

The assessment of the trees presented within this report has been made using accepted arboricultural techniques. These include a visual examination of the above-ground parts of each tree for structural defects, scars, external indications of decay, evidence of insect presence, discoloured foliage, the general condition of the trees and the surrounding site, as well as the proximity of property and people. None of the trees examined were dissected, cored, probed, or climbed, and detailed root crown examinations involving excavation were not undertaken.

Notwithstanding the recommendations and conclusions made in this report, it must be realized that trees are living organisms and their health and vigour is constantly changing. They are not immune to changes in site conditions or seasonal variations in the weather.

While reasonable efforts have been made to ensure the trees recommended for retention are healthy, no guarantees are offered or implied, that these trees or any part of them will remain standing.

Note that this arborist report has been prepared using the latest drawings and information provided by the client. Any subsequent design or site plan changes affecting trees may require revisions to this report. Any new information or drawings are to be provided to RKLA prior to report submission to planning authorities.

9.0 Contact Information

Office:
Ron Koudys Landscape Architects Inc.
368 Oxford Street East
London, Ontario
N6A 1V7
Ph: 519-667-3322
Fax: 519-645-2474

Staff:

Field work and report author
Michelle Peeters - michelle@rkla.ca
Qualifications ISA Certified Arborist ON-2129A
ISA Tree Risk Assessment Qualified
Qualified Butternut Health Assessor BHA #710
OALA full member - landscape architect

10.0 Appendix A - Tree Preservation Drawings

GROUP OF SCOTCH PINE
(Pinus sylvestris) SAPLINGS

SUMAC (Rhus typhina) COLONY

TREE PROTECTION BARRIER

2265 OXFORD ST W

2085 OXFORD ST W

2700 KAINS RD

1959 C

EX. ROAD ALIGNMENT

PROPOSED ROAD ALIGNMENT

PROPOSED PAVEMENT MARKINGS

2166 OXFORD ST W

EX. LIGHT STANDARD

PROPOSED SIDEWALK

ACTIVE AGRICULTURE FIELD

TREE PROTECTION BARRIER

TREE PROTECTION BARRIER

FUTURE EASTBOUND LANE

FUTURE STREET CONNECTION

14 GIDEON DR

FUTURE DEVELOPMENT

14 GIDEON DR

FUTURE ROAD

WOODED AREA

36 GIDEON DR

52 GIDEON DR

44 GIDEON DR

MATCH LINE - SEE T-2

TREE PRESERVATION PLAN 'A'

SCALE = 1:400

REFER TO TREE ASSESSMENT REPORT FOR ADDITIONAL INFORMATION

KEY MAP

RON KOUDYS LANDSCAPE ARCHITECTS INC

ALL DRAWINGS REMAIN THE PROPERTY OF THE LANDSCAPE ARCHITECT AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT THE LANDSCAPE ARCHITECTS WRITTEN PERMISSION.

THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION OR TENDER PURPOSES UNLESS SIGNED AND DATED BY RONALD H. KOUDYS, OALA, CSLA, LANDSCAPE ARCHITECT, LONDON, ONTARIO (519) 667-3322.

Ronald H. Koudys, O.A.L.A. C.S.L.A. DATE

DATE	DESCRIPTION	No.
2021Ø92Ø	ISSUED FOR REVIEW	1

PLOTTING INFORMATION:
PLOTTED DATE = 2021Ø92Ø
PLOTTED SCALE = 1:1

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — RONALD H. KOUDYS — OALA MEMBER

PROJECT TITLE:
OXFORD ST &
GIDEON DR INTERSECTION
LONDON, ONTARIO

DRAWING TITLE:
TREE PRESERVATION
PLAN 'A'

DATE:	SCALE:	DRAWING No.
AUGUST 2021	AS NOTED	T-1
DRAWN: RKLA Inc.	CHECKED BY: R.H.K.	
PROJECT No. 21-117Lb		

TREE PRESERVATION PLAN 'B'

SCALE = 1:400

NOTES:

1. EXISTING TREES ARE TO BE PROTECTED FROM CONSTRUCTION WITH THE INSTALLATION OF A 1200MM (4'-0") HIGH SNOW FENCE, HELD IN PLACE WITH 1800MM (6'-0") 'T-BAR'.
2. THE BARRIER IS TO BE INSTALLED PRIOR TO ANY CONSTRUCTION AND MUST REMAIN IN PLACE UNTIL ALL CONSTRUCTION IS COMPLETED.
3. ALL SUPPORTS AND BRACING SHOULD BE INSIDE THE TREE PROTECTION ZONE. ALL SUCH SUPPORTS SHOULD MINIMIZE DAMAGING ROOTS IN THE TREE PROTECTION ZONE.
4. NO CONSTRUCTION ACTIVITY, GRADE CHANGES, SURFACE TREATMENT, OR EXCAVATION OF ANY KIND IS PERMITTED WITHIN THE TREE PROTECTION ZONE.
5. NO MOVEMENT OF EQUIPMENT, STORAGE OF BUILDING SUPPLIES, CLEANING OR EQUIPMENT, OR DUMPING OF SOLVENTS, GASOLINE, ETC., MAY OCCUR WITHIN THIS FENCE LINE.
6. WHERE HIGH QUALITY SPECIMENS OCCUR ADJACENT TO AREAS SUBJECTED TO INTENSIVE CONSTRUCTION ACTIVITY, WOODEN CRIBBING SHOULD BE INSTALLED TO PROTECT TRUNKS FROM DAMAGE IN THE EVENT THAT HEAVY EQUIPMENT BREAKS DOWN THE SNOW FENCING.
7. FENCE TO BE INSPECTED BY ENVIRONMENTAL CONSULTANT ON A REGULAR BASIS AND BE MAINTAINED BY THE SUBDIVIDER / BUILDER.

TEMP. TREE PROTECTION BARRIER - N.T.S.

CONSTRUCTION IMPACT MITIGATION RECOMMENDATIONS

PRE-CONSTRUCTION RECOMMENDATIONS

a) PRIOR TO ANY CONSTRUCTION ACTIVITY, TREE PRESERVATION FENCING IS TO BE INSTALLED AS PER THE ATTACHED TREE PRESERVATION DRAWINGS AND DETAILS AND TO BE REVIEWED/ACCEPTED BY THE CONSULTING ARBORIST PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

b) TREES TO BE REMOVED MUST BE CLEARLY MARKED VIA SPRAY PAINT OR OTHER AGREED UPON METHOD PRIOR TO REMOVAL. TREE MARKING CAN BE COMPLETED BY PROJECT ARBORIST, CITY OF LONDON CONSTRUCTION ADMINISTRATOR, OR APPROVED APPOINTEE.

c) WHERE HIGH QUALITY SPECIMENS TO BE PRESERVED ARE ADJACENT TO AREAS SUBJECT TO INTENSIVE CONSTRUCTION ACTIVITIES, THESE TREES ARE TO HAVE ADDITIONAL PROTECTION MEASURES IMPLEMENTED TO PROTECT THEIR TRUNKS FROM MECHANICAL DAMAGE. THESE MEASURES MAY INCLUDE SURROUNDING THE TRUNK WITH WOOD PLANKS (TRUNK ARMOUR). TREES THAT REQUIRE ADDITIONAL PROTECTION WILL BE CLEARLY IDENTIFIED ON THE TREE PRESERVATION PLAN WITH DETAILED INFORMATION ON SPECIFIC PROTECTION MEASURES.

d) IN ACCORDANCE WITH THE MIGRATORY BIRDS CONVENTION ACT, 1994, ALL REMOVALS MUST TAKE PLACE BETWEEN SEPTEMBER 1ST AND MARCH 31ST TO AVOID DISTURBING NESTING MIGRATORY BIRDS. IF TREE REMOVAL OCCURS BETWEEN APRIL 1ST AND AUGUST 31ST, A BIOLOGIST IS REQUIRED TO COMPLETE A SEARCH FOR NESTS. ONCE CLEARED, THE CONTRACTOR HAS 48 HOURS TO REMOVE. IF REMOVAL DOES NOT OCCUR WITHIN 48 HOURS, ANOTHER SEARCH WILL BE REQUIRED.

e) CARE SHOULD BE TAKEN DURING THE FELLING OPERATION TO AVOID DAMAGING THE BRANCHES, STEMS, TRUNKS, AND ROOTS OF NEARBY TREES TO BE PRESERVED. WHERE POSSIBLE, ALL TREES ARE TO BE FELLED TOWARDS THE CONSTRUCTION ZONE TO MINIMIZE IMPACTS ON ADJACENT VEGETATION. ALL REMOVALS TO BE UNDERTAKEN BY AN ISA CERTIFIED ARBORIST.

f) FINAL SITE GRADING PLANS SHOULD ENSURE THAT THE EXISTING SOIL MOISTURE CONDITIONS ARE MAINTAINED.

g) SOME TREES MAY BE CANDIDATES FOR PRE-CONSTRUCTION ROOT PRUNING TO HELP REDUCE STRESS AND PREPARE THE TREE FOR NEARBY CONSTRUCTION ACTIVITY. THESE TREES ARE TO BE IDENTIFIED ON THE TREE PRESERVATION PLAN ALONG WITH ROOT PRUNING SPECIFICATIONS. TO BE UNDERTAKEN BY AN ISA CERTIFIED ARBORIST.

RECOMMENDATIONS RELATED TO THE CONSTRUCTION PROCESS

a) TREE PRESERVATION FENCING IS TO BE MAINTAINED IN GOOD CONDITION AND EFFECTIVE FOR THE DURATION OF CONSTRUCTION UNTIL ALL CONSTRUCTION ACTIVITY IS COMPLETE OR AS PER THE PROJECT ARBORIST OR CONTRACT ADMINISTRATOR.

b) TREE PRESERVATION FENCING IS TO REMAIN INTACT AS PER THE TREE PRESERVATION DRAWINGS. SHOULD TREE PRESERVATION FENCING NEED TO BE TEMPORARILY RELOCATED OR MOVED TO FACILITATE CONSTRUCTION, THE PROJECT ARBORIST AND CITY OF LONDON FORESTRY OPERATIONS ARE TO BE IMMEDIATELY INFORMED. FENCING IS TO BE REINSTATED AS PER THE TREE PRESERVATION PLANS AS SOON AS POSSIBLE.

c) NO CONSTRUCTION, EXCAVATION, ADDING OF FILL, STOCKPILING OF CONSTRUCTION MATERIAL, OR HEAVY EQUIPMENT IS PERMITTED WITHIN THE TREE PROTECTION ZONE.

d) WHEN EXCAVATION NEAR A TREE IS REQUIRED, AND IT IS ANTICIPATED THAT ROOTS WILL BE SEVERED AND EXPOSED, DURATION OF EXPOSURE IS TO BE MINIMIZED TO PREVENT ROOT DESICCATION.

e) DURING THE EXCAVATION PROCESS, ROOTS 25MM OR LARGER THAT ARE SEVERED AND EXPOSED SHOULD BE HAND PRUNED TO LEAVE A CLEAN-CUT SURFACE. TO BE UNDERTAKEN BY AN ISA CERTIFIED ARBORIST. EXPOSED SEVERED ROOTS THAT CANNOT BE COVERED IN SOIL ON THE SAME DAY AS THE CUTS ARE MADE ARE TO BE KEPT MOIST. EXPOSED ROOTS ARE TO BE KEPT MOIST BY COVERING THEM WITH WATER SOAKED BURLAP OR ANY OTHER MEANS AVAILABLE TO PREVENT THEM FROM DRYING OUT. ADEQUATE MOISTURE LEVELS ARE TO BE MAINTAINED UNTIL SUCH TIME AS TOPSOIL HAS BEEN REPLACED SATISFACTORILY OR AS OTHERWISE DIRECTED BY THE CONTRACT ADMINISTRATOR.

f) AVOID IDLING HEAVY EQUIPMENT UNDER OR WITHIN CLOSE PROXIMITY TO TREES TO BE PRESERVED TO PREVENT CANOPY DAMAGE FROM EXPOSURE TO THE HEAT OF THE EXHAUST.

g) SHOULD BRANCHES ON CITY OWNED TREES BE DAMAGED BY OR DURING CONSTRUCTION, THE CONTRACTOR IS TO NOTIFY CITY OF LONDON FORESTRY OPERATIONS AS SOON AS POSSIBLE. NO PERSON(S) OTHER THAN CITY STAFF OR THE CITY'S DESIGNATED CONTRACTOR MAY PERFORM WORK ON ANY CITY TREE.

h) OPEN TRENCHING WITHIN A CRITICAL ROOT ZONE IS PROHIBITED. ALTERNATIVE EXCAVATION METHODS SUCH AS HORIZONTAL BORING AND VACUUM EXCAVATION ARE REQUIRED WHERE PROPOSED SERVICES OR INSTALLATION REQUIREMENTS CONFLICT WITH CRITICAL ROOT ZONES.

i) THE EXISTING GROUND-LAYER VEGETATION AT THE BASE OF TREES MUST REMAIN INTACT WITHIN THE CRITICAL ROOT ZONE SO AS NOT TO DISTURB THE SOIL AROUND THE BASE OF THE EXISTING TREES. THIS INCLUDES THE PRACTICE OF NOT REPLACING EXISTING TURF WITH NEW SOD. A HEAVY APPLICATION OF SEED IN THESE INSTANCES IS PREFERRED.

j) REGULAR COMMUNICATION WITH THE SITE SUPERVISOR AND REGULAR MONITORING OF THE SITE BY THE PROJECT ARBORIST OR LANDSCAPE ARCHITECT IS RECOMMENDED TO ENSURE PROPER PROCEDURES ARE FOLLOWED AND PROTECTION BARRIERS ARE MAINTAINED.

IT IS THE RESPONSIBILITY OF THE SITE SUPERVISOR TO PROMPTLY CONTACT THE PROJECT ARBORIST IF ANY CONCERNS OR QUESTIONS ARISE REGARDING TREES.

POST-CONSTRUCTION RECOMMENDATIONS

a) AVOID DISCHARGING RAIN WATER LEADERS ADJACENT TO RETAINED TREES, AS THIS MAY RESULT IN AN OVERLY MOIST ENVIRONMENT WHICH CAN CAUSE ROOT ROT.

b) AFTER ALL WORK IS COMPLETED, TREE PRESERVATION FENCES AND ANY OTHER IMPACT MITIGATION PARAPHERNALIA MUST BE REMOVED UNDER THE DIRECTION OF THE CONSULTING ARBORIST OR CONSTRUCTION ADMINISTRATOR.

c) A FINAL REVIEW MUST BE UNDERTAKEN BY THE PROJECT ARBORIST TO ENSURE THAT ALL MITIGATION MEASURES AS DESCRIBED ABOVE HAVE BEEN MET.

d) POST CONSTRUCTION MONITORING OF TREES MAY BE REQUIRED. MONITORING SCHEDULE TO BE DETERMINED WITH DESIGN TEAM AND CITY CONSENSUS.

TREES RECOMMENDED FOR REMOVAL (19)

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
13	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 6, 6	2.5	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
14	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 5, 4	2	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
17	*Morus alba*	Mulberry	City ROW Oxford St. W	13	4	5	fair	fair	Included bark at primary union, coving seam, squat form	direct conflict with proposed road construction	remove
18	*Morus alba*	Mulberry	City ROW Oxford St. W	20	4	4	fair	fair	Dead lower branches, squat form	direct conflict with proposed road construction	remove
20	*Morus alba*	Mulberry	City ROW Oxford St. W	8, 8, 7	3	5	fair	fair	Multistem 3, primary union at grade, dead lower branches	direct conflict with proposed road construction	remove
21	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	42	6	5	good	good	Low branched	direct conflict with proposed road construction	remove
22	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	46, 35	6	5	fair	fair	Multistem 2, included bark and seam at primary union, low branched	direct conflict with proposed road construction	remove
25	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	15	3	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed road construction	remove
26	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	12	2	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed road construction	remove
27	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Supressed	direct conflict with proposed road construction	remove
43	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	32	5	5	good	good	Metal tag #266, low branched, on slope	adjacent to proposed s/w, impact to critical root zone expected	remove
45	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	20	4.5	5	good	good	Metal tag #264, branched to grade, dead lower branches	direct conflict with proposed s/w construction	remove
48	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	15	3	5	good	fair	Significant vertical trunk wounds, full crown	direct conflict with proposed s/w construction	remove
49	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	13	3	5	good	good	Full form	direct conflict with proposed s/w construction	remove
51	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
52	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	1.5	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
53	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	1	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
54	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
64	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	58	6	3	poor	hazard	North half of tree torn off, leaving large wound, canopy heavy south, dead wood	Indirect conflict with proposed road construction & hazardous tree condition	remove

TREES RECOMMENDED FOR PRESERVATION (45)

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
1	*Carya cordiformis*	Bitternut Hickory	2085 Oxford St. W	39	7	4	fair	fair	Codominant leaders with included bark and bulging seam, gall through crown, Buckthorn understory, grapevine through bottom third of canopy	none	preserve
2	*Juglans nigra*	Black Walnut	2085 Oxford St. W	8	2.5	5	good	good	Low branched, on slope	none	preserve
3	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	32	5	4	fair	good	Buckthorn understory, grapevine through crown	none	preserve
4	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	19	4	4	good	good	Dense Buckthorn understory, canopy heavy with grapevine	none	preserve
5	*Acer negundo*	Manitoba Maple	2265 Oxford St. W	23, 22	6	4	fair	poor	Multistem 2, supressed, large branch cavities, grapevine, 1 stem bend and lean SW	none	preserve
6	*Juglans nigra*	Black Walnut	2265 Oxford St. W	11	1.5	5	fair	good	Low crown, several Black Walnut saplings nearby	none	preserve
7	*Juniperus spp*	Juniper	2265 Oxford St. W	11	3	4	fair	good	Unbalanced crown, limbed up approx. 2m	none	preserve
8	*Crataegus spp*	Hawthorn	2265 Oxford St. W	~25, 20, 20, 10	7	4	fair	fair	Multistem 4, minor dead wood	none	preserve
9	*Pinus sylvestris*	Scotch Pine	2265 Oxford St. W	15	2.5	1	good	fair	Dead	none	preserve
10	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	~13	3.5	5	fair	good	Low branched, scrubby form, grapevine through crown	adjacent to proposed s/w.	preserve, tree protection barrier
11	*Acer negundo*	Manitoba Maple	2166 Oxford St. W	~70, 55	8	5	poor	poor	Multistem 2, included bark at primary union and seam to base	adjacent to proposed s/w.	preserve, tree protection barrier
12	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	2	4	good	good	Canopy covered in grapevine	adjacent to proposed s/w.	preserve, tree protection barrier
15	*Unknown deciduous tree*	*Unknown deciduous tree*	City ROW Oxford St. W	~15	3	-	fair	fair	Canopy completely covered in grapevine and virginia creeper	none	preserve
16	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	3	5	fair	good	Low branched	none	preserve
19	*Morus alba*	Mulberry	City ROW Oxford St. W	11	3	4	poor	fair	Disfigured form, leader bends and twists, dead wood	none	preserve
23	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Canopy heavy with grapevine	none	preserve
24	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	15	3	5	good	good	Grapevine into lower half of crown	none	preserve
28	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	4	5	good	good	Supressed	no conflict with critical root zone	preserve, tree protection barrier
29	*Morus alba*	Mulberry	City ROW Gideon Dr.	18, 17	7	4	fair	fair	Multistem 2, tight unions, scrubby form, grapevine into crown	no conflict with critical root zone	preserve, tree protection barrier
30	*Juglans nigra*	Black Walnut	2166 Oxford St. W	12	3	5	good	good	Low branched, full form	none	preserve
31	*Juniperus spp*	Juniper	City ROW Gideon Dr.	~30	4	3	good	good	Covered in vines, dense understory	none	preserve
32	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	~15	3	3	good	good	Covered in vines	none	preserve
33	*Gleditsia triacanthos var. inermis*	Honeylocust	44 Gideon Dr.	~40	8	5	good	good	Minor hydro line clearance pruning, otherwise full form	none	preserve
34	*Picea glauca*	White Spruce	36 Gideon Dr.	~15	2	5	good	good	Branched to grade	none	preserve
35	*Juglans nigra*	Black Walnut	36 Gideon Dr.	85, 73	9	5	good	good	Multistem 2, large lovely specimen, supressed on East side, elevated at base, tight unions	none	preserve
36	*Tilia americana*	Basswood	14 Gideon Dr.	26, 18	6	5	good	good	Multistem 2, in wooded area, low branched	none	preserve
37	*Tilia americana*	Basswood	14 Gideon Dr.	19, 15, 9	5	5	good	good	Multistem 3, in wooded area, metal tag #s 200&201	none	preserve
38	*Tilia americana*	Basswood	14 Gideon Dr.	31, 30, 18	5	5	good	fair	Multistem 3, in wooded area, metal tag #277, included bark at primary union	none	preserve
39	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	In wooded area, metal tag #270, low branches, on slope, supressed, grapevine into crown	none	preserve
40	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	19	4.5	5	good	good	Metal tag #269, grapevine into crown, on slope	no conflict with critical root zone	preserve, tree protection barrier
41	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	Metal tag #267, supressed	none	preserve
42	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	25	5	5	good	good	Metal tag #268, minor vines into crown	no conflict with critical root zone	preserve, tree protection barrier
44	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	13, 11, 7	4	5	good	fair	Multistem 3, metal tag #265, included bark at primary union	no conflict with critical root zone	preserve, tree protection barrier
46	*Pinus strobus*	White Pine	14 Gideon Dr.	39	5.5	5	good	good	Metal tag #259, limbed up approx. 4m, Northern edge of loose hedge row	none	preserve
47	*Acer platanoides 'Royal Red'*	Royal Red Norway Maple	14 Gideon Dr.	~60	4.5	5	good	good	Significant prune cuts	none	preserve
50	*Salix spp*	Willow	City ROW Gideon Dr.	48, 11	5	3	poor	poor	Multistem 2, significant dead wood and trunk rot, loose open crown	none	preserve
55	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	26	4	5	good	good	Metal tag #213, thin crown	none	preserve
56	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	42	6.5	5	good	good	Metal tag #212, low branched, large broad crown	none	preserve
57	*Juniperus spp*	Juniper	City ROW Oxford St. W	10	2	5	good	good	Branched to grade	none	preserve
58	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	3	5	good	good	Branched to grade	none	preserve
59	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	2	5	good	good	At fence line	none	preserve
60	*Juglans nigra*	Black Walnut	2012 Oxford St. W	~30	5	5	good	good	Branched to grade	none	preserve
61	*Acer spp*	Maple	2012 Oxford St. W	~30, 30	5	3	poor	poor	Multistem 2, rot at base, significant dead wood	none	preserve
62	*Juglans nigra*	Black Walnut	2012 Oxford St. W	32	6	5	good	good	Under hydro lines	none	preserve
63	*Juglans nigra*	Black Walnut	2012 Oxford St. W	30	6	5	good	good	Metal tag #198, under hydro lines	none	preserve

KEY MAP

RON KOUDYS LANDSCAPE ARCHITECTS INC

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Ronald H. Koudys, O.A.L.A. C.S.L.A. DATE

DATE	DESCRIPTION	No.
2021.09.20	ISSUED FOR REVIEW	1.

PLOTTING INFORMATION:
PLOTTED DATE = 2021.09.20
PLOTTED SCALE = 1:1

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — RONALD H. KOUDYS — OALA — MEMBER

PROJECT TITLE:
OXFORD ST & GIDEON DR INTERSECTION
LONDON, ONTARIO

DRAWING TITLE:
TREE PRESERVATION PLAN 'B'

DATE: AUGUST 2021
SCALE: AS NOTED
DRAWN: RKLA Inc.
CHECKED BY: RHK
PROJECT No. 21-117Lb
DRAWING No. T-2

RON KOUDYS LANDSCAPE ARCHITECTS INC

GIDEON DRIVE & OXFORD STREET WEST INTERSECTION IMPROVEMENTS LONDON ONTARIO

TREE ASSESSMENT REPORT

PREPARED BY:	RON KOUDYS LANDSCAPE ARCHITECTS INC
DATE:	SEPTEMBER 2021
REVISED:	NOVEMBER 2021
RKLA PROJECT #:	21-117

CERTIFIED ARBORIST ISA TM

Michelle Peeters
ON 2129A

MICHELLE PEETERS
LANDSCAPE ARCHITECT
BLA, DIP. HORT. TECH, OALA, ISA CERTIFIED ARBORIST

368 OXFORD STREET EAST, LONDON, ONTARIO, CANADA N6A 1V7 | T: 519-667-3322 | F: 519-645-2474 | E: MAIL@RKLA.CA | W: RKLA.CA

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1.0 Introduction and Executive Summary

1.1 Introduction

Ron Koudys Landscape Architects Inc. (RKLA) was retained RV Anderson Associates Ltd. to conduct a tree inventory and assessment in conjunction with the proposed intersection improvements at Gideon Drive and Oxford Street West in London Ontario. The proposed improvements will include a new round about and associated sidewalks, street lights, etc. This report outlines the expected impacts of the proposed work on trees within or in proximity to the limits of disturbance and makes recommendations for tree removal and preservation based both tree health and construction impacts.

1.2 Executive Summary

The inventory captured 64 individual trees. Trees were identified within the City ROW and on private properties adjacent to the proposed construction. No tree species listed as endangered or threatened under O. Reg. 230/08: Species at Risk in Ontario List under Endangered Species Act, 2007, S.O. 2007, c. 6 were observed during the tree inventory. The construction limits do not conflict with a City of London Tree Protection Area. All trees observed are common and typical of the current land uses.

1.2.1 Tree Species Composition

The following chart outlines the breakdown of tree species included in this inventory.

%	Qty	Common Name
39%	25	Black Walnut
9%	6	Manitoba Maple
8%	5	Juniper
8%	5	Mulberry
6%	4	Trembling Aspen
5%	3	Basswood
5%	3	Bitternut Hickory
3%	2	Cottonwood
3%	2	Freeman Maple

%	Qty	Common Name
2%	1	Hawthorn
2%	1	Honeylocust
2%	1	Maple
2%	1	Royal Red Norway Maple
2%	1	Scotch Pine
2%	1	Unknown deciduous tree
2%	1	White Pine
2%	1	White Spruce
2%	1	Willow
100%	64	Total

1.2.2 Tree Removal and Preservation Recommendation Summary

The following chart summarizes trees recommended for removal and preservation categorized by location/ownership.

	City Right-of-Way		Privately Owned Land		TOTAL
	Quantity	Tree ID #'s	Quantity	Tree ID #'s	
Trees to be removed	20	13, 14, 17, 18, 20, 21, 22, 25, 26, 27, 29, 43, 45, 48, 49, 51, 52, 53, 54 & 64	0		20
Trees to be preserved	19	10, 12, 15, 16, 19, 23, 24, 28, 31, 32, 40, 42, 44, 50, 55, 56, 57, 58 & 59	25	1 - 9, 11, 30, 33 - 39, 41, 46, 47, 60, 61, 62 & 63	44

1.2.3 Tree Removal and Preservation Recommendations.

1. 20 trees are recommended for removal from the City ROW due to conflict with the proposed road construction.
2. Tree preservation fencing is to be installed as noted on the tree preservation drawings and as per the tree preservation barrier detail.
3. Follow the pre-construction, construction process, and post construction recommendations listed in this report.
4. Follow all City of London tree protection guidelines and by-laws.

2.0 Scope of Inventory

Trees and woody vegetation (shrubs) within the City ROW of Oxford Street West and Gideon Drive and approximately 3m beyond the ROW were included in the inventory and assessment. See Figure 1 for scope of inventory.

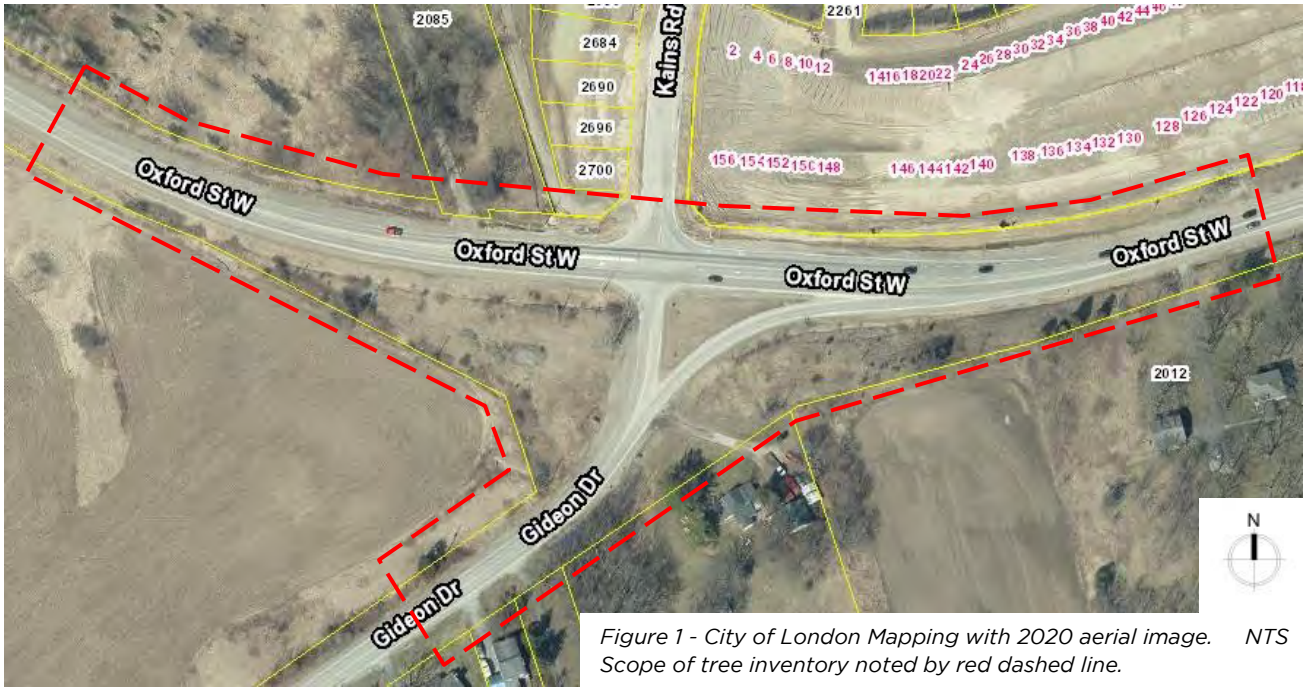


Figure 1 - City of London Mapping with 2020 aerial image. NTS
Scope of tree inventory noted by red dashed line.

3.0 Methodology

Field work was completed on August 12, 2021 by RKLA staff member Michelle Peeters, ISA certified arborist ON 2129A. A topographic survey supplied by RV Anderson was used as a base for the field work. Trees within the given scope with a diameter at breast height (DBH) of ≥10cm were identified and assessed as individuals. Significant hedges or groups of immature trees were not assessed, but their locations are noted on the tree preservation drawing. Trees were NOT tagged in the field. Each tree was assigned a number which are identified on the tree data table and on the tree preservation drawings. Individual tree identification numbers include 1 - 64 - refer to section 4.1 of this report.

The following information was recorded for each individual tree:

- Genus + specific epithet (tree species)
- Diameter at breast height (DBH) (centimetres)
- Crown radius (metres)
- Crown Condition (overall general vigour of crown)
- Structural Form (excellent, good, fair, poor)
- Structural Condition (good, fair, poor, hazard)
- General Comments

Field work was conducted again on November 20, 2021 to observe and tally existing trees and woody vegetation with a DBH of less than 10cm within the scope of inventory. This group of plant material is not graphically included on the tree preservation drawings. The tally was prepared to provide a more complete understanding of the existing woody plant material on site to inform future restoration efforts. A list of this plant material is included in section 4.2 of this report.

3.1 Health Assessment

Trees were assessed following accepted arboricultural techniques and best practices using a limited visual inspection. The inspection included a 360 degree (where possible) visual examination of the above-ground parts of each tree for structural defects including cavities, wounds, scars, external indicators of internal decay, evidence of insect presence, discoloured or deformed foliage, canopy and root distribution, and the overall condition of the tree. Evaluation of tree health was based on visible tree health indicators including live buds, foliage condition, deadwood, structural defects, form, and signs of disease or insect infestation. Field observations were reviewed against available online imagery of the trees to assist in determining tree canopy health. Quantified health assessments included in the inventory are explained here:

Crown Condition Assessment

5 Healthy: less than 10% crown decline
4 Slight decline: 11% - 30% crown decline
3 Moderate decline: 31% - 60% crown decline
2 Severe decline: 61% - 90% crown decline
1 Dead - No visible indication of living foliage or buds in crown

Structural Form Assessment

Excellent: An ideal expression of a specific tree species, true to form, balanced canopy, good flare, typical internode length, full crown, etc.

Good: A satisfactory and generally expected expression of a specific tree species, with only minor or typical variances from an ideal form.

Fair: Nearly satisfactory, with defects or a combination of defects such as codominant leaders, unbalanced crown, poor/no flare, shortened internodes, has been poorly pruned, etc.

Poor: Significantly flawed expression of a specific tree species

Structural Integrity Assessment

Good: Defects if present are minor (e.g. twig dieback, small wounds); defective tree part is small (e.g. 5-8 cm diameter limb) providing little, if any risk.

Fair: Defects are numerous or significant (e.g. dead scaffold limbs); defective parts are moderate in size (e.g. limb greater than 5-8 cm in diameter).

Poor: Defects are severe (trunk cavity in excess of 50%); defective parts are large (e.g. majority of crown).

Hazard: Defects are severe and acute; defective part or collective defective parts render the tree a high risk threat to potential targets.

3.2 Critical Root Zones and Tree Preservation Barriers

The critical root zone of a tree is the portion of the root system that is the minimum necessary to maintain tree vitality and stability. Critical root zones are commonly prescribed by municipal bylaws based solely on DBH and/or drip line, and are typically expressed as a circular shape around the tree. There are a number of other factors, however, that should be considered when establishing a critical root zone, particularly in a streetscape setting where there are physical barriers such as sidewalks and curbs that have shaped and limited typical root development patterns.

Factors that inform location and extent of a tree preservation barriers to protect the critical root zone include: species tolerance to root loss and other construction impacts (as established by authoritative resources and professional experience), tree trunk size (DBH), tree health and vigour, structural condition, landscape context, soil type, moisture availability, topography, ground cover, crown size and balance (drip line), current physical root restrictions, visible root arrangement, relationship to neighbouring trees, relationship between tree and proposed construction, type of proposed construction, etc.

Critical root zones will be protected in the field with tree preservation barriers.

4.0 Tree Inventory Data and Recommendations

The following recommendations are based on a combination of tree species tree health/condition and requirements of the proposed street reconstruction.

4.1 Assessed Tree Data Table

Grey indicates recommended removal.

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
1	*Carya cordiformis*	Bitternut Hickory	2085 Oxford St. W	89	7	4	fair	fair	Codominant leaders with included bark and bulging seam, gall through crown, Buckthorn understory, grapevine through bottom third of canopy	none	preserve
2	*Juglans*	Black	2085 Oxford St.	8	2.5	5	good	good	Low branched, on slope	none	preserve

	nigra	Walnut	W								
3	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	32	5	4	fair	good	Buckthorn understory, grapevine through crown	none	preserve
4	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	19	4	4	good	good	Dense Buckthorn understory, canopy heavy with grapevine	none	preserve
5	*Acer negundo*	Manitoba Maple	2265 Oxford St. W	23, 22	6	4	fair	poor	Multistem 2, supressed, large branch cavities, grapevine, 1 stem bend and lean SW	none	preserve
6	*Juglans nigra*	Black Walnut	2265 Oxford St. W	11	1.5	5	fair	good	Low crown, several Black Walnut saplings nearby	none	preserve
7	*Juniperus spp*	Juniper	2265 Oxford St. W	11	3	4	fair	good	Unbalanced crown, limbed up approx. 2m	none	preserve
8	*Crataegus spp*	Hawthorn	2265 Oxford St. W	~25, 20, 20, 10	7	4	fair	fair	Multistem 4, minor dead wood	none	preserve
9	*Pinus sylvestris*	Scotch Pine	2265 Oxford St. W	15	2.5	1	good	fair	Dead	none	preserve
10	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	~13	3.5	5	fair	good	Low branched, scrubby form, grapevine through crown	none	preserve, tree protection barrier
11	*Acer negundo*	Manitoba Maple	2166 Oxford St. W	~70, 65	8	5	poor	poor	Multistem 2, included bark at primary union and seam to base	none	preserve, tree protection barrier
12	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	2	4	good	good	Canopy covered in grapevine	none	preserve, tree protection barrier
13	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 9, 6	2.5	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
14	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 5, 4	2	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
15	*Carya cordiformis*	*Bitternut Hickory*	City ROW Oxford St. W	~15	3	4	fair	fair	Canopy completely covered in grapevine and virginia creeper	none	preserve
16	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	3	5	fair	good	Low branched	none	preserve
17	*Morus alba*	Mulberry	City ROW Oxford St. W	19	4	5	fair	fair	Included bark at primary union, oozing seam, squat form	direct conflict with proposed road construction	remove
18	*Morus alba*	Mulberry	City ROW Oxford St. W	20	4	4	fair	fair	Dead lower branches, squat form	direct conflict with proposed road construction	remove
19	*Morus alba*	Mulberry	City ROW Oxford St. W	11	3	4	poor	fair	Disfigured form, leader bends and twists, dead wood	none	preserve
20	*Morus alba*	Mulberry	City ROW Oxford St. W	8, 8, 7	3	5	fair	fair	Multistem 3, primary union at grade, dead lower branches	direct conflict with proposed road construction	remove
21	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	42	6	5	good	good	Low branched	direct conflict with proposed road construction	remove
22	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	46, 35	6	5	fair	fair	Multistem 2, included bark and seam at primary union, low branched	direct conflict with proposed road construction	remove
23	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Canopy heavy with grapevine	none	preserve
24	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	15	3	5	good	good	Grapevine into lower half of crown	none	preserve
25	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	3	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed s/w construction	remove
26	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	12	2	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed s/w construction	remove

27	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Supressed	direct conflict with proposed s/w construction	remove
28	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	4	5	good	good	Supressed	no conflict with critical root zone	preserve, tree protection barrier
29	*Morus alba*	Mulberry	City ROW Gideon Dr.	18, 17	7	4	fair	fair	Multistem 2, tight unions, scrubby form, grapevine into crown	direct conflict with proposed s/w construction	remove
30	*Juglans nigra*	Black Walnut	2166 Oxford St. W	12	3	5	good	good	Low branched, full form	none	preserve
31	*Juniperus spp*	Juniper	City ROW Gideon Dr.	~30	4	3	good	good	Covered in vines, dense understory	none	preserve
32	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	~15	3	3	good	good	Covered in vines	none	preserve
33	*Gleditsia triacanthos var. inermis*	Honeylocust	44 Gideon Dr.	~40	8	5	good	good	Minor hydro line clearance pruning, otherwise full form	none	preserve
34	*Picea glauca*	White Spruce	36 Gideon Dr.	~15	2	5	good	good	Branched to grade	none	preserve
35	*Juglans nigra*	Black Walnut	36 Gideon Dr.	85, 79	9	5	good	good	Multistem 2, large lovely specimen, supressed on East side, elevated at base, tight unions	none	preserve
36	*Tilia americana*	Basswood	14 Gideon Dr.	26, 18	6	5	good	good	Multistem 2, in wooded area, low branched	minor impact adjacent to critical root zone	preserve, tree protection barrier
37	*Tilia americana*	Basswood	14 Gideon Dr.	19, 13, 9	5	5	good	good	Multistem 3, in wooded area, metal tag #s 200 &201	minor impact adjacent to critical root zone	preserve, tree protection barrier
38	*Tilia americana*	Basswood	14 Gideon Dr.	31, 30, 13	5	5	good	fair	Multistem 3, in wooded area, metal tag #277, included bark at primary union	minor impact adjacent to critical root zone	preserve, tree protection barrier
39	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	In wooded area, metal tag #270, low branches, on slope, supressed, grapevine into crown	minor impact adjacent to critical root zone	preserve, tree protection barrier
40	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	19	4.5	5	good	good	Metal tag #269, grapevine into crown, on slope	minor impact adjacent to critical root zone	preserve, tree protection barrier
41	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	Metal tag #267, supressed	minor impact adjacent to critical root zone	preserve, tree protection barrier
42	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	25	5	5	good	good	Metal tag #268, minor vines into crown	minor impact adjacent to critical root zone	preserve, tree protection barrier
43	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	32	5	5	good	good	Metal tag #266, low branched, on slope	adjacent to proposed s/w, impact to critical root zone expected	remove
44	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	13, 11, 7	4	5	good	fair	Multistem 3, metal tag #265, included bark at primary union	no conflict with critical root zone	preserve, tree protection barrier
45	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	20	4.5	5	good	good	Metal tag #264, branched to grade, dead lower branches	direct conflict with proposed s/w construction	remove
46	*Pinus strobus*	White Pine	14 Gideon Dr.	39	5.5	5	good	good	Metal tag #259, limbed up approx. 4m, Northern edge of loose hedge row	none	preserve
47	*Acer platanoides 'Royal Red'*	Royal Red Norway Maple	14 Gideon Dr.	~60	4.5	5	good	good	Significant prune cuts	none	preserve
48	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	15	3	5	good	fair	Significant vertical trunk wounds, full crown	direct conflict with proposed s/w construction	remove
49	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	13	3	5	good	good	Full form	direct conflict with proposed s/w construction	remove

50	*Salix spp*	Willow	City ROW Gideon Dr.	48, 11	5	3	poor	poor	Multistem 2, significant dead wood and trunk rot, loose open crown	none	preserve
51	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
52	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	1.5	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
53	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	1	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
54	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
55	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	26	4	5	good	good	Metal tag #213, thin crown	none	preserve
56	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	42	6.5	5	good	good	Metal tag #212, low branched, large broad crown	none	preserve
57	*Juniperus spp*	Juniper	City ROW Oxford St. W	10	2	5	good	good	Branched to grade	none	preserve
58	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	3	5	good	good	Branched to grade	none	preserve
59	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	2	5	good	good	At fence line	none	preserve
60	*Juglans nigra*	Black Walnut	2012 Oxford St. W	~30	5	5	good	good	Branched to grade	none	preserve
61	*Acer spp*	Maple	2012 Oxford St. W	~30, 30	5	3	poor	poor	Multistem 2, rot at base, significant dead wood	none	preserve
62	*Juglans nigra*	Black Walnut	2012 Oxford St. W	32	6	5	good	good	Under hydro lines	none	preserve
63	*Juglans nigra*	Black Walnut	2012 Oxford St. W	30	6	5	good	good	Metal tag #198, under hydro lines	none	preserve
64	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	58	6	3	poor	hazard	North half of tree torn off, leaving large wound, canopy heavy south, dead wood	Indirect conflict with proposed road construction & hazardous tree condition	remove

4.1 SHRUBS & TREES WITH DBH <10CM

The following list of woody plant material was observed within the scope of inventory. This plant material may or may not be impacted by the proposed road reconstruction.

OBSERVED SHRUBS AND TREES WITH DBH <10cm LOCATIONS NOT NOTED ON THE TREE PRESERVATION DRAWINGS						
BOTANICAL NAME	COMMON NAME	APPROX. QUANTITY OBSERVED WITHIN SCOPE OF INVENTORY		BOTANICAL NAME	COMMON NAME	APPROX. QUANTITY OBSERVED WITHIN SCOPE OF INVENTORY
Acer negundo	Manitoba Maple	1		*Pinus sylvestris*	Scotch Pine	1
Cornus alternifolia	Pagoda Dogwood	1		*Populus tremuloides*	Trembling Aspen	4
Cornus racemosa	Gray Dogwood	2 colonies		*Prunus spp*	Cherry	1
Cornus sericea	Red Osier Dogwood	1 colony		*Pyrus spp*	Pear	3
Elaeagnus umbellata	Autumn Olive	25		*Rhamnus spp*	Buckthorn	22
Juglans nigra	Black Walnut	26		*Rhus typhina*	Staghorn Sumac	3 colonies
Juniperus spp	Juniper	80		*Rubus spp*	Raspberry	1 colony
Malus spp	Apple	1		*Salix spp*	Willow	2
				Ulmus pumila	Siberian Elm	6

5.0 Potential Construction Impacts on Trees

Trees that are not in conflict with the proposed construction have been recommended for preservation. Trees to be preserved may be affected by the construction process or by the construction itself. It is imperative that the design team and the construction crew understand the potential for, and the causes of tree damage. Trees recommended for preservation may experience some or all of the following potential construction impacts. Strategies and methods to avoid these impacts are outlined in the Construction Impact Mitigation Recommendations section of this report.

5.1 Soil Compaction

Soil compaction is caused by heavy or repeated compression or vibration of the soil around the tree. Soil compaction reduces the amount and size of macro and micro pore space that is vital for subsurface movement of air and water. The harmful effects of soil compaction include, but are not limited to: slower water infiltration, poor aeration, reduced root growth and an overall increased susceptibility to biotic and abiotic stressors.

5.2 Root Loss

Root loss occurs when roots are severed. The majority of roots are typically located within the top 60cm of soil and can extend outward up to three times the extent of the tree drip line. Excavation of any kind within the critical root zone* can sever roots. Two categories of roots need to be considered when evaluating impacts of root loss - small, fibrous absorbing roots, and large structural roots. Significant loss of either or both of these functions can cause stress and/or affect the structural stability of the tree. Note, however, that it is commonly accepted that healthy trees can typically tolerate and recover from the removal of approximately 33% (up to a maximum of 50%) of their root mass. Thorough consideration regarding extent of acceptable root removal is dependent on individual species characteristics, root loss distribution, and site specific conditions *(ref. Trees and Development: A Technical Guide to Preservation of Trees During Land Development by Nelda Matheny and James R. Clark, 1998. Pg 72)*.

* Refer to 'Critical Root Zones and Tree Preservation Barriers" in this report for definition.

5.3 Grade Changes

Lowering of the grade around trees has immediate and long term effects on trees. Lowering of grade requires immediate root loss from cutting the roots which results in water stress from the root removal and potential reduced structural stability.

Raising the grade around a tree can be equally damaging. The addition of fill over the root zone of a tree alters the roots' ability for normal water and gas exchange that is necessary for healthy root growth and stability. Fill essentially suffocates the roots and can lead to the slow and eventual decline of the tree.

5.4 Mechanical Damage

Mechanical damage is caused by physical contact with a tree that damages the tree to any degree. During land development and construction activities, there is an increased risk of both minor and fatal mechanical damage to trees from construction equipment. Minor damage can create entry points for insects and pathogens, and fatal damage can cause irreparable structural damage.

5.5 Changes to Exposure - Sun and Wind

Trees can be negatively affected by increased exposure to sun or wind when neighbouring trees are removed. This can be of particular concern when 'interior trees' (trees that have developed surrounded by other trees) are suddenly exposed to forest edge conditions. These trees may experience higher intensity of direct sunlight resulting in leaf scald, and instability due to increased wind and snow loads.

Trees can be negatively affected by decreased exposure to sunlight. Proposed development that includes tall buildings located to the south and west of mature existing trees can greatly reduce the amount of daily direct sunlight. While this change in environment may not cause the immediate or eventual death of a tree, it can certainly slow development and alter growing habits and patterns, and must therefore be a consideration when evaluating trees for potential preservation.

5.6 Soil Contamination

Soil health around a tree can be compromised by contamination from spills or leaks of fuels, solvents, or other construction related fluids.

5.7 Water Availability

Grading and servicing requirements for development can affect water availability for trees. Trees may experience a loss of available water due to a lowered water table or the capture or redirection of subsurface and/or overland flow. Conversely, trees may experience an increase of available water due to changes in site grading and storm water retention efforts.

The successful survival of the trees to be preserved is largely dependent on adhering to the construction impact mitigation recommendations that follow.

6.0 Construction Impact Mitigation Recommendations

The following recommendations are provided to guide the removal process, mitigate construction impacts, and ensure compliance with provincial, federal, and municipal regulatory requirements. Some of the recommendations listed below are noted to be undertaken by an ISA certified arborist.

6.1 Pre-construction recommendations

a) Prior to any construction activity, tree preservation fencing is to be installed as per the attached tree preservation drawings and details and to be reviewed/accepted by the consulting arborist PRIOR to the commencement of construction.
b) Trees to be removed must be clearly marked via spray paint or other agreed upon method prior to removal. Tree marking can be completed by project arborist, City of London construction administrator, or approved appointee.
c) In accordance with the Migratory Birds Convention Act, 1994, all removals must take place between September 1st and March 31st to avoid disturbing nesting migratory birds. If tree removal occurs between April 1st and August 31st, a biologist is required to complete a search for nests. Once cleared, the contractor has 48 hours to remove. If removal does not occur within 48 hours, another search will be required.
d) Care should be taken during the felling operation to avoid damaging the branches, stems, trunks, and roots of nearby trees to be preserved. Where possible, all trees are to be felled towards the construction zone to minimize impacts on adjacent vegetation. All removals to be undertaken by an ISA certified arborist.
e) Final site grading plans should ensure that the existing soil moisture conditions are maintained.

6.2 Recommendations related to the construction process

a) Tree preservation fencing is to be maintained in good condition and effective for the duration of construction until all construction activity is complete or as per the project arborist or contract administrator.
b) Tree preservation fencing is to remain intact as per the tree preservation drawings. Should tree preservation fencing need to be temporarily relocated or moved to facilitate construction, the project arborist and City of London Forestry Operations are to be immediately informed. Fencing is to be reinstated as per the tree preservation plans as soon as possible.
c) No construction, excavation, adding of fill, stockpiling of construction material, or heavy equipment is permitted within the tree protection zone.
d) When excavation near a tree is required, and it is anticipated that roots will be severed and exposed, duration of exposure is to be minimized to prevent root desiccation.
e) During the excavation process, roots 25mm or larger that are severed and exposed should be hand pruned to leave a clean-cut surface. To be undertaken by an ISA certified arborist. Exposed severed roots that cannot be covered in soil on the same day as the cuts are made are to be kept moist.

Exposed roots are to be kept moist by covering them with water soaked burlap or any other means available to prevent them from drying out. Adequate moisture levels are to be maintained until such time as topsoil has been replaced satisfactorily or as otherwise directed by the contract administrator.

f) Avoid idling heavy equipment under or within close proximity to trees to be preserved to prevent canopy damage from exposure to the heat of the exhaust.
g) Should branches on City owned trees be damaged by or during construction, the contractor is to notify City of London Forestry Operations as soon as possible. No person(s) other than City staff or the City's designated contractor may perform work on any City tree.
h) Open trenching within a critical root zone is prohibited. Alternative excavation methods such as horizontal boring and vacuum excavation are required where proposed services or installation requirements conflict with critical root zones.
i) The existing ground-layer vegetation at the base of trees MUST remain intact within the critical root zone so as not to disturb the soil around the base of the existing trees. This includes the practice of NOT replacing existing turf with new sod. A heavy application of seed in these instances is preferred.
j) Regular communication with the site supervisor and regular monitoring of the site by the project arborist or landscape architect is recommended to ensure proper procedures are followed and protection barriers are maintained.
It is the responsibility of the site supervisor to promptly contact the project arborist if any concerns or questions arise regarding trees.

6.3 Post-construction recommendations

a) Avoid discharging rain water leaders adjacent to retained trees, as this may result in an overly moist environment which can cause root rot.
b) After all work is completed, tree preservation fences and any other impact mitigation paraphernalia must be removed under the direction of the consulting arborist or construction administrator.
c) A final review must be undertaken by the project arborist to ensure that all mitigation measures as described above have been met.
d) Post construction monitoring of trees may be required. Monitoring schedule to be determined with design team and City consensus.

7.0 City of London Tree Protection By-laws & Specifications

Note that this project is located in the City of London. It follows therefore, that all applicable City of London rules, regulations, and by laws are to be respected. The City of London has several by-laws and specifications related to trees that must be understood and followed by the design team, the contractor, and all sub-contractors working on projects within the City.

All project parties to be aware of and familiar with the following City of London documents in their entirety and potential penalties noted therein for noncompliance:

8.0 DISCLAIMER

The assessment of the trees presented within this report has been made using accepted arboricultural techniques. These include a visual examination of the above-ground parts of each tree for structural defects, scars, external indications of decay, evidence of insect presence, discoloured foliage, the general condition of the trees and the surrounding site, as well as the proximity of property and people. None of the trees examined were dissected, cored, probed, or climbed, and detailed root crown examinations involving excavation were not undertaken.

Notwithstanding the recommendations and conclusions made in this report, it must be realized that trees are living organisms and their health and vigour is constantly changing. They are not immune to changes in site conditions or seasonal variations in the weather.

While reasonable efforts have been made to ensure the trees recommended for retention are healthy, no guarantees are offered or implied, that these trees or any part of them will remain standing.

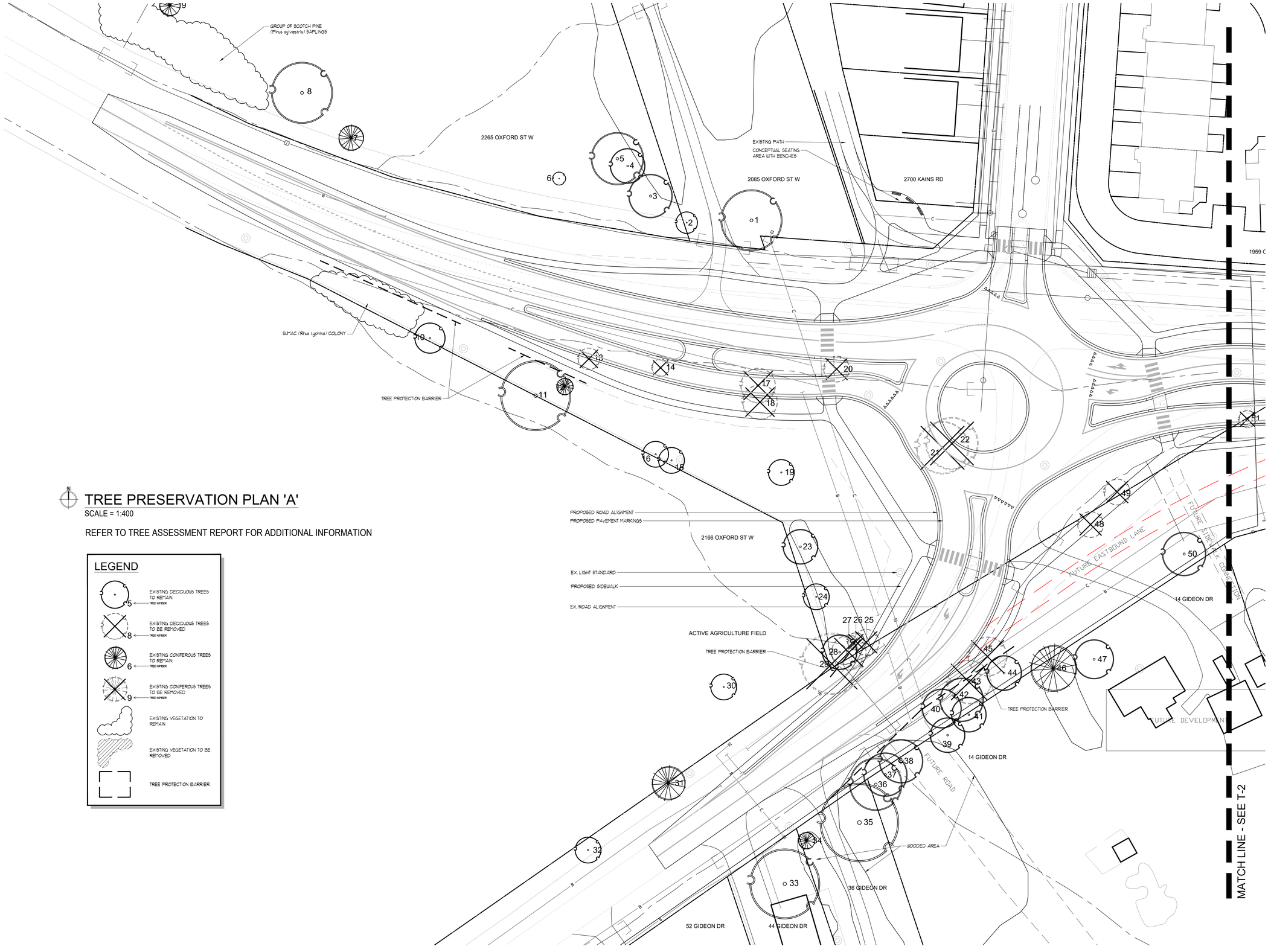
Note that this arborist report has been prepared using the latest drawings and information provided by the client. Any subsequent design or site plan changes affecting trees may require revisions to this report. Any new information or drawings are to be provided to RKLA prior to report submission to planning authorities.

9.0 CONTACT INFORMATION

Office:
Ron Koudys Landscape Architects Inc.
368 Oxford Street East
London, Ontario
N6A 1V7
Ph: 519-667-3322
Fax: 519-645-2474

Staff:
Field work and report author
Michelle Peeters - michelle@rkla.ca
Qualifications ISA Certified Arborist ON-2129A
ISA Tree Risk Assessment Qualified
Qualified Butternut Health Assessor BHA #710
OALA full member - landscape architect

10.0 Appendix A - Tree Preservation Drawings



TREE PRESERVATION PLAN 'A'

SCALE = 1:400

REFER TO TREE ASSESSMENT REPORT FOR ADDITIONAL INFORMATION

LEGEND

- EXISTING DECIDUOUS TREES TO REMAIN (TREE NUMBER)
- EXISTING DECIDUOUS TREES TO BE REMOVED (TREE NUMBER)
- EXISTING CONIFEROUS TREES TO REMAIN (TREE NUMBER)
- EXISTING CONIFEROUS TREES TO BE REMOVED (TREE NUMBER)
- EXISTING VEGETATION TO REMAIN
- EXISTING VEGETATION TO BE REMOVED
- TREE PROTECTION BARRIER

KEY MAP

RON KOUDYS LANDSCAPE ARCHITECTS INC

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THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION OR TENDER PURPOSES UNLESS SIGNED AND DATED BY RONALD H. KOUDYS, OALA, CSLA, LANDSCAPE ARCHITECT, LONDON, ONTARIO (519) 667-3322.

Ronald H. Koudys, O.A.L.A. C.S.L.A. DATE

2021.11.26	ISSUED FOR 100% SUBMISSION	4.
2021.11.24	ISSUED FOR REVIEW	3.
2021.09.07	ISSUED FOR REVIEW	2.
2021.09.20	ISSUED FOR REVIEW	1.
DATE	DESCRIPTION	No.

PLOTTING INFORMATION:
PLOTTED DATE = 2021.11.26
PLOTTED SCALE = 1:1

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — RONALD H. KOUDYS — OALA — MEMBER

PROJECT TITLE:
OXFORD ST & GIDEON DR INTERSECTION
LONDON, ONTARIO

DRAWING TITLE:
TREE PRESERVATION PLAN 'A'

DATE: AUGUST 2021	SCALE: AS NOTED	DRAWING No. T-1
DRAWN: RKLA Inc.	CHECKED BY: R.H.K.	
PROJECT No. 21-117Le		

TREE PRESERVATION PLAN 'B'

SCALE = 1:400

LEGEND

- EXISTING DECIDUOUS TREES TO REMAIN (5 ← TREE NUMBER)
- EXISTING DECIDUOUS TREES TO BE REMOVED (8 ← TREE NUMBER)
- EXISTING CONIFEROUS TREES TO REMAIN (6 ← TREE NUMBER)
- EXISTING CONIFEROUS TREES TO BE REMOVED (9 ← TREE NUMBER)
- EXISTING VEGETATION TO REMAIN
- EXISTING VEGETATION TO BE REMOVED
- TREE PROTECTION BARRIER

CONSTRUCTION IMPACT MITIGATION RECOMMENDATIONS

PRE-CONSTRUCTION RECOMMENDATIONS

a) PRIOR TO ANY CONSTRUCTION ACTIVITY, TREE PRESERVATION FENCING IS TO BE INSTALLED AS PER THE ATTACHED TREE PRESERVATION DRAWINGS AND DETAILS AND TO BE REVIEWED/ACCEPTED BY THE CONSULTING ARBORIST PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.

b) TREES TO BE REMOVED MUST BE CLEARLY MARKED VIA SPRAY PAINT OR OTHER AGREED UPON METHOD PRIOR TO REMOVAL. TREE MARKING CAN BE COMPLETED BY PROJECT ARBORIST, CITY OF LONDON CONSTRUCTION ADMINISTRATOR, OR APPROVED APPOINTEE.

c) IN ACCORDANCE WITH THE MIGRATORY BIRDS CONVENTION ACT, 1994, ALL REMOVALS MUST TAKE PLACE BETWEEN SEPTEMBER 1ST AND MARCH 31ST TO AVOID DISTURBING NESTING MIGRATORY BIRDS. IF TREE REMOVAL OCCURS BETWEEN APRIL 1ST AND AUGUST 31ST, A BIOLOGIST IS REQUIRED TO COMPLETE A SEARCH FOR NESTS. ONCE CLEARED, THE CONTRACTOR HAS 48 HOURS TO REMOVE. IF REMOVAL DOES NOT OCCUR WITHIN 48 HOURS, ANOTHER SEARCH WILL BE REQUIRED.

d) CARE SHOULD BE TAKEN DURING THE FELLING OPERATION TO AVOID DAMAGING THE BRANCHES, STEMS, TRUNKS, AND ROOTS OF NEARBY TREES TO BE PRESERVED. WHERE POSSIBLE, ALL TREES ARE TO BE FELLED TOWARDS THE CONSTRUCTION ZONE TO MINIMIZE IMPACTS ON ADJACENT VEGETATION. ALL REMOVALS TO BE UNDERTAKEN BY AN ISA CERTIFIED ARBORIST.

e) FINAL SITE GRADING PLANS SHOULD ENSURE THAT THE EXISTING SOIL MOISTURE CONDITIONS ARE MAINTAINED.

RECOMMENDATIONS RELATED TO THE CONSTRUCTION PROCESS

a) TREE PRESERVATION FENCING IS TO BE MAINTAINED IN GOOD CONDITION AND EFFECTIVE FOR THE DURATION OF CONSTRUCTION UNTIL ALL CONSTRUCTION ACTIVITY IS COMPLETE OR AS PER THE PROJECT ARBORIST OR CONTRACT ADMINISTRATOR.

b) TREE PRESERVATION FENCING IS TO REMAIN INTACT AS PER THE TREE PRESERVATION DRAWINGS. SHOULD TREE PRESERVATION FENCING NEED TO BE TEMPORARILY RELOCATED OR MOVED TO FACILITATE CONSTRUCTION, THE PROJECT ARBORIST AND CITY OF LONDON FORESTRY OPERATIONS ARE TO BE IMMEDIATELY INFORMED. FENCING IS TO BE REINSTATED AS PER THE TREE PRESERVATION PLANS AS SOON AS POSSIBLE.

c) NO CONSTRUCTION, EXCAVATION, ADDING OF FILL, STOCKPILING OF CONSTRUCTION MATERIAL, OR HEAVY EQUIPMENT IS PERMITTED WITHIN THE TREE PROTECTION ZONE.

d) WHEN EXCAVATION NEAR A TREE IS REQUIRED, AND IT IS ANTICIPATED THAT ROOTS WILL BE SEVERED AND EXPOSED, DURATION OF EXPOSURE IS TO BE MINIMIZED TO PREVENT ROOT DESICCATION.

e) DURING THE EXCAVATION PROCESS, ROOTS 25MM OR LARGER THAT ARE SEVERED AND EXPOSED SHOULD BE HAND PRUNED TO LEAVE A CLEAN-CUT SURFACE. TO BE UNDERTAKEN BY AN ISA CERTIFIED ARBORIST. EXPOSED SEVERED ROOTS THAT CANNOT BE COVERED IN SOIL ON THE SAME DAY AS THE CUTS ARE MADE ARE TO BE KEPT MOIST. EXPOSED ROOTS ARE TO BE KEPT MOIST BY COVERING THEM WITH WATER SOAKED BURLAP OR ANY OTHER MEANS AVAILABLE TO PREVENT THEM FROM DRYING OUT. ADEQUATE MOISTURE LEVELS ARE TO BE MAINTAINED UNTIL SUCH TIME AS TOPSOIL HAS BEEN REPLACED SATISFACTORILY OR AS OTHERWISE DIRECTED BY THE CONTRACT ADMINISTRATOR.

f) AVOID IDLING HEAVY EQUIPMENT UNDER OR WITHIN CLOSE PROXIMITY TO TREES TO BE PRESERVED TO PREVENT CANOPY DAMAGE FROM EXPOSURE TO THE HEAT OF THE EXHAUST.

g) SHOULD BRANCHES ON CITY OWNED TREES BE DAMAGED BY OR DURING CONSTRUCTION, THE CONTRACTOR IS TO NOTIFY CITY OF LONDON FORESTRY OPERATIONS AS SOON AS POSSIBLE. NO PERSON(S) OTHER THAN CITY STAFF OR THE CITY'S DESIGNATED CONTRACTOR MAY PERFORM WORK ON ANY CITY TREE.

h) OPEN TRENCHING WITHIN A CRITICAL ROOT ZONE IS PROHIBITED. ALTERNATIVE EXCAVATION METHODS SUCH AS HORIZONTAL BORING AND VACUUM EXCAVATION ARE REQUIRED WHERE PROPOSED SERVICES OR INSTALLATION REQUIREMENTS CONFLICT WITH CRITICAL ROOT ZONES.

i) THE EXISTING GROUND-LAYER VEGETATION AT THE BASE OF TREES MUST REMAIN INTACT WITHIN THE CRITICAL ROOT ZONE SO AS NOT TO DISTURB THE SOIL AROUND THE BASE OF THE EXISTING TREES. THIS INCLUDES THE PRACTICE OF NOT REPLACING EXISTING TURF WITH NEW SOD. A HEAVY APPLICATION OF SEED IN THESE INSTANCES IS PREFERRED.

j) REGULAR COMMUNICATION WITH THE SITE SUPERVISOR AND REGULAR MONITORING OF THE SITE BY THE PROJECT ARBORIST OR LANDSCAPE ARCHITECT IS RECOMMENDED TO ENSURE PROPER PROCEDURES ARE FOLLOWED AND PROTECTION BARRIERS ARE MAINTAINED.

IT IS THE RESPONSIBILITY OF THE SITE SUPERVISOR TO PROMPTLY CONTACT THE PROJECT ARBORIST IF ANY CONCERNS OR QUESTIONS ARISE REGARDING TREES.

POST-CONSTRUCTION RECOMMENDATIONS

a) AVOID DISCHARGING RAIN WATER LEADERS ADJACENT TO RETAINED TREES, AS THIS MAY RESULT IN AN OVERLY MOIST ENVIRONMENT WHICH CAN CAUSE ROOT ROT.

b) AFTER ALL WORK IS COMPLETED, TREE PRESERVATION FENCES AND ANY OTHER IMPACT MITIGATION PARAPHERNALIA MUST BE REMOVED UNDER THE DIRECTION OF THE CONSULTING ARBORIST OR CONSTRUCTION ADMINISTRATOR.

c) A FINAL REVIEW MUST BE UNDERTAKEN BY THE PROJECT ARBORIST TO ENSURE THAT ALL MITIGATION MEASURES AS DESCRIBED ABOVE HAVE BEEN MET.

d) POST CONSTRUCTION MONITORING OF TREES MAY BE REQUIRED. MONITORING SCHEDULE TO BE DETERMINED WITH DESIGN TEAM AND CITY CONSENSUS.

REFER TO TREE ASSESSMENT REPORT FOR ADDITIONAL INFORMATION

TREES RECOMMENDED FOR REMOVAL (20)

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
13	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 9, 6	2.5	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
14	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	10, 5, 4	2	5	fair	fair	Multistem 3, scrubby form	direct conflict with proposed road construction	remove
17	*Morus alba*	Mulberry	City ROW Oxford St. W	19	4	5	fair	fair	Included bark at primary union, oozing seam, squat form	direct conflict with proposed road construction	remove
18	*Morus alba*	Mulberry	City ROW Oxford St. W	20	4	4	fair	fair	Dead lower branches, squat form	direct conflict with proposed road construction	remove
20	*Morus alba*	Mulberry	City ROW Oxford St. W	8, 8, 7	5	5	fair	fair	Multistem 5, primary union at grade, dead lower branches	direct conflict with proposed road construction	remove
21	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	42	6	5	good	good	Low branched	direct conflict with proposed road construction	remove
22	*Populus deltoides*	Cottonwood	City ROW Gideon Dr.	46, 35	6	5	fair	fair	Multistem 2, included bark and seam at primary union, low branched	direct conflict with proposed road construction	remove
25	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	3	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed s/w construction	remove
26	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	12	2	5	good	good	Low branched, grapevine into lower half of crown	direct conflict with proposed s/w construction	remove
27	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Supressed	direct conflict with proposed s/w construction	remove
29	*Morus alba*	Mulberry	City ROW Gideon Dr.	18, 17	7	4	fair	fair	Multistem 2, tight unions, scrubby form, grapevine into crown	direct conflict with proposed s/w construction	remove
43	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	32	5	5	good	good	Metal tag #266, low branched, on slope	adjacent to proposed s/w. impact to critical root zone expected	remove
45	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	20	4.5	5	good	good	Metal tag #264, branched to grade, dead lower branches	direct conflict with proposed s/w construction	remove
48	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	15	5	5	good	fair	Significant vertical trunk wounds, full crown	direct conflict with proposed s/w construction	remove
49	*Acer x freemanii*	Freeman Maple	City ROW Gideon Dr.	13	3	5	good	good	Full form	direct conflict with proposed s/w construction	remove
51	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
52	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	1.5	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
53	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	10	1	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
54	*Populus tremuloides*	Trembling Aspen	City ROW Oxford St. W	12	2	5	good	good	Low branched, in ditch	direct conflict with proposed road construction	remove
64	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	58	6	3	poor	hazard	North half of tree torn off, leaving large wound, canopy heavy south, dead wood	Indirect conflict with proposed road construction & hazardous tree condition	remove

TREES RECOMMENDED FOR PRESERVATION (44)

GENERAL INFORMATION				SIZE		HEALTH & CONDITION				IMPACTS & RECOMMENDATIONS	
ID #	BOTANICAL NAME	COMMON NAME	LOCATION	DBH (cm)	CANOPY RADIUS (m)	CROWN CONDITION	STRUCTURAL FORM	STRUCTURAL INTEGRITY	COMMENTS	EXPECTED CONSTRUCTION IMPACTS	PRESERVE / REMOVE / IMPACT MITIGATION
1	*Carya cordiformis*	Bitternut Hickory	2085 Oxford St. W	89	7	4	fair	fair	Codominant leaders with included bark and bulging seam, gall through crown, Buckthorn understory, grapevine through bottom third of canopy	none	preserve
2	*Juglans nigra*	Black Walnut	2085 Oxford St. W	8	7.5	5	good	good	Low branched, on slope	none	preserve
3	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	32	5	4	fair	good	Buckthorn understory, grapevine through crown	none	preserve
4	*Carya cordiformis*	Bitternut Hickory	2265 Oxford St. W	19	4	4	good	good	Dense Buckthorn understory, canopy heavy with grapevine	none	preserve
5	*Acer negundo*	Manitoba Maple	2265 Oxford St. W	23, 22	6	4	fair	poor	Multistem 2, supressed, large branch cavities, grapevine, 1 stem bend and lean SW	none	preserve
6	*Juglans nigra*	Black Walnut	2265 Oxford St. W	11	1.5	5	fair	good	Low crown, several Black Walnut saplings nearby	none	preserve
7	*Juniperus spp*	Juniper	2265 Oxford St. W	11	3	4	fair	good	Unbalanced crown, limbed up approx. 2m	none	preserve
8	*Crataegus spp*	Hawthorn	2265 Oxford St. W	~25, 20, 20, 10	7	4	fair	fair	Multistem 4, minor dead wood	none	preserve
9	*Pinus sylvestris*	Scotch Pine	2265 Oxford St. W	15	2.5	1	good	fair	Dead	none	preserve
10	*Acer negundo*	Manitoba Maple	City ROW Oxford St. W	~13	3.5	5	fair	good	Low branched, scrubby form, grapevine through crown	none	preserve, tree protection barrier
11	*Acer negundo*	Manitoba Maple	2155 Oxford St. W	~70, 65	8	5	poor	poor	Multistem 2, included bark at primary union and seam to base	none	preserve, tree protection barrier
12	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	2	4	good	good	Canopy covered in grapevine	none	preserve, tree protection barrier
15	*Carya cordiformis*	*Bitternut Hickory*	City ROW Oxford St. W	~15	3	4	fair	fair	Canopy completely covered in grapevine and virginia creeper	none	preserve
16	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	3	5	fair	good	Low branched	none	preserve
19	*Morus alba*	Mulberry	City ROW Oxford St. W	11	3	4	poor	fair	Disfigured form, leader bends and twists, dead wood	none	preserve
23	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	17	4	5	good	good	Canopy heavy with grapevine	none	preserve
24	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	15	3	5	good	good	Grapevine into lower half of crown	none	preserve
28	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	16	4	5	good	good	Supressed	no conflict with critical root zone	preserve, tree protection barrier
30	*Juglans nigra*	Black Walnut	2155 Oxford St. W	12	3	5	good	good	Low branched, full form	none	preserve
31	*Juniperus spp*	Juniper	City ROW Gideon Dr.	~30	4	3	good	good	Covered in vines, dense understory	none	preserve
32	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	~15	3	3	good	good	Covered in vines	none	preserve
33	*Gleditsia triacanthos var. inermis*	Honeylocust	44 Gideon Dr.	~40	8	5	good	good	Minor hydro line clearance pruning, otherwise full form	none	preserve
34	*Picea glauca*	White Spruce	36 Gideon Dr.	~15	2	5	good	good	Branched to grade	none	preserve
35	*Juglans nigra*	Black Walnut	36 Gideon Dr.	85, 79	9	5	good	good	Multistem 2, large lovely specimen, supressed on East side, elevated at base, tight unions	none	preserve
36	*Tilia americana*	Basswood	14 Gideon Dr.	26, 18	6	5	good	good	Multistem 2, in wooded area, low branched	minor impact adjacent to critical root zone	preserve, tree protection barrier
37	*Tilia americana*	Basswood	14 Gideon Dr.	19, 13, 9	5	5	good	good	Multistem 3, in wooded area, metal tag #s 200&201	minor impact adjacent to critical root zone	preserve, tree protection barrier
38	*Tilia americana*	Basswood	14 Gideon Dr.	31, 30, 13	5	5	good	fair	Multistem 3, in wooded area, metal tag #277, included bark at primary union	minor impact adjacent to critical root zone	preserve, tree protection barrier
39	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	In wooded area, metal tag #270, low branches, on slope, supressed, grapevine into crown	minor impact adjacent to critical root zone	preserve, tree protection barrier
40	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	19	4.5	5	good	good	Metal tag #269, grapevine into crown, on slope	minor impact adjacent to critical root zone	preserve, tree protection barrier
41	*Juglans nigra*	Black Walnut	14 Gideon Dr.	18	4	5	good	good	Metal tag #267, supressed	minor impact adjacent to critical root zone	preserve, tree protection barrier
42	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	25	5	5	good	good	Metal tag #268, minor vines into crown	minor impact adjacent to critical root zone	preserve, tree protection barrier
44	*Juglans nigra*	Black Walnut	City ROW Gideon Dr.	13, 11, 7	4	5	good	fair	Multistem 3, metal tag #265, included bark at primary union	no conflict with critical root zone	preserve, tree protection barrier
46	*Pinus strobus*	White Pine	14 Gideon Dr.	39	5.5	5	good	good	Metal tag #259, limbed up approx. 4m, Northern edge of loose hedge row	none	preserve
47	*Acer platanoides 'Royal Red'*	Royal Red Norway Maple	14 Gideon Dr.	~60	4.5	5	good	good	Significant prune cuts	none	preserve
50	*Salix spp*	Willow	City ROW Gideon Dr.	48, 11	5	3	poor	poor	Multistem 2, significant dead wood and trunk rot, loose open crown	none	preserve
55	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	26	4	5	good	good	Metal tag #213, thin crown	none	preserve
56	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	42	5.5	5	good	good	Metal tag #212, low branched, large broad crown	none	preserve
57	*Juniperus spp*	Juniper	City ROW Oxford St. W	10	2	5	good	good	Branched to grade	none	preserve
58	*Juniperus spp*	Juniper	City ROW Oxford St. W	14	3	5	good	good	Branched to grade	none	preserve
59	*Juglans nigra*	Black Walnut	City ROW Oxford St. W	10	2	5	good	good	At fence line	none	preserve
60	*Juglans nigra*	Black Walnut	2012 Oxford St. W	~30	5	5	good	good	Branched to grade	none	preserve
61	*Acer spp*	Maple	2012 Oxford St. W	~30, 30	5	3	poor	poor	Multistem 2, rot at base, significant dead wood	none	preserve
62	*Juglans nigra*	Black Walnut	2012 Oxford St. W	32	6	5	good	good	Under hydro lines	none	preserve
63	*Juglans nigra*	Black Walnut	2012 Oxford St. W	30	6	5	good	good	Metal tag #198, under hydro lines	none	preserve

CITY OF LONDON STANDARD DRAWING

TREE PRESERVATION DETAILS

DWG	DATE	APPROVED BY:
TPP-1	2020-09-29	

TREE PROTECTION ZONE

No grade change, storage of materials or equipment is permitted within this TPZ. Tree protection barrier must not be moved or altered in any way without the written authorization from the City.

For information contact City of London at: (519) 661-2500 ext ????

London CANADA

KEY MAP

RON KOUDYS LANDSCAPE ARCHITECTS INC

ALL DRAWINGS REMAIN THE PROPERTY OF THE LANDSCAPE ARCHITECT AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT THE LANDSCAPE ARCHITECTS WRITTEN PERMISSION.

THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION OR TENDER PURPOSES UNLESS SIGNED AND DATED BY RONALD H. KOUDYS, OALA, CSLA, LANDSCAPE ARCHITECT, LONDON, ONTARIO (519) 667-3322.

Ronald H. Koudys, O.A.L.A. C.S.L.A. DATE

DATE	DESCRIPTION	No.
2021.11.26	ISSUED FOR 100% SUBMISSION	4.
2021.11.24	ISSUED FOR REVIEW	3.
2021.10.07	ISSUED FOR REVIEW	2.
2021.09.20	ISSUED FOR REVIEW	1.

PLOTTING INFORMATION:
PLOTTED DATE = 2021.11.26
PLOTTED SCALE = 1:1

N

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS — RONALD H. KOUDYS — OALA — MEMBER

PROJECT TITLE:

OXFORD ST & GIDEON DR INTERSECTION
LONDON, ONTARIO

DRAWING TITLE:

TREE PRESERVATION PLAN 'B'

DATE:	SCALE:	DRAWING No.
AUGUST 2021	AS NOTED	T-2
DRAWN: RKLA Inc.	CHECKED BY: RHK	
PROJECT No. 21-117Le		

Appendix H

Resumes

PAUL MIKODA

staff member of R.V. Anderson Associates Limited

education

B.Sc., (Ecology), University of Guelph, Guelph, Ontario, Canada, 2003

registrations

Natural Sciences, MTO RAQS

additional education/certifications

Canadian Certified Inspector of Sediment and Erosion Control (CAN-CISEC #0765)
Ontario Freshwater Mussel Identification Workshop, Dept. of Fisheries and Oceans, 2019
Ontario Wetland Evaluation System, Ministry of Natural Resources and Forestry, 2017
Class 2 Electrofishing Certification, 2017
Reptile and Amphibian Training Course for Conservation Partners, Ministry of Natural Resources and Forestry, 2013
Ecological Land Classification for Southern Ontario Training Course, Ministry of Natural Resources, 2011
MED-A3 and SVOP Training, Georgian College, Barrie, Ontario, Canada, 2011
Aquatic Renewal Workshop, Trout Unlimited, Ontario, Canada, 2010
Introductory Bioengineering Course, American Fisheries Society, Ontario Chapter, Canada, 2009
Understanding Construction Activities and Impacts to Fish Habitat, Dept. of Fisheries and Oceans, Canada, 2007
Newbury Stream Restoration Course (Level I), Bob Newbury, Burlington, Ontario, Canada. 2006
Class 1 Electrofishing Certification, Institute for Watershed Science, Peterborough, Ontario, Canada, 2005
Pleasurecraft Operator Card, 2004

professional activities

Paul is a Terrestrial Ecologist with more 18 years of experience providing technical, field and writing support to academic, infrastructure and development projects across the province, including general ecological condition and habitat surveys, targeted species surveys and studies, and authoring environmental impact reports. He has a solid understanding of ecological process and principles and a strong attention to detail. Paul is adept at designing and carrying out field surveys, particularly for reptiles, and has extensive experience mitigating impacts to wildlife and habitat during construction activities. He is well-versed in the provincial Endangered Species Act, including working with regulators to determine appropriate mitigation measures to avoid contravention of the Act and to create overall benefit permits when impacts cannot be avoided. Paul is certified to carry out Ecological Land Classification (ELC) in Southern Ontario and is a certified wetland evaluator, having completed the Ontario Wetland Evaluation System Course.

projects

infrastructure projects

- Oxford Street West and Gideon Drive Intersection EA – City of London: Compiled existing natural heritage data to scope field investigations. Completed breeding bird survey, floral inventory, and vegetation community classification to assess the potential impacts of design alternatives for the intersection upgrades. Upon selection of a preferred alternative, the natural heritage data, assessment of potential impacts and proposed mitigation plan will be documented in an EIS. (2021 – present)

- Highway 401 Expansion, Grand River – MTO: Environmental monitoring specialist responsible for on-site monitoring during construction. (2021 – present)
- Springbank Res #1 and #3 Refurbishment – City of London: To support the rehabilitation of two existing drinking water reservoirs, including Preliminary and Detailed Design, as well as Tender Support and Contract Administration services. Extensive existing site-specific background documentation was reviewed and will be confirmed in the field. This information will be used to create an Environmental Impact Mitigation and Protection Plan to manage soil removal, movement and stockpiling to minimize potential environmental impacts within the work area and beyond. Species at risk (SAR) protected under the Endangered Species Act (ESA) are present within and adjacent to the Study Area and will require additional consideration if impacts to protected habitat prescribed under the ESA are contemplated. (2020-2023)
- Gully Creek Culvert Replacement – Ministry of Transportation Ontario (MTO): Environmental monitoring specialist responsible for on-site erosion and sediment control monitoring for the removal and replacement of the Gully Creek crossing. (2020 – present)
- Caledon Growth-Related Roads Class Environmental Assessments - Town of Caledon: Detailed design, permitting approvals and submission of tender-ready packages to support repairs and upgrades to six (6) road sections within the Town of Caledon. Reviewed and compiled existing background data and completed terrestrial field investigations of vegetation communities, wetlands, and documented rare and at-risk species and other wildlife habitats potentially impacted by the project. This data will be used to guide design and to complete a Natural Environment Inventory Memo for incorporation into the larger EA document. Correspondence with various agencies (Conservation Authorities, relevant provincial and federal ministries/departments) will determine the need and requirements for permits which may be required to support the roadworks. (2020 – 2021)
- Colgan Water Distribution System – Town of Adjala-Torsoronito: Consulted with Ministry of Environment Conservation and Parks (MECP) regarding Species at Risk (SAR) and site-specific surveys. Completed all field surveys which was summarized in a Natural Heritage Assessment Report in support of a water storage infrastructure project in the hamlet of Colgan. (2020 – 2021)
- Labatt Siphon Replacement – City of London: Detailed design and Contract Administration to replace an existing sanitary sewage siphon under the Thames River. Compiled existing natural heritage data and will complete terrestrial field investigations of vegetation communities, wildlife and their habitats to create a site-specific update to an existing EIS of a larger study area. Upon selection of a preferred alternative, the updated data in the EIS will be used to create an Impact Assessment and Mitigation Plan which will evaluate the potential impacts to the natural environment and recommend appropriate mitigation measures. (2020-2022)
- Pentecostal Camp Sanity Servicing Review – Installation of sanitary forcemain and watermain to upgrade existing services at the Lakeshore Pentecostal Camp, as well as a gravel access/emergency evacuation route with passage over two (2) watercourses. Terrestrial site investigations were completed to assess existing site conditions and determine the presence of sensitive terrestrial habitats and Species At Risk (SAR), as well as appropriate mitigation measures to reduce the potential for environmental impacts, including impacts to potentially present SAR, migratory birds and notable vegetation communities. (2020 – 2022)
- Cross Street Culvert Repair – City of Hamilton: Repair of a concrete culvert which conveys Sydenham Creek to the Desjardins Canal. Completed a tree inventory and a field review of the study area for significant wildlife habitat as well as rare or at-risk species and terrestrial features and functions. This information will be used to support required permitting from the Conservation Authority and to guide staging of materials and equipment during repair to minimize impacts to the natural environment. (2020-2021)
- Columbia Way Environmental Assessment (EA) Study – Town of Caledon: Preliminary design to urbanize and improve rural settings of Columbia Way in Bolton. Compiled existing natural heritage data and completed terrestrial

field investigations of vegetation communities, wildlife habitats and a tree inventory to produce an existing conditions summary and constraints map. Upon selection of a preferred alternative, an Impact Assessment and Mitigation Summary Report will be completed, assessing the impacts to the natural environment and appropriate mitigation measures. (2020-2021)

- Cainsville Water and Wastewater Servicing – County of Brant: Preliminary design for both water and wastewater servicing to meet the needs of the community to 2050. Compiled existing natural heritage data to produce an existing conditions summary and constraints map. Guided by the proposed project scope, terrestrial field investigations were completed to fill data gaps. Summarized the results of those investigations, along with potential impacts to the natural environment and proposed mitigations in an Environmental Impact Assessment. (2020)
- Bayly Street East – Town of Ajax: Completed tree inventory to evaluate condition of trees slated for removal to support construction of a multi-use pathway. (2020)
- King Street Reconstruction – Municipality of Thames Center: Assisted with tree inventory to evaluate condition of trees potentially impacted by construction and determine tree protection measures. (2020)
- Kenilworth Reservoir Rehabilitation – City of Hamilton: To support reservoir roof rehabilitation, including earthworks, near regulated habitat of endangered Butternut trees. Through correspondence with the Ministry of Environment, Conservation and Parks (MECP), determined details required to inform regulators if regulated habitat was present within the work area. Obtained opinion that existing site conditions precluded regulated habitat from existing within the project area. (2020)
- Gordie Howe Bridge Early Works – City of Windsor: Worked in conjunction with on-site staff to manage and mitigate against impacts to terrestrial and aquatic wildlife as the both the Reptile Specialist and Aquatic Specialist. Completed site-wide snake salvages utilizing coverboards and visual encounter surveys. Completed multiple fish salvages within the Broadway and McKee Drains, as well as the Detroit River shoreline. Advised client on mitigation and site management measures to reduce human/wildlife conflict for entire site as well as specific cases. Supervised construction activities in areas/features with the potential to contain at-risk snakes and monitored construction of a jetty in the Detroit River. Provided additional guidance throughout project on an as-needed basis. (2015-2020)
- Bayfield River Highway 4 Bridge Rebuild – Town of Clinton: Conducted fish and at-risk mussel salvage within the defined work area. Provided guidance to contractor on best management practices regarding works near habitat for sensitive aquatic species. (2019)
- Kent Breeze Wind Facility – Thamesville: Coordinated and conducted bird and bat mortality monitoring surveys to comply with Renewable Energy Approval, including study design. Organized searchers and trials, analyzed data, wrote monitoring reports, corresponded with regulators and obtained necessary wildlife permits. (2011-2014)
- Kenilworth Reservoir Rehabilitation – City of Hamilton: To support reservoir roof rehabilitation, including earthworks, near regulated habitat of endangered Butternut trees. Through correspondence with the Ministry of Environment, Conservation and Parks (MECP), determined details required to inform regulators if regulated habitat was present within the work area. Obtained opinion that existing site conditions precluded regulated habitat from existing within the project area. (2020)

development projects

- Hospice – Municipality of Leamington: Completed ELC delineations and habitat assessment for Eastern Foxsnake for development of a hospice facility. Liaised with the client and provincial government to acquire an overall benefit permit under the Endangered Species Act and assisted in the implementation of the benefit measures. (2014)
- Wallace Woods Secondary Plan – Town of Lakeshore: Conducted coverboard surveys for snakes, amphibian monitoring and aquatic habitat surveys and sampling to support and Issues Scoping Report (ISR) for the Wallace Woods Secondary Plan. Compiled all relevant data and authored the ISR. (2015-2018)

- Boblo Island – Town of Amherstburg: Conducted ELC delineations, surveys for breeding birds and amphibians, targeted surveys for snakes, turtles and wildlife habitats. Authored the Environmental Impact Assessment for site, including detailed analysis of the results of snake surveys. Liaised with client and provincial government to obtain an overall benefit permit under the Endangered Species Act to support infill development on the island. (2013 – 2017)
- St. Clair College – City of Windsor: Supervised vegetation clearing and site preparation to mitigate against incidental impacts to at-risk snakes. Led the overall benefit permit process for impacts to an at-risk plant, including planting, monitoring and reporting. (2013-2015)
- Timberwalk Subdivision – Village of Ilderton: Completed breeding amphibian monitoring of a pond to be lost to development. Planned and implemented construction of compensatory ponds on adjacent lands, including native plant salvage to increase ecological function. Completed multi-year monitoring of compensatory ponds for evidence of amphibian breeding and presence of invasive plant species. Authored monitoring reports and proposed adaptive management strategies. (2016 – 2019)
- California Avenue – City of Windsor: Completed ELC and surveys for individuals and habitat for at-risk plants and wildlife, including snakes. (2018)
- Goosemarsh Line – The Municipality of Lambton Shores: Conducted habitat and presence/absence surveys for at-risk plants and wildlife, including reptile surveys and ELC assessments across multiple properties. Liaised with the province regarding presence of individuals and habitat protected under the Endangered Species Act to guide development activities on select properties, including acquiring an overall benefit permit. (2014-2019)
- Queen Valley Estates – Town of Kingsville: Conducted surveys for individuals and assessment of habitat for at-risk species to support development proposal. Authored the Environmental Impact Assessment and various reports to obtain approvals under the Endangered Species Act. (2013 – 2016)
- Kingsbridge Subdivision – Town of Amherstburg: Conducted breeding bird and amphibian surveys, ELC delineations, reptile habitat assessment and targeted surveys. Obtained an overall benefit permit under the Endangered Species Act and assisted with its implementation over multiple years, including construction supervision, client and regulator liaison and authoring annual reports. (2014 – 2020)
- Huron Shores Investments Inc. – Village of Grand Bend: Completed surveys for the presence of and habitat for at-risk reptiles and plants and potential habitat for bats. Authored the Environmental Impacts Statement for the proposal and submitted documentation for compliance with the Endangered Species Act. (2018-2019)
- Lighthouse Cove Residence – Municipality of Tilbury: Completed targeted surveys for at-risk turtles and general habitat assessment for reptiles. Worked with the client and province to draft and implement an overall benefit permit under the Endangered Species Act. Assisted with permit implementation and construction supervision. (2017-2020)
- Gianni Estates – Town of Essex: Carried out ELC evaluations, assessment of habitat features for and presence of at-risk snakes, authored supporting Issues Scoping Report and documentation for compliance with the Endangered Species Act. (2015-2016)

research projects

- University of Guelph Marten Project – University of Guelph: Head field technician carrying out trapping and tracking of pine marten inhabiting managed clay belt forest in Kapuskasing Ontario. Included various related habitat assessments, including prey availability, vegetation characterization, coarse woody debris surveys and winter community wildlife inventories. Managed the day to day components of field camp and research tasks, communicated with remote supervisors to manage changes and challenges, taught new field staff operation of equipment and camp. Assisted in project design utilizing forestry data polygons and ARCView software. (2003-2005)

- Chemical Management Plan – Canadian Wildlife Service: Assisted Canadian Wildlife Service scientists to conduct sampling of wildlife with funding from the Chemicals Management Plan. Included capturing and collecting biological samples from Snapping Turtles and American Kestrels to test for PCB's and residual DDT, respectively. Also completed intense monitoring and biological sampling of Tree Swallows for presence and potential endocrine-disrupting effects of poly-brominated diphenyl ethers. (2007-2009)
- At-Risk Moss Species Surveys – Niagara Peninsula Conservation Authority: As part of a team, completed detailed transect surveys for at-risk moss species within a Conservation Area. Described and evaluated the biotic and abiotic characteristics of the new populations, then used this information and orthoimage interpretation to identify other suitable habitats, which were confirmed through field surveys. Co-authored a report on the study results and wrote an article summarizing the survey season for an online newsletter. (2008)

memberships

- Society for Ecological Restoration – Ontario Chapter (SER)

committees + special undertakings

- Conservation Committee Member of the Canadian Herpetological Society (CHS)

presentations

- Martin PA., de Solla SR., Mikoda P., Palonen KE., Toxicity and absorption of pesticides and fertilizers to snapping turtle eggs (*Chelydra serpentina*), Presentation, IAGLR, 2010
- Weseloh D.V., Mikoda P., Pekarik C., Satellite tracking of breeding Great Black-backed Gulls from eastern Lake Ontario, Presentation, Waterbird Society, 2008
- de Solla DR., Fernie K., Martin PA., Mayne G., Letcher RJ., Havelka T., Barrett G., Mikoda P., Organohalogen contaminants and trophic level in snapping turtles from Cootes Paradise, Presentation, Researching and Monitoring Workshop hosted by Project Paradise, 2008
- de Solla DR., Martin PA., Mikoda P., Toxicity of nitrogenous fertilizers to eggs of snapping turtles (*Chelydra serpentina*) in field and laboratory settings, Presentation, Understanding Agriculture's Effects on Amphibians and Reptiles in a Changing World, 2007
- de Solla DR., Martin PA., McDaniel TV., Pettit KE., Mikoda P., Struger J., Bishop CA., Elliot JE., Direct and indirect impacts of nutrient enrichment on amphibians and reptiles, Presentation, Understanding Agriculture's Effects on Amphibians and Reptiles in a Changing World, 2006
- de Solla DR., Martin PA., McDaniel TV., Pettit KE., Mikoda P., Struger J., Bishop CA., Elliot JE., Direct and indirect impacts of nutrient enrichment on amphibians and reptiles, Presentation, Eleventh annual meeting of the Canadian Amphibian and Reptile Conservation Network 409(20):4306-11, 2007

publications + papers

- de Solla SR., Martin PA., Mikoda P., Toxicity of pesticide and fertilizer mixture stimulating corn production to eggs of snapping turtles (*Chelydra serpentina*), Sci Total Environ, 2011
- Mikoda P., Woodward P., A Carolinian Setting for a Rare "Cutlery" Moss, Species and Habitats at Risk Special Edition Newsletter, 2010

employment record

2020 to date	Terrestrial Ecologist, R.V. Anderson Associates Limited, London, Ontario, Canada
2011 to 2020	Biologist, BioLogic Incorporated / MTE Consultants, London, Ontario Canada
2010 to 2011	Environmental Biologist, Tarandus Associates Limited, Brampton, Ontario, Canada
2009 to 2010	Protected Areas Technician, Environment Canada, London Ontario, Canada
2009	Biological Technician, Environment Canada, Burlington, Ontario, Canada
2008	Species at Risk / Land Stewardship Technician, Niagara Peninsula Conservation Authority, Welland, Ontario, Canada
2007 to 2008	Technologist / Wildlife Intern, Environment Canada, Burlington, Ontario, Canada
2006	Fisheries Management Planning Assistant, Upper Thames River Conservation Authority, London, Ontario, Canada
2005	Field Supervisor, University of Guelph Marten Project, Kapuskasing, Ontario, Canada
2003 to 2005	Head Biological Field Technician, University of Guelph Marten Project, Kapuskasing, Ontario, Canada
2003, 2005	Woodpecker Survey Technician, Canadian Forest Service, Espanola, Ontario, Canada
2003	Wildlife Technician, Canadian Ecology Centre, Kapuskasing, Ontario, Canada

COURTNEY BENETEAU

staff member of R.V. Anderson Associates Limited

education

M.Sc., (Environmental Science), University of Windsor, Windsor, Ontario, Canada, 2007
B.Sc., (Biology – Honours Genetics), University of Western Ontario, London, Ontario, 2005

registrations

Fisheries Assessment, MTO RAQS
Fisheries Compliance During Contracts, MTO RAQS
Environmental Inspection During Construction, MTO RAQS

certifications

Canadian Certified Inspector of Sediment and Erosion Control (CAN-CISEC #0754)
Class 1 Electrofishing
DFO Freshwater Mussel Identification
Erosion and Sediment Control Practitioner (ESCP)
Marine Emergency Duties (MED A3)
MTO/DFO/MNR Fisheries Protocol Training
Ontario Stream Assessment Protocol (OSAP)
ROM Fish Identification
ROM Species at Risk Identification
Pleasurecraft Operator

professional activities

Courtney is a Fisheries Biologist and Freshwater Mussel Specialist with over 13 years of experience conducting fisheries and aquatic habitat assessments throughout Ontario. She is proficient at preparing reports and studies including thorough descriptions of fish habitat and community inventories, impact assessment, mitigation measures, compensation plans, and enhancement opportunities. Courtney has demonstrated experience with the federal and provincial SAR permitting processes in Ontario and has completed several freshwater fish and mussel SAR surveys, relocations and post-relocation monitoring. In addition to her work as an aquatic ecologist, Courtney has provided extensive onsite environmental monitoring and reporting during construction for a variety of projects.

projects – municipal

- Oxford Street West and Gideon Drive Intersection EA – City of London: Compiled existing natural heritage data and completed EIS scoping checklist. Field investigations including visual fish habitat assessment to determine potential impacts to nearby coldwater 'Tributary C'. This data will be used in the assessment of design alternatives for the intersection upgrades. Upon selection of a preferred alternative, the natural heritage data, assessment of potential impacts and proposed mitigation plan will be documented in an EIS. (2021 – present)
- Colgan Water Distribution System – Town of Adjala-Torsoronito: Compiled existing natural heritage data and completed agency correspondence and SAR screening in support of the water storage infrastructure project in the hamlet of Colgan. (2020 – 2021)

- Labatt Siphon Replacement Detailed Design – City of London: Compiled existing natural heritage data and completed EIS scoping checklist. Conducting field investigations including visual fish habitat mapping. This data will be used in the assessment of design alternatives for the replacement of an existing sanitary sewage siphon under the Thames River. Upon selection of a preferred alternative, the natural heritage data, assessment of potential impacts and proposed mitigation plan will be documented in an EIS update document. (2020 – present)
- Mississauga Road Widening and Huttonville Creek Restoration – Region of Peel: Project oversight during construction to monitor mitigation measures, including erosion and sediment controls, and ensure compliance with the federal and provincial SAR environmental permits for Redside Dace. (2020 – present)
- Caledon Growth-Related Roads Detailed Design – Town of Caledon: Compiled existing natural heritage data and undertaking fisheries field investigations including fish community sampling and fish habitat mapping, and SAR screening in support of the acquisition of environmental permits and approvals for the rehabilitation of six sections of roads within the Town of Caledon. (2020 – present)
- Lakeshore Pentecostal Camp Sanitary Servicing Detailed Design – Gathered existing natural heritage data for the study area, including contact with the conservation authority. Completed field studies examining fish habitat in Coverts Creek and tributaries, in support of the detailed design for the installation of sanitary forcemain and watermain to upgrade existing services at the Lakeshore Pentecostal Camp, as well as a gravel access/emergency evacuation route which included one new culvert. (2020 – 2021)
- Cross Street Culvert Repair – City of Hamilton: Completed a review of fish and potential mussel habitat field review of the study area for significant wildlife habitat as well as rare or at-risk species and terrestrial features and functions. This information will be used to support required permitting from the Conservation Authority and to guide staging of materials and equipment during repair of a concrete culvert which conveys Sydenham Creek to the Desjardins Canal. (2020 – 2021)
- Columbia Way Environmental Assessment (EA) Study – Town of Caledon: Preliminary design for road improvements to urbanize and improve rural settings of Columbia Way in Bolton. Compiled existing natural heritage data and completed field investigations of fish community and fish habitat to produce an existing conditions summary and constraints map. Upon selection of the preferred alternative, assessment of the impacts to the natural environment, determine appropriate mitigation, and preparation of an Impact Assessment and Mitigation Summary Report. (2020 – 2021)
- Cainsville Water and Wastewater Servicing EA – County of Brant: Preliminary design for both water and wastewater servicing to meet the needs of the community to 2050. Compiled existing natural heritage data to produce an existing conditions summary and constraints map. Guided by the proposed project scope she completed fisheries field investigations to fill data gaps and summarized the results, potential impacts, and proposed mitigations to the natural environment in an Environmental Impact Assessment. (2020 – 2021)
- Church Street Bridge Replacement – Town of Ajax: Post-Construction monitoring at Remnar Bridge over the East Duffins Creek to satisfy Toronto Region Conservation Authority (TRCA). The stability and condition of the creek banks and abutment slopes, success of vegetative plantings and cuttings, and fish community will be assessed annually for two years following restoration works. Three additional years of slope monitoring will be conducted. (2020 – 2024)
- Highbury Avenue South and the Wenige Expressway Bridge Rehabilitation – City of London: Preliminary and detailed design and tendering services for rehabilitation of the Wenige Expressway Bridge and detailed design for rehabilitation of Highbury Avenue pavement and related corridor infrastructure. Courtney assisted with aquatic field investigations, preparing the Ecological Memo, identifying environmental features and potential impacts and recommending appropriate mitigation. She also reviewed the contract special provisions, drawings and Request for Review submitted to DFO. (2019 – 2020)

- Long Point Causeway Reconstruction – Norfolk County: Courtney was responsible for providing aquatic input to the Natural Ecosystems Report and design to minimize impacts of the road reconstruction and widening. (2018 – 2020)
- South Boundary Road and Franklin Boulevard Extension Detailed Design – Region of Waterloo: Under a retainer contract with the Region of Waterloo, provided detailed design services for the South Boundary Road corridor from Water Street (Hwy 24) to Dundas Street (Hwy 8) in addition to the Franklin Boulevard Extension. Following detailed design, provided contract administration services for Phase 1A, and currently Phase 1B. Courtney was responsible for overseeing the environmental component of the Phase 1B project and Phase 2 Environmental Impact Study (EIS). (2018 – 2020)
- Adelaide Street North Widening Environmental Assessment – City of London: Courtney was responsible for the aquatic component of the environmental assessment for widening Adelaide Street North from Fanshawe Park Road East to Sunningdale Road East. She contributed to the preparation of the EIS, including characterizing the aquatic habitat and fish communities within the study area. (2017 – 2019)
- Bostwick Road Class Environmental Assessment – City of London: Performed fish community and aquatic habitat surveys to establish the existing conditions. Identified and assessed impacts to the aquatic ecosystem of the proposed road realignment project and mitigation measures for inclusion into the Environmental Impact Study and Environmental Study Report. (2016 – 2019)
- Dingman Creek Erosion Control Wetland – City of London: Post-construction monitoring of fish communities and constructed fish habitats for the Erosion Control Wetland constructed adjacent to Dingman Creek. Preparation of technical memos to provide environmental updates and recommendations for improvement. (2013 – 2017)
- Stoney Creek Erosion Control Wetland, Stormwater Management Facility – City of London: Monitored environmental protection measures for the creation of an erosion control wetland. Ensured compliance with contract environmental requirements including groundwater monitoring, ESC measures, the installation of fishways, turtle nesting mounds, landscaping and native vegetation salvage. Post-construction monitoring of wetland. Courtney organized the emergency relocation of the Rainbow mussel following a bank washout of Stoney Creek which included commercial divers, completed follow-up post relocation monitoring, data collection and analysis, and report preparation and submission. (2012 – 2014)
- Green Valley Drive – City of London: Collected fisheries data and performed onsite assessment to determine constraints and opportunities for design of a stormwater outlet storage system. Post-construction monitoring of fish communities and constructed fish habitats. (2015 – 2017)
- Mud Creek Subwatershed Study Update – City of London: Collected and amalgamated existing study information on aquatic habitat features within the Mud Creek Subwatershed, and completed additional field surveys (fisheries surveys, aquatic habitat assessments) to address data gaps. Prepared a summary of existing conditions and ecological constraints for inclusion in the final project report. Assisted with base-flow monitoring. (2012 – 2014)
- Central Thames River Subwatershed Study – City of London: Collected and amalgamated existing data concerning aquatic features within the Central Thames Subwatershed in the City of London. Prepared a summary of existing conditions and ecological constraints. (2012 – 2014)
- Sunningdale Stormwater Management Facility #4 and Compensation Area – City of London: Monitoring environmental protection measures for the creation of a storm water management facility and compensation area adjacent to Medway Creek. Ensuring compliance with contract environmental requirements including groundwater monitoring (piezometers and staff gauges), ESC measures and landscaping. Post-construction monitoring of compensation wetland. (2012 – 2014)

- Creek Road EA and Preliminary Design – Niagara Region: Completed fish and fish habitat field surveys to permit impact assessment of the proposed project and mitigation measures for inclusion into the Environmental Impact Study and Environmental Study Report. (2015)
- West Vaughan Sewer Servicing – Region of York: Completed fish habitat and water quality assessments at 18 watercourse crossings of proposed pipeline. Redside Dace habitat mapping at one crossing. Liaison with MNRF and DFO to confirm Redside Dace Species at Risk (SAR) permitting/exemption requirements. Input into sewer alignment and above-ground tunneling shaft locations to avoid impacts to SAR (Redside Dace) and minimize impacts to fish and fish habitat. Preparation of a Natural Environment Summary and numerous risk and mitigation tables. (2017 – 2019)
- Beaverdams Road Stormwater Management – Niagara Region: Completed an assessment of aquatic environmental features on a proposed SWM lot in the City of Niagara Falls. Included fish habitat assessment, Species at Risk review, and consultation with government agencies. (2015)
- Fountain Street Bridge Rehabilitation – Region of Waterloo: Completed a natural environment review of the study area surrounding the Fountain Street Bridge over the Grand River. Included extensive background information review, assessment of fish and mussel habitat around the bridge structure and within Blair Creek. (2014 – 2016)

projects – provincial

- Grand River Species at Risk (SAR) Mussel Relocation, Highway 401, Kitchener – Ministry of Transportation (MTO) West Region: Leading the SAR mussel relocations and post-relocation monitoring for a multi-year construction project. Performing post-relocation monitoring, data collection and analysis, and report preparation and submission. Ensuring compliance with all *Endangered Species Act* (ESA), *Fisheries Act*, and *Species at Risk Act* (SARA) permits and authorizations. Also performing erosion and sediment control (ESC) inspections. (2021 – present)
- Gully Creek Bridge Replacement, Highway 21, Bayfield – MTO West Region: SAR Fisheries Biologist responsible for fish salvage (Redside Dace - SAR), relocation, monitoring of fish habitat restoration, and reporting as well as ESC monitoring for the removal and replacement of the Gully Creek structure. (2020 – present)
- Speed River SAR Mussel Relocation, Highway 401, Cambridge – MTO, West Region: Led the SAR mussel relocations and post-relocation monitoring for a multi-year construction project. Habitat enhancement measures for additional project impact mitigation for the SAR mussel included: improved host fish species habitat, extended SAR mussel surveys, and increased Contractor awareness. Performed post-relocation monitoring, data collection and analysis, and report preparation and submission. Ensured compliance with all Endangered Species Act (ESA) Permit stipulations including design and execution of a semi-quantitative mussel survey in the Speed River. (2015 – 2019)
- Natural Science Retainer Assignments (three consecutive awards) – MTO, West Region: Providing environmental services to the Ministry of Transportation of Ontario on an assignment basis at various locations in southwest Ontario. Projects consisted of fish and fish habitat assessments, bird assessments, vegetation assessments, and turtle surveys and required Species at Risk review, Licence to Collect Fish permit applications and consultation with government agencies. Prepared environmental contracts requirements. The Craig Street Culvert Replacement and Heyrock Creek Fish Ladder assignments were included among the many successful and unique projects under these retainers. (2012 – 2020)
- Highway 401 Widening and Speed River Bridge Replacements – MTO, West Region: Completed fisheries existing conditions and impact assessment for the Speed River Bridge replacements and eight culvert crossings. Developed mitigation measures and provided notification to DFO for anticipated construction works at all locations. Discovered SAR freshwater mussel (Wavyrayed Lampmussel) in the river; prepared ESA Information Gathering Form, Avoidance Alternatives Form, and Overall Benefit Application Form for the mussel SAR. The Overall Benefit application included a detailed mussel relocation plan, and subsequent monitoring. (2011 – 2014)

- Highway 401 Expansion, Credit River to Regional Road 25 – MTO, Central Region: This project is a fully integrated design-build joint venture, is widening approximately 18 km of Highway 401 from 6 lanes to 10 to 12 lanes to facilitate high-occupancy vehicle median lanes. The expansion is from the Credit River in Mississauga to Regional Road 25 in Milton, Ontario. As the Fisheries Assessment Specialist, Courtney updated impact assessments for work related to fish and fish habitat, prepared and submitted applications for agency permits related to SAR and the Fisheries Act. (2019 – 2020)
- Highway 401 Rehabilitation, Elgin County – MTO, West Region: Provided oversight of environmental monitoring during construction. Conducted fish salvage operations, water control measures and by-pass monitoring, ESC and bird nesting preventative measures monitoring. (2018 – 2019)
- Highway QEW/Walkers Line – MTO, Central Region: Provided environmental inspection during construction. This project included the rehabilitation of the Dorval Drive and Walkers Line structures over the QEW Highway, and the rehabilitation of several structural culverts conveying fish bearing watercourses, two of which required SAR permitting for Redside Dace, and Silver Shiner. (2017 – 2018)
- McGregor Creek SAR Mussel Relocation, Highway 401 – MTO, West Region: Led SAR permit and approval acquisition with provincial and federal agencies. Completed the SAR mussel relocation, post-relocation monitoring, data collection, analysis, and reporting. (2017 – 2019)
- Highway and Bridge Design Retainer – MTO, East Region: Projects included various levels of highway reconstruction, bridge and culvert work, and all related disciplines to complete the detailed designs. Courtney was responsible for the aquatic ecology components of the projects, including completing fieldwork, fish habitat assessments, and species-at-risk screening and preparing the fish and fish habitat existing conditions and impact assessment reports. (2017 – 2020)
- Welland River Bridges Design-Build Replacement and Rehabilitation of Three Structural Culverts, St. Catharines – MTO, Central Region: Replacement of the existing twin Welland River Bridges and rehabilitation of three structural culverts (Warren Creek, Grassy Brook, Ussher's Creek culverts). Considerations for SAR mussels in the Welland River and at one of the culverts. Courtney was responsible for fisheries input in advance of construction and leading the mussel relocation. (2019 – 2020)
- Highway 401/Highway 40 Interchange Reconstruction – MTO, West Region: Monitored environmental protection measures including, erosion and sediment controls; vegetation clearing and in-water work. Ensured compliance with contract environmental requirements including in-water timing restrictions; reviewed contractor temporary water passage proposals; and reviewed and provided on-site supervision of de-fishing operations. Reviewed and submitted weekly environmental construction monitoring reports. (2017 – 2018)
- Highway 24 Reconstruction and Whitemans Creek Bridge Replacement – MTO, West Region (Contract 2010-3016): Monitored environmental protection measures including bridge replacement over a coldwater stream with sensitive trout spawning habitats. Ensuring compliance with contract environmental requirements including in-water timing restrictions, reviewing contractor ESC proposals for groundwater management. (2011 – 2012)
- Highway 24 Reconstruction and Whitemans Creek Bridge Replacement – MTO, West Region (GWP 336-97-00): Conducted fisheries and aquatic habitat assessments to confirm species composition and habitat sensitivities in Whitemans Creek, a coldwater stream with trout spawning habitat, and associated groundwater tributaries. Prepared Impact Assessment Report for MTO including the design of a groundwater transfer compensation plan. Completed No HADD Forms and supporting documentation for submission to DFO. (2008 – 2010)
- Highway 7 Rehabilitation, Stratford – MTO, West Region: Completed an aquatic environmental review of the Highway 7 corridor between Perth Line 9 and the City of Stratford. Fisheries inventories and aquatic habitat assessments were completed. Impact assessment and mitigation measures were determined, including re-creating enhanced fish habitat to compensate for loss in design. (2015 – 2018)

- Highway 7 Reconstruction and Culvert and Bridge Rehabilitation, St. Mary's – MTO, West Region (GWP-361-98-00): Conducted fisheries and aquatic habitat assessments to determine species composition and habitat sensitivities of 27 culvert and 8 bridge crossings. Prepared Fish and Fish Habitat Existing Conditions Report for MTO. Completed No HADD Forms and supporting documentation for submission to DFO. Courtney was instrumental in acquiring the ESA Overall Benefit permit for relocation of the SAR mussels and performed relocation and follow-up population monitoring services. (2013 – 2015)
- Highway 3, Cayuga – MTO, West Region (Advanced Contract 2013-3007): Supervised in-water work including caisson and cofferdam installation in the Grand River from a barge. Prepared a Mitigation Plan requesting an in-water timing extension on behalf of the MTO, which was supported by the DFO. Maintained daily MTO Construction Inspection Checklists. (2015)
- Highway 40, Chatham to Wallaceburg – MTO, West Region (Contract 2011-3015): Monitored environmental protection measures for the rehabilitation of seven structures along Highway 40. This project dealt with SAR fish and DFO recommendations at two of the watercourses as well as SAR reptiles including Eastern Foxsnake and MNR Letter of Advice. Mitigation measures in addition to the Contract were implemented to protect the SAR. Ensuring compliance with contract environmental requirements including in-water timing restrictions, ESC measures and bird nesting restrictions. (2013)
- Highway 402, Sarnia – MTO, West Region (Contract 2009-3001): Monitored environmental protection measures for the Highway 402 widening, SWMPs construction and structure replacements. Ensured compliance with contract environmental requirements including in-water timing restrictions, groundwater monitoring, air quality monitoring during fly ash handling, ESC measures and bird nesting restrictions. (2009 – 2010)
- Highway 3 Canfield Drainage Improvements and Rehabilitation/Replacement of One Structural Culvert – MTO, West Region (GWP 3507-02-00): Conducted fisheries and aquatic habitat assessment to determine species composition and habitat sensitivities of one culvert crossing. Prepared Fish and Fish Habitat Existing Conditions Report for MTO. (2011)
- Highway 23 Structure Replacements and Rehabilitation – MTO, West Region (GWP 3043-06-00): Conducted fisheries and aquatic habitat assessments to determine species composition and habitat sensitivities in four watercourse crossings. Prepared Fish and Fish Habitat Existing Conditions and Impact Assessment Report for MTO. Completed No HADD Forms and supporting documentation for submission to DFO. Completed freshwater mussel SAR surveys under ESA permit at two locations. (2011)
- Highway 8, Replacement of Structural Culvert at Fairchild Creek, City of Hamilton – MTO, West Region: Completed fisheries inventories and agency correspondence for the for the assessment of impacts and development of environmental mitigation measures and contract specifications during the Class EA Study. Provided environmental monitoring services during construction. (2010 – 2011)
- Highway 3 Improvements and Black Creek and Catfish Creek Culvert Replacements and Stream Realignments – MTO, West Region (Contract 2009-3024): Supervised in-water work including cofferdam construction, dewatering activities, and fish habitat restoration. Conducted fish salvage operations including freshwater mussel relocations prior to in-water construction. Maintained daily MTO Construction Inspection Checklists and Environmental Monitoring Reports. Prepared a Final Environmental Monitoring for submission to the MTO Report and Fish Collection Report for submission to the MNRF. (2010)
- Highway 21 & 9 Rehabilitation and Culvert and Bridge Replacements – MTO, West Region (GWP 136-98-00): Conducted fisheries and aquatic habitat assessments to determine species composition and habitat sensitivities of 42 culvert and 5 bridge crossings, including several coldwater systems. Prepared Fish and Fish Habitat Existing Conditions and Impact Assessment Report for MTO. Completed No HADD Forms and supporting documentation for submission to DFO. (2010)

- Pelee Island, Kingsville and Leamington Ferry Dock Rehabilitation – MTO, West Region (Contract 2007-3410): Monitored environmental protection measures including turbidity curtain placement during underwater construction activities such as excavation, concrete pouring and rock placement for the Leamington Ferry Dock rehabilitation. Ensured compliance with contract environmental requirements including in-water timing restrictions. (2010)
- Highway 401/Provincial Road, Windsor – MTO, West Region (Contract 2007-3043): Monitored environmental protection measures including major watercourse re-alignment, concrete culvert rehabilitations and culvert extensions. Ensured compliance with contract environmental requirements including in-water timing restrictions, reviewing contractor temporary water passage proposals and reviewing and supervision of de-fishing operations. (2009 – 2011)

publications + papers

- Ginson R., Walter R.P., Mandrak N.E., Beneteau C.L., Heath D.D., Hierarchical analysis of genetic structure in the habitat-specialist Eastern Sand Darter (Ammocrypta pellucida), Ecology and Evolution, 2014
- Beneteau C.L., Walter R.P., Mandrak N.E., Heath D.D., Range expansion by invasion: genetic characterization of invasion of the greenside darter (Etheostoma blennioides) at the northern edge of its distribution, Biological Invasions, 2011
- Pitcher T.E., Beneteau C.L., Walter R.P., Wilson C.C., Mandrak N.E., Heath D.D., Isolation and characterization of microsatellite loci in the Redside dace Clinostomus elongates, Conservation Genetics Resources, 2009
- Beneteau C.L., Mandrak N.E., Heath D.D., The effects of river barriers and range expansion of the population genetic structure and stability in Greenside Darter (Etheostoma blennioides) populations, Conservation Genetics, 2008
- Beneteau C.L., Mandrak N.E., Heath D.D., Characterization of eight polymorphic microsatellite DNA markers for the greenside darter, Eheostoma blennioides (Percidae), Molecular Ecology Notes, 2006

employment record

2020 to date	Fisheries Biologist and Freshwater Mussel Specialist, R.V. Anderson Associates Limited, London, Ontario, Canada
2009 to 2020	Fisheries Biologist and Freshwater Mussel Specialist, Parsons Inc., London, Ontario, Canada
2007 to 2009	Field Coordinator and Lab Technician, Great Lakes Institute for Environmental Research, Windsor, Ontario, Canada
2008 to 2009	Field Assistant, Leadley Environmental, Essex, Ontario, Canada
2005 to 2007	Teaching Assistant, University of Windsor and Great Lakes Institute for Environmental Research (GLIER), Windsor, Ontario, Canada

Natasha M. Welch

staff member of R.V. Anderson Associates Limited

education

Grad.Cert., (Ecosystem Restoration), Niagara College, Niagara-on-the-lake, Ontario, Canada, 2017
B.Sc., (Wildlife Biology and Conservation – Honours Program), University of Guelph, Guelph, Ontario, 2016

additional education

4-day Workshop on the Identification of Ontario Fish, Royal Ontario Museum, Guelph, Ontario, Canada, 2018
3-day Workshop on the Identification of Ontario Minnows, Royal Ontario Museum, Guelph, Ontario, Canada, 2019
2-day Workshop on the Identification of Ontario Fishes at Risk, Royal Ontario Museum, Guelph, Ontario, Canada, 2019

certifications

Canadian Certified Inspector of Sediment and Erosion Control (CAN-CISEC #0804)
Class 2 Backpack Electrofishing Crew Leader
Ontario Benthos Biomonitoring Network (OBBN) Participant
Ontario Stream Assessment Protocol (OSAP) Crew Leader
Pleasure Craft Operator

professional activities

Natasha is an Aquatic Biologist of the firm with over 4 years of environmental consulting experience. Her capabilities include fish inventories, aquatic habitat and impact assessments and reporting, desktop background reviews, data analysis and management, species-at-risk screening, agency consultation, environmental permit acquisition, and onsite construction and post construction regulatory compliance monitoring with respect to transportation, infrastructure, urban development, and renewable energy projects. In addition to her work as an aquatic ecologist, Natasha assists with terrestrial field investigations and is proficient with geographic information system (GIS) software, such as ArcGIS.

projects

infrastructure & transportation

- Oxford Street West and Gideon Drive Intersection EA – City of London: Undertook field investigations including visual fish habitat assessment to determine potential impacts to nearby coldwater ‘Tributary C’. This data will be used in the assessment of design alternatives for the intersection upgrades. Upon selection of a preferred alternative, the natural heritage data, assessment of potential impacts and proposed mitigation plan will be documented in an EIS. (2021 – present)
- Caledon Growth-Related Roads Detailed Design – Town of Caledon: Aquatic biologist responsible for characterizing existing aquatic habitat to identify potential impacts, as well as environmental permit and approval requirements associated with the rehabilitation of six sections of roads within the Town of Caledon. As part of this project, Natasha carried out fish habitat assessments and a SAR screening to inform the design. (2021 – present)
- Church Street Bridge Replacement – Town of Ajax: Post-Construction monitoring at Remnar Bridge over the East Duffins Creek to satisfy TRCA. Aquatic biologist responsible for assessing the stability and condition of the creek banks and abutment slopes, the success of vegetative plantings and cuttings, and undertaking annual fish sampling

to assess the fish community for two years following restoration works. Three additional years of slope monitoring will be conducted. (2021 – present)

- Grand River Species at Risk (SAR) Mussel Relocation, Highway 401, Kitchener – Ministry of Transportation (MTO) West Region: Assisting with the SAR mussel relocations and post-relocation monitoring for a multi-year construction project to comply with all *Endangered Species Act* (ESA), *Fisheries Act*, and *Species at Risk Act* (SARA) permits and authorizations. Also performing erosion and sediment control (ESC) inspections. (2021 – present)
- Glenwood Crescent Slope and Road Restoration – City of Toronto: Detailed design services for emergency slope remediation and road reconstruction along Glenwood Crescent for a slope failure that occurred during a large storm event. Natasha was the Aquatic Biologist responsible for the characterization of Taylor-Massy Creek, down slope of the road failure, in support of a scoped Environmental Impact Study (EIS) prepared for the Toronto and Region Conservation Authority. This characterization included reviewing and compiling background data, as well as completing an aquatic habitat assessment. (2017 – 2018)
- Baycliffe Stormwater Management (SWM) Pond Cleanout – Baycliffe Homes Inc. Aquatic biologist for the Baycliffe SWM Pond Cleanout, undertaken adjacent to Redside Dace habitat, in anticipation of City assumption of infrastructure, in Whitby, Ontario. Responsible for the collection and relocation of fish and wildlife from pond in preparation for cleanout, as well as the continuous water quality monitoring completed during the dewatering of the SWM pond to ensure the resulting discharge did not impair Redside Dace habitat. Monitoring was carried out in accordance with the MNRF requirements for preserving aquatic species at risk regulated habitat. As part of this project, Natasha obtained scientific collector permits from MNRF in preparation for field work and prepared the MNRF mandatory collection reports per permit conditions. (2017)
- Elkford Stormwater Management (SWM) Pond Cleanout – Elkford Investments Inc. Aquatic biologist for the Elkford SWM Pond Cleanout, undertaken in anticipation of City assumption of infrastructure, in Milton, Ontario. Responsible for the collection and relocation of fish and wildlife from pond during dewatering, obtaining scientific collector permits in preparation for field work, and preparing the MNRF mandatory collection reports per permit conditions. (2017)
- MTO Central Region, Two Contract Packages for Seven Culverts, Simcoe Region, York Region, and Durham Region, Ontario, Canada. – Ministry of Transportation of Ontario. Detailed design services and preparation of two contract packages to repair, reline, or replace seven nonstructural culverts along Highway 400 in Simcoe Region, Highway 9 in York Region, and Highway 12 in Durham Region. The scope of work also included undertaking a Group C Class Environmental Assessment, coordinating utilities, reviewing sign and pavement marking upgrades, and providing roadside safety upgrades. Natasha was the fisheries biologist responsible for undertaking field investigations to address data gaps identified during the background review. She also prepared the fisheries memo summarizing existing conditions and ecological constraints at the seven culvert locations, assessing the potential impacts of the proposed design, and preparing the Ministry of Transportation notification package. (2020 – 2021)
- Natural Sciences Services Retainer No. 3, Assignments 1–27 (3016-E-0013), London, Ontario, Canada – Ministry of Transportation of Ontario. Fisheries biologist for a natural sciences retainer agreement with the Ministry of Transportation of Ontario Southwestern Region, various environmental services were provided to MTO. Assignments 1–27 included performing terrestrial field investigations, preparing condition and impact assessment reports, and conducting aquatic habitat and fish community surveys. Natasha was responsible for collecting and compiling background information to identify data gaps, obtaining licences to collect fish for scientific purposes in preparation for fieldwork, conducting fisheries surveys and aquatic habitat assessments, assisting with post-relocation mussel monitoring programs, preparing existing condition and impact assessment reports, consulting with government agencies, and preparing the Ministry of Transportation notification form and environmental contract special provisions for the client. (2019 – 2021)
- Welland River Twin Bridge Replacement and Structural Culvert Rehabilitation, Engineering Services During Construction, St. Catharines, Ontario, Canada – Ministry of Transportation of Ontario. Fisheries biologist for the twin

bridge replacement design-build project. Responsibilities included assisting with species-at-risk mussel relocations and fish salvages in advance of cofferdam installation and existing pier removal work. (2019 – 2021)

- Long Point Causeway Bridge Rehabilitation and Replacement, Long Point, Ontario, Canada. – Norfolk County. Detailed design services for rehabilitating Long Point Causeway from Lakeshore Road to Erie Boulevard and replacing the Long Point Causeway Bridge over Big Creek. The scope of work includes reconstructing and widening Long Point Road with two 3.5m wide lanes, 1.5m wide paved shoulders to accommodate cyclists, and 1.0m wide gravel shoulders; replacing the existing timber pile bridge over Big Creek with a new precast hollow-core concrete girder bridge to the west of the existing bridge; providing environmental services, including permitting and approvals; and overseeing stakeholder engagement. Natasha assisted with fish habitat assessments and fisheries inventories within species-at-risk habitat. These studies were required to obtain regulatory approvals for Fisheries Act, Species at Risk Act, and Endangered Species Act permitting in support of the bridge rehabilitation and causeway improvement construction works. (2020)
- Eglinton West Light Rail Transit Extension, Greater Toronto Area, Ontario, Canada. – Metrolinx. The Eglinton West Light Rail Transit Extension project is an approximately 9.4 km long light rail extension running west along Eglinton Avenue from Mount Dennis Station to the Toronto Pearson International Airport, including eight underground stations. The line is a direct extension of the Eglinton Crosstown Light Rail Transit, which consists of 19 km of new light rail alignment from Kennedy Road in Scarborough to Mount Dennis Station in Toronto. As one of the project biologists, Natasha conducted a desktop review to identify data gaps and to scope fieldwork by collecting and assessing existing information. After identifying data gaps, undertook field investigations to assess existing conditions and coauthored the natural environment summary report detailing the ecological constraints within the project area for inclusion in the environmental project report. Responsibilities included completing an assessment of aquatic conditions, assisting with the assessment of terrestrial environmental features, performing a species-at-risk review, and consulting with government agencies. (2019 -2020)
- Highway 401 Widening from Highway 8 to Highway 24 and Bridge Rehabilitation and Replacement, Kitchener, Waterloo, and Cambridge, Ontario, Canada. – Ministry of Transportation of Ontario. Detailed design for widening 5.5 km of Highway 401 from 6 to 10 lanes, from Highway 8 to Highway 24. The design included alignment improvements, two underpass bridge replacements, two rail crossing bridge widenings and rehabilitation, four bridge replacements over the Speed River, retaining walls, an advanced traffic management system, high-mast lighting, drainage, construction staging, and environmental mitigation. Natasha assisted with species-at-risk mussel post-relocation monitoring for this multiyear highway construction project, which included monitoring habitat enhancement measures installed to mitigate project impacts by improving host fish species habitat. (2019 – 2020)
- MTO Northeastern Region Retainer, Highway 129 Phase 2 Culvert Replacements, Work Order No. 9, Sudbury, Ontario, Canada. – Ministry of Transportation of Ontario. As part of the Ministry of Transportation of Ontario's five-year Northeastern Retainer Contract. Natasha was a fisheries biologist for the Highway 129 in Sudbury culvert replacement project. Her responsibilities included collecting and compiling existing study information and undertaking fisheries surveys and aquatic habitat assessments to address data gaps. She also prepared a summary of existing conditions and ecological constraints for inclusion in the final project report, the Ministry of Transportation notification form, and environmental contract special provisions. (2019 – 2020)

urban development – institutional and residential

- Lakeshore Pentecostal Camp Sanitary Servicing Detailed Design – Completed field studies examining fish habitat in Coverts Creek and tributaries, in support of the detailed design for the installation of sanitary forcemain and watermain to upgrade existing services at the Lakeshore Pentecostal Camp, as well as a gravel access/emergency evacuation route which included one new culvert. Findings were documented in a natural heritage memo. (2021 – present)

- Redside Dace Habitat Restoration – Stouffville Grace Baptist Church: Aquatic Biologist responsible for the preparation of an Information Gathering Form in support of a church development within the regulated habitat of the endangered Redside Dace, which included undertaking background literature review, aquatic field investigations, and agency consultation. (2018 – 2019)
- Sycamore II & Elliot Lands Townhouses – ARG Group Inc.: Aquatic Biologist for the environmental assessment of impacts associated with a new housing development in Schomberg, Ontario. Contributed to an Environmental Impact Study (EIS) in support of a proposed residential development through the characterization of the aquatic habitat and on-site fisheries significance. Field work results were used to identify project impacts and develop recommendations concerning habitat enhancement and restoration of surface water features. (2017 – 2018)
- West Whitby Holdings Small Pond Decommissioning – West Whitby Holdings Inc. Aquatic biologist for the West Whitby Holdings pond decommissioning undertaken in support of a new housing development in Whitby, Ontario. Responsible for the collection and relocation of fish and wildlife from pond during dewatering, obtaining scientific collector permits in preparation for field work, and preparing the MNRF mandatory collection reports per permit conditions. (2017)

energy – renewable

- St. Columban Wind Facility Post-Construction Bird and Bat Mortality Monitoring – BluEarth Renewables Inc.: Field Ecologist for the post-construction monitoring of the 32.98-Megawatt St. Columban Wind Facility in St. Columban, Ontario. Responsible for the post-construction bird and bat mortality monitoring and compliance reporting, including regular mortality surveys, scavenger impact trials, and searcher efficiency trials involving the collection, identification, and organization of bird and bat specimens, and data analysis. (2017 – 2019)
- K2 Wind Energy Facility Post-Construction Bird and Bat Mortality Monitoring – Pattern Energy Group Ltd.: Field Ecologist for the post-construction monitoring of the 270-Megawatt K2 Wind Energy Facility located between Kincardine and Goderich, Ontario. Responsible for the post-construction bird and bat mortality monitoring, including regular mortality surveys, scavenger impact trials, and searcher efficiency trials involving the collection, identification, and organization of bird and bat specimens and data analysis. (2017)

committees + special undertakings

- Council-appointed Member of the City of Markham's Environmental Advisory Committee
- Volunteer with Trout Unlimited – Greg Clark Chapter Working Group

presentations

- Garrido Cortes C., Welch N., Is Forestry Impacting Dipteran Communities in Algonquin Park? Part II: Body Size, Presentation, Entomological Society of Ontario Annual General Meeting, 2015.

publications + papers

- Smith M. A., Boyd A., Chan A., Cloutt S., Brisa P., Dolson S., Eagalle T., Espinola S., Fairweather A., Frank S., Fruetel C., Garrido Cortes C., Hall J., Ho C., Matczak E., McCubbin S., McPhee M., Pare K., Paris K., Richard E., Roblin M., Russell C., Snyder R., Solecki A., Schmitt T., Trombley C., Vandermeer C., Warne C., Welch N., Xavier-Blower C., Investigating the effect of forestry on leaf-litter arthropods (Algonquin Park, Ontario, Canada). PLoS ONE, 2017.

safety training

- RVA Safe Work Practices and Procedures

- RVA Confined Space Entry Policy and Procedures
- WHMIS
- Safe Practices for Trenching and Shoring
- AODA Compliance

employment record

2021 to date	Aquatic Biologist, R.V. Anderson Associates Limited, Burlington, Ontario, Canada
2019 to 2021	Fisheries Biologist, Parsons Inc., Markham, Ontario, Canada
2019	Arboriculture Intern, Aboud & Associates Inc., Guelph, Ontario, Canada
2017 to 2019	Aquatic Biologist, COLE Engineering Group Ltd., Markham, Ontario, Canada
2017	Contract Field Ecologist, Colville Consulting Inc., St. Catharines, Ontario, Canada

TISHA DOUCETTE

staff member of R.V. Anderson Associates Limited

education

B. Sc., (Ecology & Evolution), Western University, London, Ontario, Canada.
Diploma, (Environmental Technology), Fanshawe College, London, Ontario, Canada

registrations

Class EA Process, MTO RAQS
Fisheries Assessment, MTO RAQS
Fisheries Compliance During Construction Specialist, MTO RAQS
Natural Sciences, MTO RAQS
Environmental Inspection During Construction Registered, MTO RAQS

certifications

Certified Environmental Professional, Canadian Environmental Certifications Approvals Board (CECAB)
GGHACA ESC for Urban Construction (9aa89736)
Certified Inspector of Sediment and Erosion Control (CAN-CISEC #0796)
Temperate Wetland Restoration, Ministry of Natural Resources and Forestry (OMNRF)

professional activities

Tisha is a Certified Environmental Professional (EP) and Project Manager with more than 20 years of experience leading provincial and municipal infrastructure projects through the Class Environmental Assessment (EA) process, coordinating ecological inventories, impact assessments, and acquiring environmental permits and approvals. She has a broad-based knowledge and understanding of a wide variety of natural environmental disciplines as well as current environmental issues. Tisha has a proven ability to coordinate a multidisciplinary team of experts and specialists pertaining to aquatic and terrestrial impact assessments, wildlife habitat management, and species at risk. She is particularly practiced in the development of environmental mitigation measures and habitat enhancement / compensation plans. She offers the technical expertise as well as the management capability to coordinate the environmental services required to meet legislative requirements and to obtain environmental approvals pertinent to a project.

Projects

provincial projects

- Natural Science Services on Retainer– Ministry of Transportation: Management of all assignments related to this three-year natural sciences services retainer. The ecological services group, led by Tisha, was awarded, for a third term, a retainer assignment to provide natural sciences services for projects throughout MTO's West Region. One of these assignments included a Feasibility Assessment for the provisions of wildlife culverts and fencing along Highway 6 near Owen Sound. (2017-2020)
- Multi Services Retainer for Detail Design Services, Work Order No. 7– Ministry of Transportation: Environmental Lead responsible for the coordination of the Class EA process, ecological inventories and archaeology for the rehabilitation of two structures on Highway 17 in the Municipality of Markstay. (2018-2023)
- Replacement of Deception Creek and Smith Creek Bridges on Highway 668 and Replacement of Gilles Creek Bridge on Highway 579 (Detail Design), Region, G.W.P. 5267-11-00 – Ministry of Transportation: Environmental Lead responsible for the coordination of the Class EA process, ecological inventories, acquisition of pertinent environmental approvals and development of environmental mitigation and contract preparation.

- Large Value Retainer, Mega 12, Work Order No. 1 & 2 – Ministry of Transportation: Natural Environment Discipline Lead for work order assignments. Assignments thus far include ecological inventories and documentation of 16.3 km of Highway 17 and ecological inventories for the replacement of two bridge structures on Highway 62 and Highway 7. (2018-2021)
- Highway 69 Naiscoot Lake Bridge Replacement (Detail Design), G.W.P. 5145-16-00 – Ministry of Transportation: Environmental Lead responsible for the coordination of the Class EA process, ecological inventories, acquisition of pertinent environmental approvals and development of environmental mitigation and contract preparation. (2017-2018)
- Natural Science Services on Retainer– Ministry of Transportation: Management of 65 separate work order assignments under this three-year natural sciences service's retainer. Assignments included: ecological inventories; assessment of potential project impacts; Species at Risk (SAR) surveys; design and monitoring of a concrete fish ladder; development of environmental mitigation measures; acquisition of required environmental permits; environmental monitoring during construction and post-construction environmental monitoring. (2014-2017)
- Highway 7 Rehabilitation, Perth County G.W.P. 3058-14-00 – Ministry of Transportation: Environmental lead for the Preliminary/ Detailed Design and Class EA Study for the rehabilitation of Highway 7 including culvert replacement, roundabout construction, ecological inventories and impact assessment. This project is classified as a Group B project including the preparation of a Transportation Environmental Study Report (TESR). Consultation has included two Public Information Centres and several property owner meetings. (2015-2018)
- Highway 3 West Bundle, Kingsville, W.P. 7-96-00 and St. Thomas W. P 3075-12-00 – Ministry of Transportation: Environmental Lead for the Detail Design and Class EA Study for the pavement reconstruction of Highway 3 from 0.6 km west of Essex Road 276 to Essex Road 34 in Kingsville and Highway 3 from Highway 4 Talbotville to Centennial Ave, City of St. Thomas. These projects were both initiated as Group B projects and were subsequently stepped down to Group C projects. (2014-2015)
- Natural Science Services on Retainer (2012-2014) – Ministry of Transportation: Management of 25 separate work assignments under a two-year natural sciences retainer assignment with MTO West Region. Assignments included aquatic and terrestrial inventories and impact assessment, the development of mitigation measures and acquisition of agency approvals. Other services have included post-construction environmental monitoring and reporting in accordance with agency permits and approvals. (2012-2014)
- Highway 7 Reconstruction, GWP 361-98-00 – Ministry of Transportation: Lead Environmental Planner responsible for the coordination of the Class EA process including public consultation, ecological inventories, assessment of ecological impacts and the development of environmental mitigation measures. This Preliminary and Detailed Design and Class EA study included highway reconstruction and rehabilitation of five bridge structures The EA process adhered to the process for a Group B project in accordance with the requirements of the Class EA for Provincial Transportation Facilities (MTO 2000). This project included the acquisition of an ESA overall Benefit permit. (2012-2013)
- Highway 21 Rehabilitation, County of Huron G.W.P. 136-98-00 – Ministry of Transportation: Coordination of the Class EA process and environmental specialties ensuring that inventories are completed within the appropriate season, assessments and reporting are as per Ministry protocols and applicable approvals are attained within in a timely fashion. (2008–2009)
- Highway 402 and County Road 79 – County of Lambton and Ontario Ministry of Transportation: Coordination of the Provincial Class EA process as a Group B project for the detailed design of new interchange ramps, structure rehabilitation, and roadway improvements. This included a PIC and preparation of a Design and Construction Report (DCR). (2007 – 2008)

- Highway 401 Widening (Detail Design) – Region of Waterloo: Lead Environmental Planner coordinating the Class EA Study and natural environmental inventories for the reconstruction and widening of Highway 401 from 0.5 km west of Regional Road 8 easterly to 0.5 km east of Regional Road 24. This project included the widening of the existing Highway 401 6 lane cross section to 10 lanes including the replacement and widening of the Speed River bridges. Public consultation was throughout the Detailed Design including two Public Information Centres. This project included the design of wildlife crossing under the Speed River bridges, and acquisition of the following environmental permits: Navigation Protection Act, Endangered Species Act (Wavy-rayed lampmussel, Barn Swallow), Noise Bylaw exemptions, DFO Support as per the MTO/DFO/OMNRF Fisheries Protocol. (2011–2014)
- Highway 24 Reconstruction and Replacement of the Whitemans Creek Bridge (Preliminary and Detail Design), GWP 336-97-00 – Ministry of Transportation: Lead Environmental Planner responsible for the coordination of the environmental assessment study including natural resource inventories and impact assessments for this assignment. Environmental considerations for the study area included the presence of several Species At Risk (SAR), a Provincially Significant Wetland (PSW), a cold water Provincial Fish Sanctuary, numerous groundwater seeps, highly erodible soils and a wildlife linkage /corridor area. Federal approvals (Fisheries Act, Navigable Waters Protection Act) were required for this project, and an Environmental Screening Report pursuant to the Canadian Environmental Assessment Act (CEAA) was prepared and all approvals were obtained. At the completion of the design phase, the ecological services team, led by Tisha, was retained to undertake on–site environmental monitoring services to oversee the environmental protection measures. (2008-2012)
- Highway 3 Reconstruction (Preliminary and Detail Design), Canfield, Haldimand County GWP 3507-02-00 – Ministry of Transportation: Lead Environmental Planner responsible for the coordination of the Class EA Study and natural environmental inventories for the assessment of drainage improvement alternatives within the community of Canfield. This assignment was classified as a Group 'B' project in accordance with the Class EA for Provincial Transportation Facilities (MTO 2000). Public consultation was continuous throughout the Preliminary and Detailed Design phases and includes three Public Information Centres (PICs). (2010-2013)
- Highway 23 Structure Replacements and Rehabilitation, County of Huron, County of Perth GWP 3043-06-00 – Ministry of Transportation: Lead Environmental Planner responsible for the coordination of the Class EA Study and management of ecological inventories for fish and fish habitat, botanical inventories and community classification, dedicated avian surveys as well as incidental wildlife surveys were key components to this study. Background investigations noted Black Redhorse (*Moxostoma duquesnei*), a provincially and nationally listed Threatened species as a documented species with the study area. An OMNR Permit for Species Protection and Recovery Clause 17(2)(b) was acquired therefore to undertake a fisheries assessment. The field studies confirmed the species was not present and further permitting was not required. This project illustrates Ms. Doucette's ability to lead a team of technical specialists to complete a comprehensive study that meets legislative requirements and is on schedule. (2010–2011)

design-build assignments

- Highway 401 Reconstruction, Elgin County – Ministry of Transportation: Environmental Lead responsible for the Class EA process, acquisition of environmental permits and approvals, development of an Environmental Management Plan (EMP), and oversight of environmental monitoring during construction. (2017 – 2019)
- Highway 596, Alice Creek Culvert Replacement – Ministry of Transportation: Development and administration of the Environmental Management System (EMS) and Environmental Management Plan (EMP) for the replacement of the Alice Creek culvert on Highway 596, including the development of environmental mitigation measures and oversight and monitoring during construction. (2016-2017)
- Highway 61, Replacement of Three Structures, Manitouwadge – Ministry of Transportation: Development and administration of the Environmental Management System (EMS) and Environmental Management Plan (EMP) for the

replacement of three structural culverts along Highway 614, Manitouwadge, including the development of environmental mitigation measures and oversight and monitoring during construction. (2013 – 2015)

- Highway 12, Replacement of the CNR Overhead Structure, Midland – Ministry of Transportation: Preparation and administration of an Environmental Management Plan (EMP) including development of environmental mitigation measures and contract specifications. Coordination of Environmental Monitoring / Inspection services during construction. (2012-2013)
- Highway 12, Replacement of the CNR Overhead, Orillia – Ministry of Transportation: Preparation and administration of an Environmental Management Plan, including the coordination of the Class EA Study and ecological inventories for the assessment of impacts and development of environmental mitigation measures including contract specifications. Provided Environmental Monitoring / Inspection services during construction. (2012-2012)
- Highway 8, Replacement of Structural Culvert at Fairchild Creek, City of Hamilton – Ministry of Transportation: Preparation of an Environmental Management Plan and coordination of the Class EA Study and ecological inventories for the assessment of impacts and development of environmental mitigation measures and contract specifications. Provided Environmental Monitoring / Inspection services during construction. (2010-2011)

environmental monitoring

Provided oversight and on-site monitoring for numerous provincial highway and municipal projects:

- MTO Gully Creek Culvert Replacement, Bayfield, ON
  - Project Manager responsible for the administration of on-site environmental monitoring specialty services for the removal and replacement of the Gully Creek crossing on Highway 21. Gully Creek provides habitat for two at-risk fish: Redside Dace and Black Redhorse. An MECP Endangered Species Act permit, DFO Species At Risk Act Permit and a Letter of Advice guided the environmental specialist oversight, monitoring and reporting.
- MTO Highway 401, Grand River, Kitchener, ON
  - Project Manager responsible for the administration of the freshwater mussel SAR relocation within the Grand River, fisheries contracts oversight and erosion and sediment control monitoring.
- Highway 401 10-lane widening and Bridge Rehabilitation and Replacements, Cambridge, ON
  - Project Manager responsible for the administration of the freshwater mussel SAR relocation within the Speed Rivers, fisheries contracts oversight and erosion and sediment control monitoring.
- Highway 401 Bridge over Ojibway Park, Windsor, MTO
- Highway 7 Rehabilitation, Rockwood, ON - MTO
- Highway 40 Rehabilitation and Intersection Improvements, Sarnia, ON, MTO
- Highway 401 – Provincial Road, Windsor ON, MTO Contract 2007-3043
- Highway 401 – Belle River Road, MTO Contract 2008-3003
- Highway 401 – Wellington Road, MTO Contract 2006-3034
- Highway 402 – Mandaumin Road to Oil Heritage Road, MTO Contract 2006-3029
- Highway 401 – French Line, MTO Contract 2005-3046
- Highway 6 - Fergus, MTO Contract 2006-3032
- Highway 401, Tilbury – Contract 2004-3002
- Highway 402, Warwick – Contract 2003-3019
- Highway 401, Kitchener – Contract 2002-3001
- Highway 403 and Highway 24 Interchange
- Highway 3 – St. Thomas, Contract 2000-48
- Highway 21 – Forest, Contract 2000-43 Stoney Creek Erosion Control Wetland, London, ON - City of London

- Airport Road Widening (formerly Highway 100), City of London
- Sunningdale Storm Water Management Pond, London, ON - City of London
- Kilally Retaining Wall Repair, London, ON - City of London

municipal projects

- Replacement of the Labatt Sanitary Siphon at the Forks of the Thames, Detailed Design – City of London: Natural Heritage Lead responsible for the oversight and management of the ecological inventory, impact assessment and documentation in a Scope Environmental Impact Study (EIS) report. (2020-2022)
- Caledon Growth-Related Roads Detailed Design – Town of Caledon: Natural Heritage lead responsible for the oversight and management of the ecological inventory, impact assessment, development of mitigation measures and acquisition of environmental permits and approvals. The ecological assessment will be documented into a Natural Heritage Assessment report. This assignment includes road and drainage improvements for Kennedy, Main, Humber Station Road, Mountainview Road, Mill Street and Willoughby roads. This detailed design assignment will be completed as six separate contracts following a Schedule A+ and Schedule B EA process. (2020-2022)
- Cainsville Water and Wastewater Servicing Environmental Assessment – County of Brant: Natural Heritage Lead for the Preliminary design for both water and wastewater servicing to meet the needs of the community to 2050. Tisha was responsible for coordinating the ecological inventory, impact assessment and reporting. (current project)
- Columbia Way Environmental Assessment (EA) Study – Town of Caledon: Tisha was the natural heritage lead for the Preliminary design for road improvements to urbanize and improve rural settings of Columbia Way in Bolton. Responsible for oversight and coordination of the compilation of existing ecological data, field investigations, assessment of impacts and development of potential mitigation measures. All of which will be documented in an Environmental Impact Study (EIS). (current project)
- Church Street Bridge Replacement – Town of Ajax: Providing oversight and coordination for the post-Construction monitoring at Remnar Bridge over the East Duffins Creek to meet Toronto Region Conservation Authority (TRCA) approval commitments. Post-construction monitoring will include: stability and condition of the creek banks and abutment slopes, success of vegetative plantings and cuttings, and fish community will be assessed annually for two years following restoration works. Three additional years of slope monitoring will also be conducted. (current project)
- Hyde Park Road Widening Phase 1, Oxford Street to South Carriage Road - City of London: Detailed design assignment consisting of widening Hyde Park Road from two to five lanes, sidewalks, bike paths, noise wall, retaining wall, storm sewers, local and deep trunk sanitary sewers, forcemain, local and trunk watermain, traffic signals, illumination and new bridge over CN Rail. Tisha was responsible for providing environmental mitigation measures for incorporation into the construction contract. This included the provision of a wildlife culvert and fencing to connect two stormwater management ponds on either side of Hyde Park Road. Post construction monitoring including the installation of a wildlife camera was also completed. Photos of turtles, the target species using the culvert were captured. (2017- 2019)
- Adelaide Street North Widening Environmental Assessment Study – City of London: Project Manager and Environmental Lead responsible for the coordination of a Schedule ‘C’ EA to identify the preferred roadway widening alternatives on Adelaide Street from Fanshawe Park Road to Sunningdale Road including provisions for a wildlife culvert next to an existing drainage culvert. (2017- 2019)
- Whiteoak / Dingman Secondary Plan, Natural Heritage Features and Subject Land Status Report – City of London: Project Manager for the inventory of natural heritage features and components of the Whiteoak and Dingman secondary plan study area including preparation of a Subject Lands Status Report. (2018 – 2019)
- Environmental Assessment Study of Bostwick Road, including the extension of Bradley Avenue Assistant – City of London: Project Manager and Environmental lead responsible for the coordination of a Schedule ‘C’ EA to identify

the preferred alignment for Bostwick Road west of Wharncliffe Road and the Bradley Avenue extension where it intersects Bostwick Road in support of the implementation strategy of the Southwest Area plan (SWAP), including the management of the Environmental Impact Study (EIS). (2016- 2019)

- Green Valley Drain Storm/ Drainage Remediation Works – City of London: Environmental lead for the oversight and coordination of the ecological assessment, development of mitigation measures and two-year post-construction monitoring. (2015-2017)
- Dingman Creek Erosion Control Wetland – City of London: Provided peer review of environmental components during the preparation of the functional design. Coordinated post-construction monitoring of fish communities and constructed fish habitats for the Erosion Control Wetland constructed adjacent to Dingman Creek. Preparation of technical memos to provide environmental updates and recommendations for improvement. (2013-2017)
- Dingman B-4 Stormwater Management Facility – City of London: Management and coordination of the Class Environmental Assessment and Scoped Environmental Impact Study for stormwater servicing. Ecological investigations included three-season vegetation surveys, breeding bird and amphibian surveys; Ecological Land Classification, wildlife surveys, fisheries and aquatic habitat assessment including benthic invertebrate sampling. Consultation included one Public Information Centre (PIC), agency and Indigenous communities engagement. (2014-2016)
- Central Thames River Subwatershed Study – City of London: Coordination of ecological services including the collection of and amalgamation of existing aquatic and terrestrial data features within the Central Thames Subwatershed in the City of London. (2012-2014)
- Mud Creek Subwatershed Study Update – City of London: Coordination of ecological services including the collection and summary of existing aquatic and terrestrial habitat features within the Mud Creek Subwatershed in the City of London. (2012-2014)
- Old Victoria Storm Water Management Facility #2 – City of London: Coordination of the Environmental Impact Study associated with the creation of a SWM pond adjacent to the Thames River. (2012-2014)
- Stoney Creek Erosion Control Wetland – Stormwater Management Facility – City of London: Oversight and coordination of environmental monitoring during and post construction. Monitoring efforts confirmed compliance with contract environmental requirements including groundwater monitoring, ESC measures, the installation of fishways, turtle nesting mounds, landscaping and native vegetation salvage. Post-construction monitoring of wetland units. (2011-2014)
- Twinning of the Thames River Bridge, Veterans Memorial Parkway – City of London: Managed the ecological services for the twinning of the Thames River Bridge. Three (3) new in-water bridge piers were required for the widening which resulted in the requirement for Fisheries Act authorization. The Wavy-rayed Lampmussel, an Endangered SAR listed on Schedule 1 of the Species at Risk Act (SARA) was confirmed present within the impacted area. Both a compensation plan for loss of fish habitat and location and monitoring plan for the displaced freshwater mussels was prepared. (2003-2006)

employment record

2019 to date	R.V. Anderson Associates Limited, Toronto, Ontario, Canada
2003 to 2019	Parsons Inc., London, Ontario, Canada
2001 to 2003	Ministry of Natural Resources and Forestry, Ontario, Canada

Oxford Street West and Gideon Drive Intersection

Environmental Impact Study (EIS)

Environmental and Ecological Planning Advisory Committee (EEPAC)

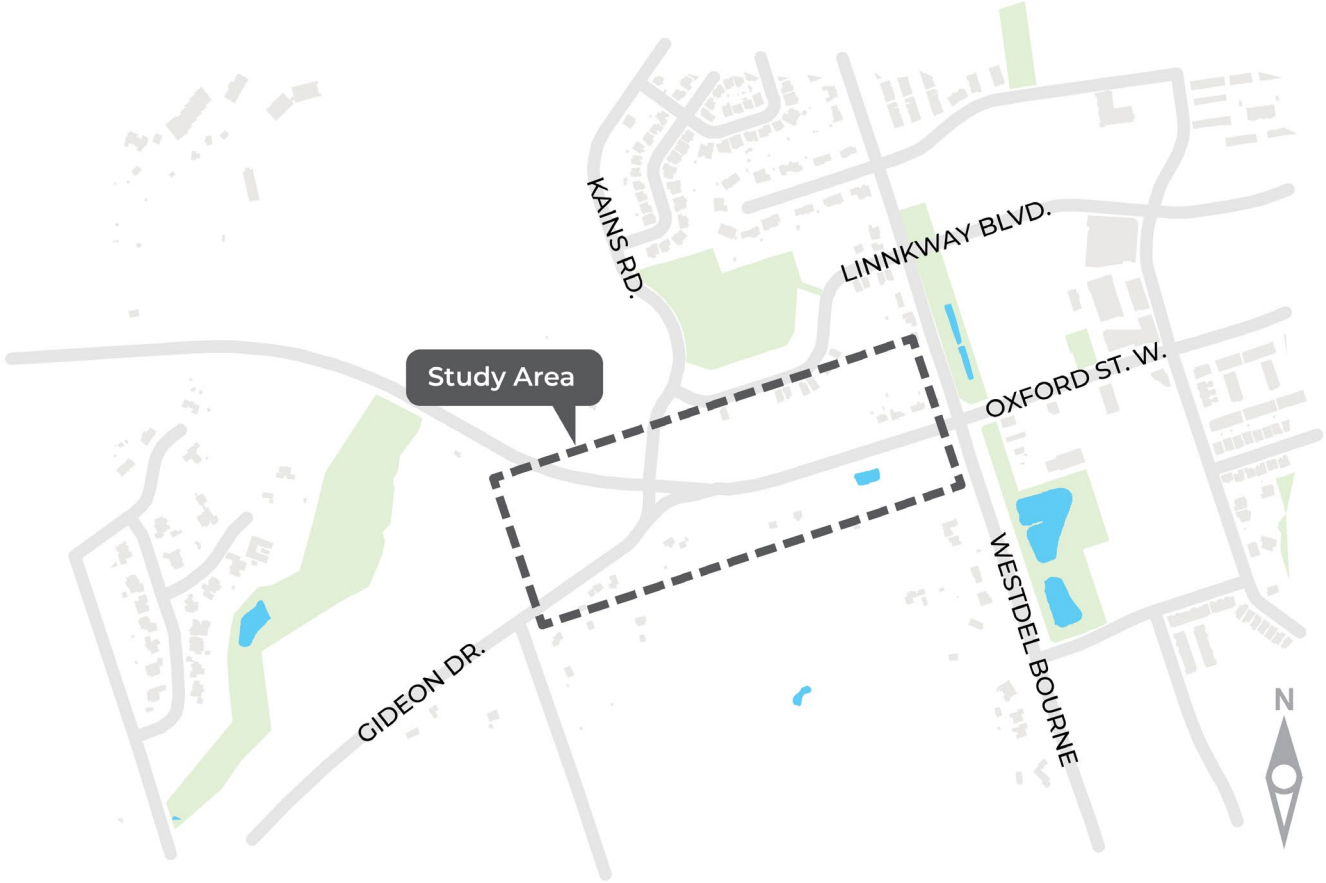
January 20, 2022 at 5pm

Agenda

- Study Area
- Municipal Class Environmental Assessment
- Environmental Impact Study Objectives
- Existing Conditions – Natural Environment
- Alternative Solutions
- Impact Assessment and Recommendations

Study Area

The Study Area consists of the Oxford Street West and Gideon Drive intersection and includes up to 200 meters in each direction of the intersection.



Municipal Class Environmental Assessment (MECA)

The Oxford Street West & Gideon Drive Intersection project was initiated in response to ongoing and planned development on the west side of the City, the connection of Kains Road, and associated increases in traffic through the intersection.

This project is classified as a Schedule ‘B’ Municipal Class Environmental Assessment (MCEA) which will be undertaken prior to the municipal construction project to ensure all reasonable alternatives, including ‘Do Nothing’, are considered and that the preferred alternative will have minimal impact on the natural, cultural, social and economic environment.

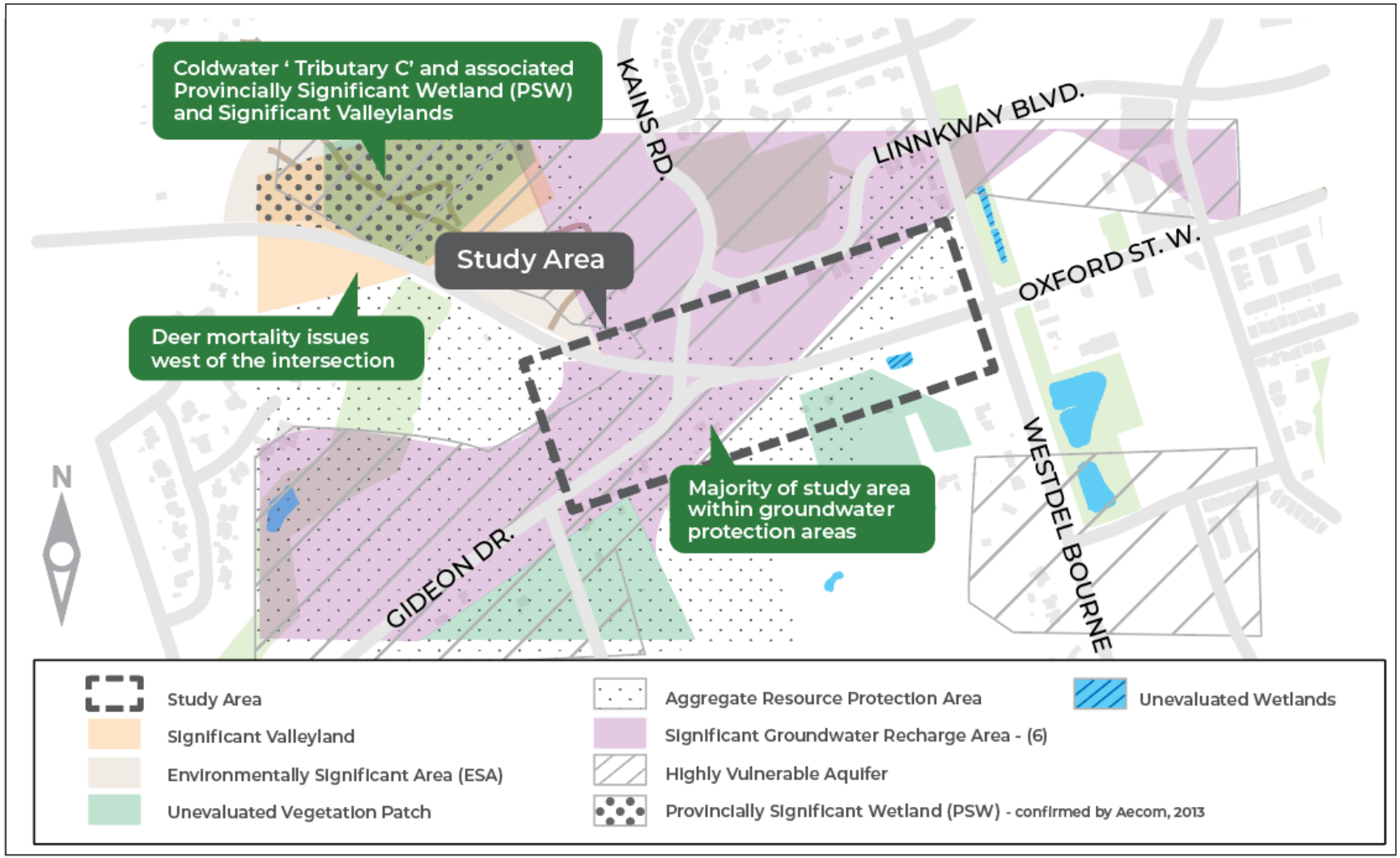
Part of this process includes the preparation of an Environmental Impact Study (EIS).

Environmental Impact Study (EIS) Objectives

The objectives of the Environmental Impact Study (EIS) for this project include:

- Characterize the existing natural heritage features within the Study Area;
- Evaluate the significance of the identified natural heritage features and functions;
- Identify potential constraints and opportunities;
- Assess the potential impacts of the alternative solutions on the natural heritage features/functions; and
- Determine mitigation measures to minimize the impacts and recommend potential enhancement.

Existing Conditions – Natural Environment



Existing Conditions – Natural Environment

ELC / Vegetation

- Ecological Land Classification (ELC) – the majority of the Study Area consists of cultural meadows and woodlands
- Surrounding Tributary C, ELCs consist of various swamps and meadow-marshes
- Rare floral species noted in background documents were not observed during inventory
- Invasive species noted – European Common Reed (*Phragmites australis*), Common Buckthorn (*Rhamnus cathartica*), and Autumn Olive (*Elaeagnus umbellate*)

Tree Inventory

- Tree inventory – 64 individual trees over 10 cm DBH
- No rare species or significant specimens, all trees inventoried were common and typical of the current land uses

Existing Conditions – Natural Environment

Wildlife and Significant Wildlife Habitat (SWH)

- Several Species at Risk (SAR) were noted in background studies
- No reptiles were observed; a Green Frog (*Rana clamitans*) was noted in Tributary C
- Area of wildlife crossing with white-tailed deer (*Odocoileus virginianus*) carcasses and game trail was noted immediately west of intersection
- Potential bat habitat is very limited within the right-of way and areas of impact
- One Monarch (*Danaus plexippus*) was noted on Common Milkweed (*Asclepias syriaca*) within the roadside south of Oxford Street

Breeding Birds

- Rare species/SAR – foraging Barn Swallow (*Hirundo rustica*) noted, no nesting
- All other species noted during surveys were common and secure in Ontario

Existing Conditions – Natural Environment

Designated Natural Areas

- Provincially Significant Wetland (PSW) associated with Tributary C, and an unevaluated wetland at eastern extent
- Kains Woods Environmentally Significant Area (ESA) includes the PSW
- Significant Valleylands are also associated with Tributary C
- Upper Thames River Conservation Authority (UTRCA) regulates the area surrounding Tributary C

Fish and Fish Habitat

- Study Area located in the River Bend subwatershed of the Upper Thames River
- Tributary C – coldwater stream with groundwater upwellings
- Resident Brook Trout (*Salvelinus fontinalis*) population and important spawning habitat

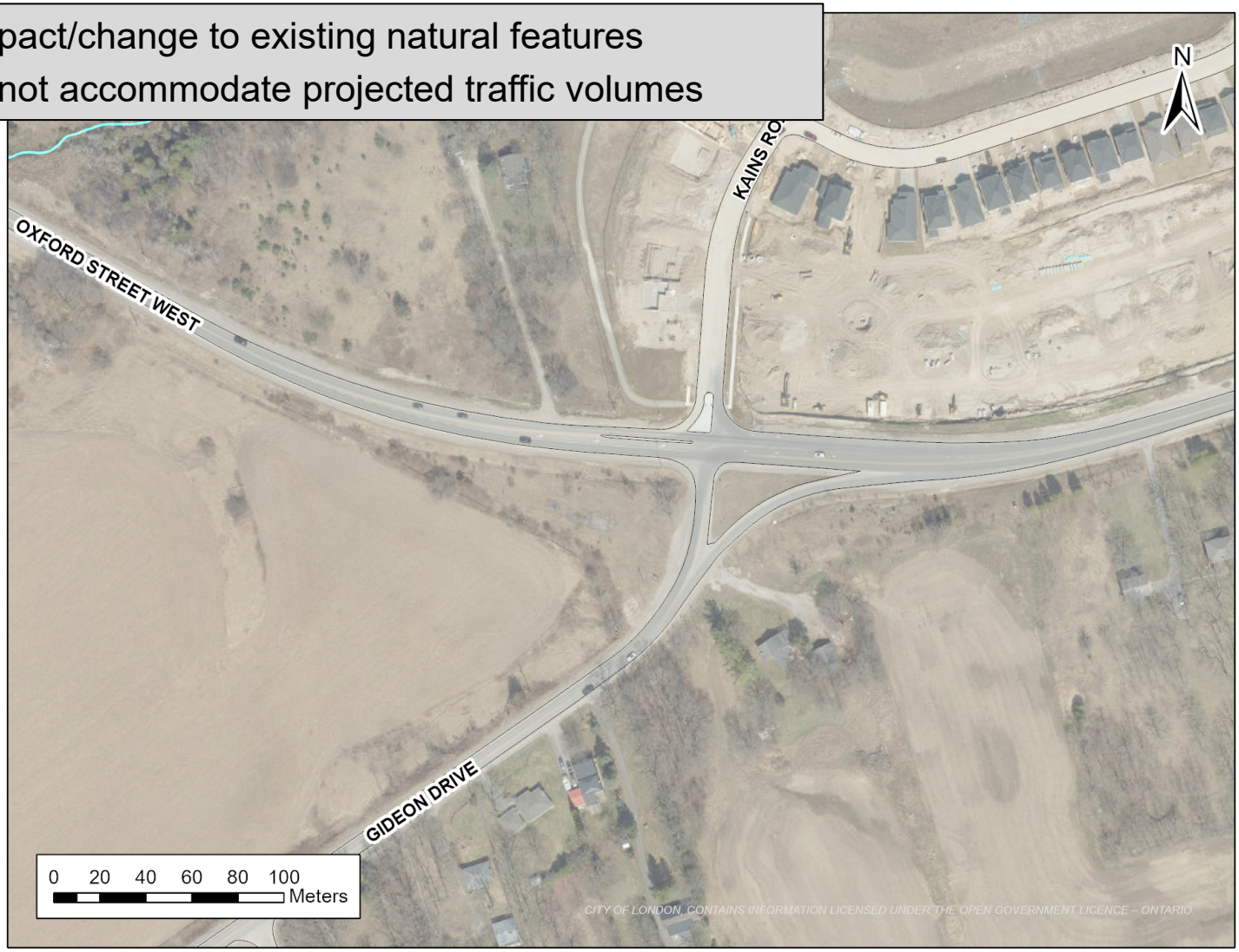
Alternative Solutions

The following alternative solutions were identified and developed for evaluation:

- **Alternative 1: Do Nothing –** Maintain existing condition of Oxford and Gideon
- **Alternative 2: Signalized Intersection –** Improvements consist of installation of traffic signals, crosswalks and cycling facilities.
- **Alternative 3: Single-Lane Roundabout –** Implement a single lane roundabout, crosswalks and cycling facilities.
- **Alternative 4: Multi-Lane Roundabout–** Implement a multi-lane roundabout with additional lanes to accommodate heavier traffic movements. Install crosswalks and cycling facilities.

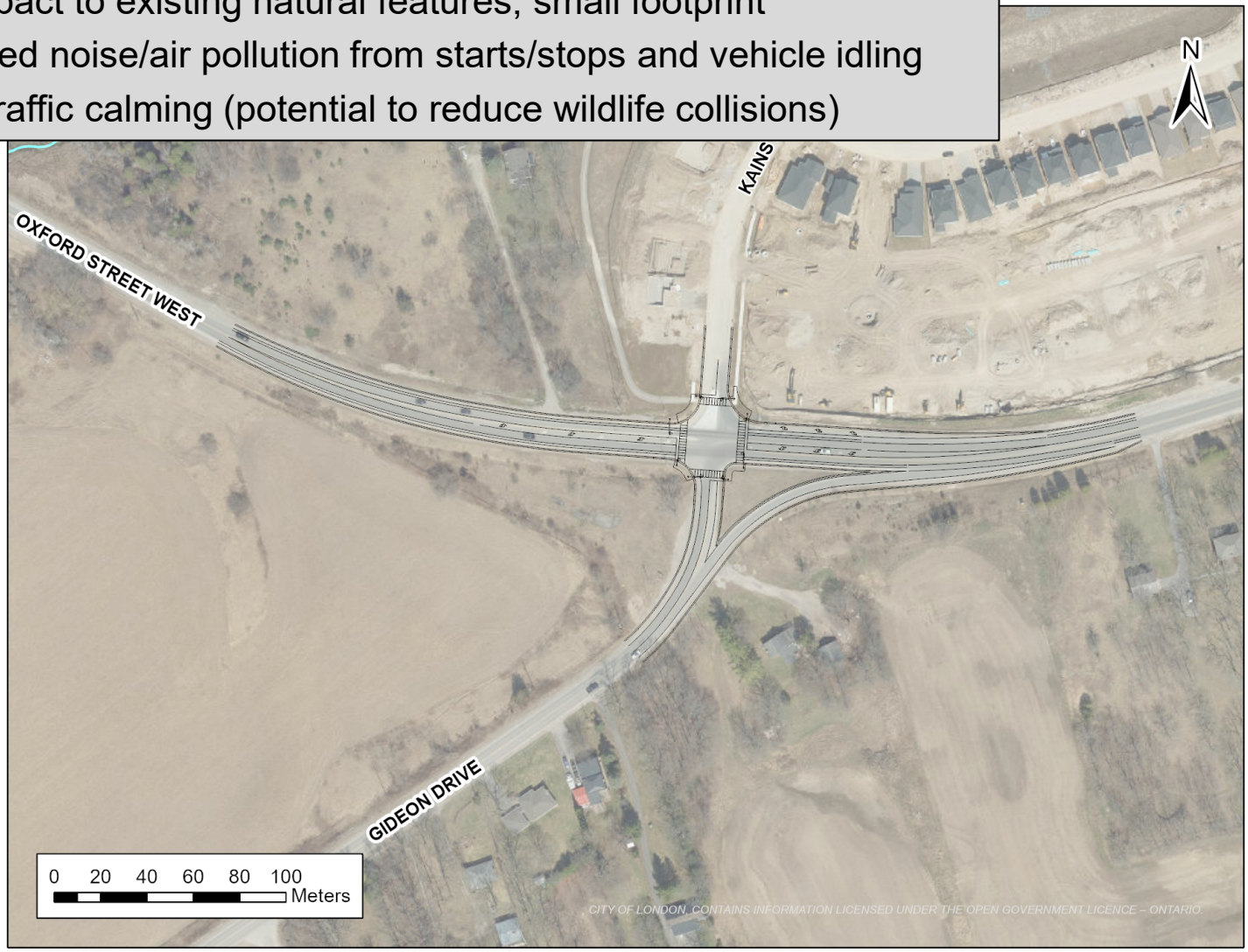
Alternative 1 – Do Nothing

- No impact/change to existing natural features
- Does not accommodate projected traffic volumes



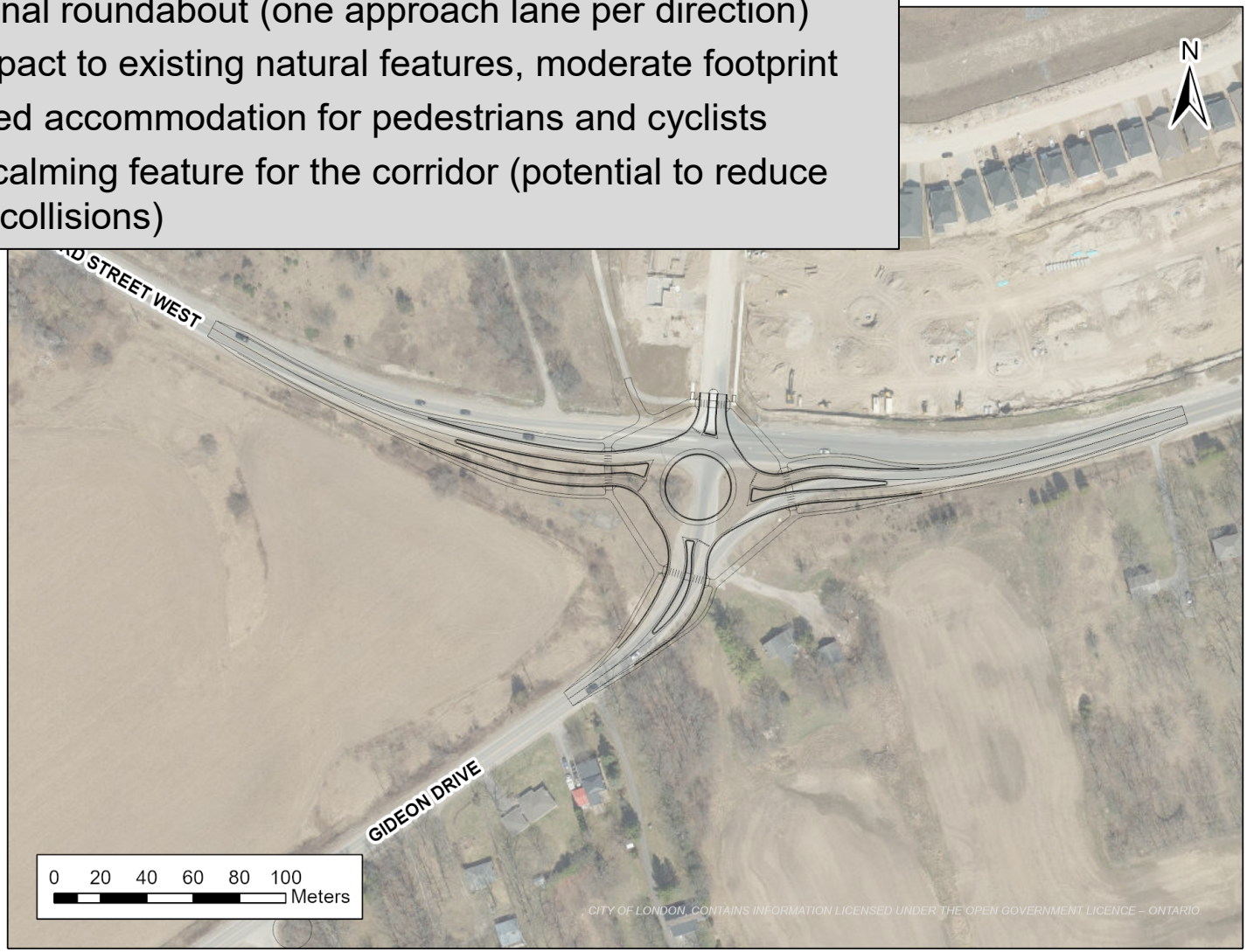
Alternative 2 – Signalized Intersection

- Low impact to existing natural features, small footprint
- Increased noise/air pollution from starts/stops and vehicle idling
- Some traffic calming (potential to reduce wildlife collisions)



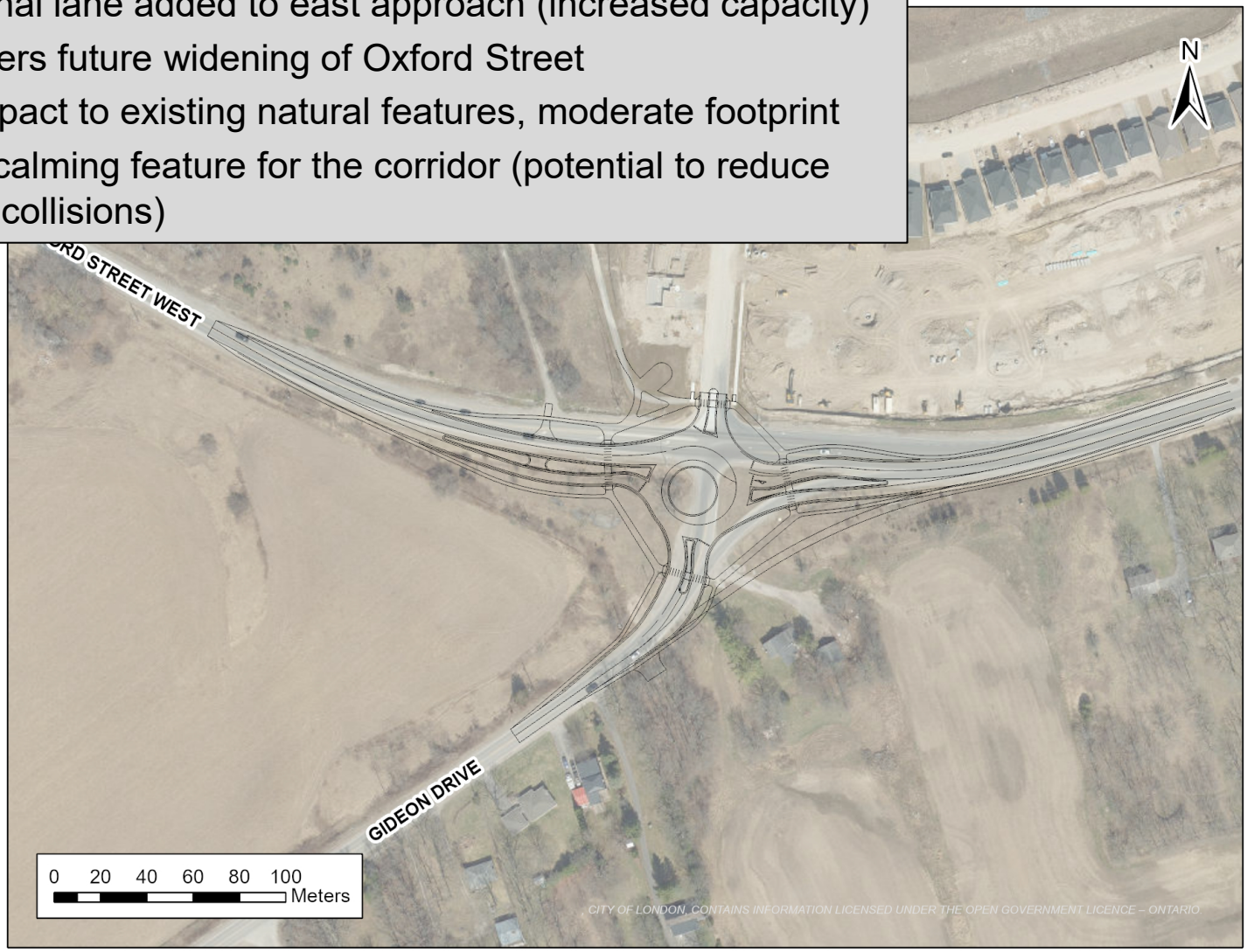
Alternative 3 – Single-Lane Roundabout

- Traditional roundabout (one approach lane per direction)
- Low impact to existing natural features, moderate footprint
- Improved accommodation for pedestrians and cyclists
- Traffic calming feature for the corridor (potential to reduce wildlife collisions)



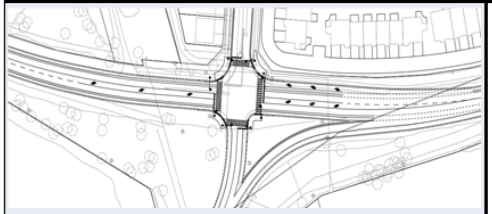
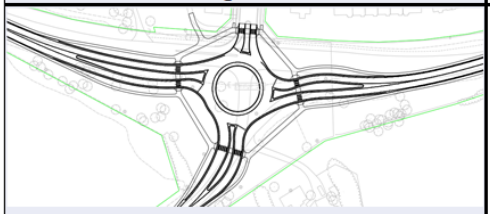
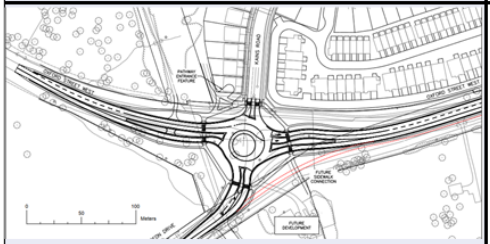
Alternative 4 – Multi-Lane Roundabout

- Additional lane added to east approach (increased capacity)
- Considers future widening of Oxford Street
- Low impact to existing natural features, moderate footprint
- Traffic calming feature for the corridor (potential to reduce wildlife collisions)



Overall Evaluation of Alternative Solutions

Eliminates opportunities for invasive removal and wildlife habitat enhancements

Alternative Solutions	Traffic Operations & Safety	Social Environment	Natural Environment	Cultural Heritage Resources	Cost	Evaluation Summary
Alternative 1 - Do Nothing	○	◕	◑	●	●	Not Recommended
 Alternative 2 - Signalized Intersection	◔	◕	◑	●	◕	Not Recommended
 Alternative 3 - Single-Lane Roundabout	◕	●	◕	●	◕	Not Recommended
 Alternative 4 - Multi-Lane Roundabout	●	●	◕	●	◕	Recommended to be Carried Forward

Alternative 4 - Multi-lane roundabout is the recommended solution to be carried forward

Impact Assessment – Multi-Lane Roundabout

- **Vegetation –** Loss of 0.36 ha of cultural meadow, savannah and thicket in the new footprint. Additional areas will be disturbed during construction and provides opportunity for enhancement during restoration.
- **SWH and candidate SAR habitat –** Cultural meadow provides SWH (Monarch) and 0.012 ha of candidate habitat for SAR bats.
- **Trees –** In total, 20 trees over 10 cm dbh were identified for removal. These specimens are common, and the loss will be addressed by the preservation plan.
- **Surface water and Tributary C –** Potential sediment transfer from the work area to the water features during construction. No direct impacts to the tributary or riparian habitat.
- **PSW –** Dewatering during construction has potential to impact local groundwater. Additional studies required in detailed design.

Recommendations – Mitigation Measures

Measures to mitigate the potential project impacts will include:

- Minimize removals and delineate work area. Tree preservation and landscape plan with native grasses, flowers, and trees to mitigate impacts to vegetation.
- Timing windows for vegetation removal to avoid wildlife impacts during sensitive life stages.
- Implement the Clean Equipment Protocol during construction. Invasive species treatment/removal plan (prior to construction).
- Erosion and sediment controls (ESCs) installed prior to disturbance and adapted/maintained until vegetative cover is restored.
- Light shields and bird-friendly roadway lighting to mitigate impacts of new lighting and reduce wildlife collision potential.
- Monitoring during construction: ESC, wildlife presence, etc.

Recommendations – Enhancement Opportunities

This project provides several opportunities for wildlife habitat enhancement:

New flat-bottom ditches vegetated with a native wetland meadow mix – enhanced surface water treatment and pollinator corridor potential

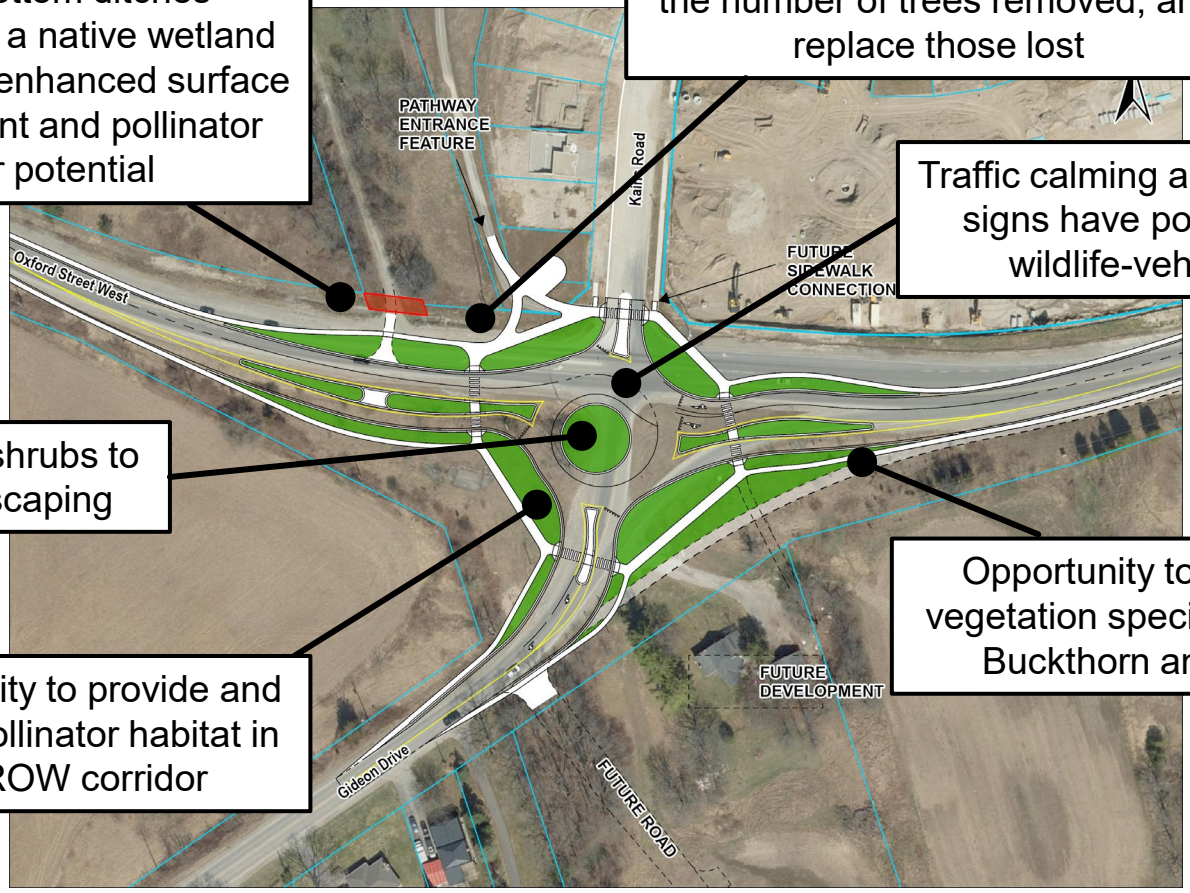
Tree preservation plan will reduce the number of trees removed, and replace those lost

Traffic calming and wildlife crossing signs have potential to reduce wildlife-vehicle collisions

Native trees and shrubs to be used in landscaping

Opportunity to remove invasive vegetation species like Phragmites, Buckthorn and Autumn Olive

Opportunity to provide and extend pollinator habitat in the ROW corridor



Thank you!

- Questions or comments?

Kathleen Johnson, EIT
Transportation Planning and Design
City of London
Phone: 519-661-2489 ext. 5232
Email: kajohnso@london.ca

Henry Huotari, P. Eng.
Senior Project Manager,
Transportation
R.V. Anderson Associates Limited
Phone: 519-681-9916 ext. 5027
Email: hhuotari@rvanderson.com

Windermere Road Improvements, Municipal Class Environmental Assessment, Environmental Impact Study

Draft Report

Prepared for:
City of London

Prepared by:
Stantec Consulting Ltd.
600-171 Queens Ave
London, ON N6A 5J7

165001183

December 17, 2021

Revision	Description	Author	Quality Check	Independent Review

Sign-off Sheet

This document entitled Windermere Road Improvements, Municipal Class Environmental Assessment, Environmental Impact Study was prepared by Stantec Consulting Ltd. ("Stantec") for the account of City of London (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

DRAFT

Prepared by _____
(signature)

Mitch Ellah, B.Sc.
Ecologist

DRAFT

Reviewed by _____
(signature)

Sean Geddes, B.Sc. (Hons.)
Senior Aquatic Biologist

DRAFT

Approved by _____
(signature)

Dan Eusebi, BES, MCIP, RPP
Senior Environmental Planner

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1.0 Introduction

Stantec Consulting Ltd. (Stantec) has been retained by The Corporation of the City of London (City) to complete the Municipal Class Environmental Assessment (EA) to identify intersection, active transportation, and transit improvements along Windermere Road corridor between Western Road and Doon Drive (**Figure 1, Appendix A**). The study will also assess the potential to connect active transportation facilities along Richmond Street from Windermere Road to the Thames Valley Parkway trail system. In addition, the accessibility improvements along the corridor and intersections will be implemented to accommodate road users of all ages and abilities. For this report, all proposed improvements described above are considered “the Project”.

The City of London has indicated that in general, should a preferred infrastructure routing option go beyond the existing road allowance and into a natural heritage feature as identified on Map 5 of the London Plan, or identified through the process, then an Environmental Impact Study (EIS) would be required which identifies potential impacts, mitigation and compensation for those areas beyond the road allowance, consistent with the Provincial Policy Statement (2020), London Plan (City of London 2016) and the London Environmental Management Guidelines (London 2007). The preferred infrastructure routing option encroaches upon a natural heritage feature on the north side of Windermere Road and west of Western Road.

The “Project Area” refers to the area of impact associated with the proposed improvements (the Project). The “Study Area” includes the Project Area, plus 120 metres (m) ‘Adjacent lands’ as per the PPS (**Figure 1, Appendix A**). This report will characterize the significance and sensitivity of the natural features in the Study Area, identify potential impacts of the Project on these natural features, and recommend appropriate measures to avoid or minimize potential negative impacts.

2.0 Policy Overview

The natural heritage features and functions in the Study Area were assessed in consideration of the requirements of the policy and guideline documents described below.

2.1 Federal Context

2.1.1 Fisheries Act

The Government of Canada is responsible for the management of fisheries resources in Canada through the *Fisheries Act*, administered primarily by Fisheries and Oceans Canada (DFO). The *Fisheries Act* addresses national interests in marine and fresh waters. On June 21, 2019, changes to the Act (Bill C68) received royal assent and became law, restoring lost protections and incorporating modern safeguards into the *Fisheries Act*. On August 28, 2019 provisions of the new Fisheries Act came into force including new protections for fish and fish habitat in the form of standards, codes of practice, and guidelines for projects near water.

The *Fisheries Act* includes prohibitions against harmful alteration, disruption or destruction (HADD) of fish habitat. It extends protection to all fish and fish habitat. When a HADD cannot be avoided or mitigated, a subsection 35(2) authorization with appropriate offsetting of residual adverse effects is required. Section 6 of the Act lists the factors considered by the Minister when considering the approval of an authorization, which are:

- Fisheries management objectives
- Whether there are measures and standards to avoid, mitigate or offset HADD to fish or fish habitat
- The public interest.

2.1.2 Species at Risk Act

Federal species at risk are identified and assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The federal *Species at Risk Act*, 2002 (SARA) protects wildlife species listed as extirpated, endangered or threatened under Schedule 1 of the Act from harm, harassment, killing, capture or collection. SARA also prohibits the damage or destruction of the residence of listed species, and the destruction of their critical habitat. SARA protections also extend to migratory birds and some aquatic species at risk (SAR) on non-federal land. The Ministry of the Environment, Conservation and Parks (MECP) may also make an order to protect species on non-federal lands if the species is not adequately protected under provincial laws. Permits for prohibited activities may be issued under Section 73 of SARA. No such orders were known to apply to the Project at the time of this report.

2.1.3 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) protects migratory birds and their nests (S.4). Section 6 of the Migratory Bird Regulations (Consolidated Regulations of Canada (CRC), c. 1035) prohibits the disturbance, destruction or taking of a nest, egg, or nest shelter of a migratory bird. Disturbance to nests of protected species during vegetation clearing or construction is a contravention of the MBCA.

2.2 Provincial Context

2.2.1 The Planning Act / Provincial Policy Statement

The Provincial Policy Statement (PPS 2020) is issued under the *Planning Act*, R.S.O. 1990, c.P.13 (PA) and supports the planning of land uses across the province. The PPS 2020 provides policy direction for the use and management of land, as well as infrastructure, while protecting the environment and resources and to ensure opportunities for employment and residential development. The PA requires that decisions made by planning authorities are consistent with the policy statements, such as the PPS, which includes policies on development and land use, resources, and public health and safety. Section 2.1 of the PPS discusses natural heritage and requires that natural heritage systems are identified in certain Ecoregions. This includes Ecoregion 7E, where the Study Area is located.

According to Section 2.1.5 of the PPS, development and site alteration are not permitted in the following features:

- *Significant wetlands* in Ecoregions 5E, 6E and 7E; and
- *Significant coastal wetlands*.

Development and site alteration shall not be permitted in the following unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions:

- *Significant woodlands in Ecoregions 6E and 7E*
- *Significant valleylands in Ecoregions 6E and 7E*
- *Significant wildlife habitat*
- *Significant areas of natural and scientific interest; and*
- *Coastal wetlands in Ecoregions 5E, 6E and 7E.*

Development and site alteration shall not be permitted the following except in accordance with provincial and federal requirements:

- *Fish habitat*
- *Habitat of endangered species and threatened species.*

Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified above unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

2.2.2 Endangered Species Act

The Endangered Species Act, 2007 (ESA) was created to identify SAR based on the best available scientific information, to protect species that are at risk and their habitats, and to promote the recovery of species that are at risk. The ESA prohibits the killing, harming, harassing, capturing or taking of a living member of a species listed as threatened, endangered or extirpated by the Species at Risk in Ontario (SARO) list, and also prohibits damage to habitat of protected species.

Species thought to be at risk in Ontario are assessed by the Committee on the Status of Species at Risk in Ontario (COSSARO), which is an independent body that reviews species based on the best available science, including community knowledge and Aboriginal traditional knowledge. Once species are classified at risk, they are added to the SARO list in one of four categories (extirpated, endangered, threatened and special concern). Extirpated, endangered and threatened species on this list automatically receive legal protection under the ESA.

The ESA also provides protection for the habitat of protected species. When a species is classified as endangered or threatened, the habitat of that species is protected under a general definition. The Lieutenant Governor in Council may make regulations prescribing an area as habitat of a species that is listed as extirpated, endangered or threatened on the SARO list. A habitat regulation can prescribe an area as the habitat of a species through the description of boundaries or features of an area, or by describing that area in any other manner. Habitat will be regulated with the goal of protecting habitat that promotes the survival and recovery of endangered or threatened species.

The ESA calls for the creation of recovery strategies for endangered or threatened species, and management plans for special concern species. These documents provide advice to the government on steps to take to protect and recover species at risk to healthy population levels.

2.2.3 Upper Thames River Conservation Authority

The *Conservation Authorities Act* (CAA) was created to provide for the organization and delivery of programs and services that further the conservation, restoration,

development and management of natural resources in watersheds in Ontario. The CAA is administered by the Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF); however, it grants each of Ontario's 36 Conservation Authorities the authority to make regulations within the areas under their respective jurisdictions.

The Upper Thames River Conservation Authority (UTRCA) has the responsibility to regulate activities in wetlands, watercourses and hazard lands (e.g., areas in and near rivers, streams, floodplains, wetlands, slopes and shorelines) through the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation (O. Reg. Ontario Regulation 157/06,) The UTRCA implements the regulation by issuing permits for works in or near watercourses, valleys, wetlands, or shorelines, when required.

Under the CAA, Authorities have certain regulations with the following objectives:

- To prevent the loss of life and property due to flooding and erosion
- To prevent pollution
- To conserve and enhance natural resources.

These policies apply to fill placement and removal or site grading in flood prone areas, erosion prone areas, dynamic beach areas, as well as alteration of watercourses, and interference with wetlands.

2.2.4 Fish and Wildlife Conservation Act

Nests and eggs of wild birds that are not protected by the MBCA, such as raptors (e.g., owls, hawks, and osprey), are protected from harm by the provincial *Fish and Wildlife Conservation Act, 1997* (FWCA).

The FWCA also protects snakes and turtles that are listed as specially protected reptiles from hunting or trapping; however, capture and release may be permitted in some cases to avoid harm to individuals of protected species.

2.3 Local Planning Context

2.3.1 London Official Plan

The City of London is transitioning from its previous 1989 Official Plan to the new London Plan (2016). While the London Plan was approved by Council and the province in December, 2016, the City is currently working through the appeal process and it has

not yet come into full force and effect. The London Plan represents Council's direction for future growth in the City.

Map 5 and Map 6 of the London Plan delineate natural features, hazards and natural resources in the City. The following are present in the Study Area:

- Natural Heritage System – Significant valleylands (Medway Valley Heritage Forest), Environmentally Significant Area (ESA) (Medway Valley Heritage Forest), woodlands (Tallwood Valley), watercourses/ponds (Medway Creek, Thames River), unevaluated wetlands
- Hazards – Upper Thames River Conservation Authority regulation limit
- Natural Resources - Significant Groundwater Recharge Area, Highly Vulnerable Aquifers, watercourses/ponds, subwatershed boundary

The FWCA also protects snakes and turtles that are listed as specially protected reptiles from hunting or trapping; however, capture and release may be permitted in some cases to avoid harm to individuals of protected species.

3.0 Methods

The scope of this EIS was prepared in consultation with the City of London and the UTRCA. Specific methods for the Background Review, Agency Consultation, Field Investigations, and Species at Risk and Provincially Rare Species are provided below.

3.1 Background Review

3.1.1 Natural Heritage Data Review

Background data applicable to the Study Area were obtained through a review of existing documents and information available online, including:

- Natural Heritage Information Centre (NHIC) database (MNRF 2021a)
- Ontario GeoHub, Land Information Ontario (LIO) database (MNRF 2021b)
- Species at Risk in Ontario List (SARO) (MECP 2021)
- Fisheries and Oceans Canada Aquatic Species at Risk Mapping (DFO 2021)
- Environment and Climate Change Canada Critical Habitat Database (ECCC 2021)
- London Plan - Map 5 and Map 6, including UTRCA regulation limits (City of London 2016)
- Middlesex Natural Heritage Systems Study (UTRCA 2014)
- iNaturalist database (iNaturalist 2021)

- eBird database (eBird 2021)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2017)
- UTRCA Regulated Area Screening Map (UTRCA 2018)
- LIO website and London Plan natural heritage mapping (City of London 2016) were assessed to determine the presence and extent of the designated natural features located in the Study Area.

Background data sources were reviewed in November 2020 and November 2021 to identify species with known ranges that overlap with the Study Area, including SAR and species of conservation concern (SOCC) (provincially rare species).

3.2 Agency Consultation

In addition to the background data described above, information requests and meetings were held with UTRCA, and the City of London Environmental and Ecological Planning Advisory Committee (EEPAC) to discuss the scope of natural heritage and gather information.

3.2.1 UTRCA Consultation

Communications with UTRCA commenced January 26, 2021, at which time the Project Team circulated the Terms of Reference and draft Scoping Checklist by email to UTRCA (Appendix B).

The first meeting with UTRCA was held on April 27, 2021 to present the scope of the project, and an overview of the EIS checklist. Stantec shared the results of the completed field surveys to date, and the tentative schedule for the remaining field surveys to be completed.

Consultation with UTRCA continued throughout the study duration to discuss wildlife identified within the Study Area.

3.2.2 EEPAC Consultation

Communications with EEPAC commenced January 26, 2021, at which time the Project Team circulated the Terms of Reference and draft Scoping Checklist by email to EEPAC.

The first meeting with EEPAC was held in conjunction with the UTRCA meeting, on April 27, 2021. This meeting presented the scope of the project, and an overview of the EIS checklist. Stantec shared the results of the completed field surveys to date, and the tentative schedule for the remaining field surveys to be completed. EEPAC shared confirmation occurrence of Queensnake within the Study Area in 2013.

A second meeting with EEPAC will be scheduled to discuss this report, to present the results of the field investigations, and to discuss potential impacts and recommended mitigation measures.

3.3 Field Investigations

3.3.1 Vegetation Surveys

Identification and mapping of ELC vegetation communities followed the protocols of the ELC field guide for Southern Ontario (Lee et al. 1998). Updates to vegetation community names and codes follow the 2008 catalogue of ELC vegetation communities. Vegetation assessments provided in this report include a general description of the community, lists of the dominant species in the canopy / sub-canopy, understory, and ground layers.

Flora nomenclature and provincial statuses of all plant species and vegetation communities is based on lists from the NHIC list of vascular plants (NHIC 2021). Identification of regionally rare or uncommon plant species in Middlesex County is based on Oldham (2017).

Identification of potentially sensitive native plant species was based on their assigned coefficient of conservatism (CC) value, as determined by Oldham et al. (1995). This CC value, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 8, 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters and are usually typical of high-quality plant communities.

Vegetation surveys were conducted on three dates between October 2020 and September 2021.

3.3.2 Amphibian Surveys

Amphibian surveys were conducted in the spring of 2021 using the protocols outlined in the Marsh Monitoring Program (MMP) Manual (Bird Studies Canada and Environment Canada 2008).

In accordance with the MMP Protocol, three rounds of amphibian call count surveys were conducted; one in April, one in May and one in June. All surveys were conducted at least one-half hour after sunset in conditions with calm winds (Beaufort scale of 0-3) and no precipitation (although light rain, fog or damp conditions provide suitable conditions for surveying). Surveys met the night-time temperature requirements as follows:

- April: >5°C
- May: >10°C
- June: >17°C

Six survey stations were established (**Figure 2, Appendix A**) to target potential amphibian breeding habitat in the Study Area. Each survey station consisted of a 100 m radius semicircle. The surveyor stood at the edge of the station and listened for three minutes for all calling toads and frogs within and outside of the survey station boundary. Call levels were described using values of 1, 2, or 3. As per the MMP Protocol, Level 1 indicates that individuals can be counted and calls are not simultaneous, Level 2 indicates that calls are distinguishable with some simultaneous calling and Level 3 indicates a full chorus where calls are continuous and overlapping.

Survey time and weather conditions are provided below in Table 1.

Table 1: Amphibian Survey Date, Time, and Weather Conditions

Survey	Date/Time	Temp. (°C)	Wind (Beaufort Scale)	Cloud (%)	Precipitation	Surveyors
1	April 10, 2021 20:40-21:15	20	1	100	Clear	M. Ellah, K. Ellis
2	May 12, 2021 21:10-21:50	13	1	10	Clear	M. Ellah
3	June 4, 2021 22:40-23:10	18	1	30	Clear	M. Ellah, K. Ellis

3.3.3 Breeding Bird Survey

Breeding bird surveys were conducted on two dates in June 2021. Five survey stations were established (**Figure 2, Appendix A**) to target potential breeding bird habitat in the Study Area.

Surveys consisted of 10-minute point counts at survey stations and recording incidental bird observations while walking along the road right-of-way (ROW) through the Study Area.

The location of species at risk and provincially rare species were recorded, if present. A conservative approach to determining breeding status was taken; all birds seen or heard in appropriate habitat during the breeding season were assumed to be breeding.

Surveys were conducted between a half an hour before sunrise and 10:00 a.m. Weather conditions (i.e., precipitation and visibility) were within the parameters required by monitoring programs such as Environment Canada's Breeding Bird Survey (Environment Canada, 2016).

Survey times, weather conditions, and observers are provided below in Table 2.

Table 2: Breeding Bird Survey Dates, Times, and Weather Conditions

Survey	Date/Time	Temp. (°C)	Wind (Beaufort Scale)	Cloud (%)	Precipitation	Surveyors
1	May 31, 2021 08:30-10:10	11	3	25	None	M. Ellah
2	June 22, 2021 08:20-09:50	10	3	50	None	M. Ellah

3.3.4 Bat Maternity Roost Survey

A habitat assessment was conducted on November 19, 2020, to identify candidate trees in the Study Area that may be suitable for bat maternity roosts. Surveyors assessed trees greater than 10 cm diameter at breast height (dbh) using methods described in *Survey Protocol for Species at Risk Bats within Treed Habitats – Little Brown Myotis, Northern Myotis & Tri-Colored Bat* (MNRF 2017). Trees were assessed prior to full leaf-out to enhance visibility of the tops of trees. Trees greater than 10 cm dbh that included loose bark, cavities, or crevices (snag trees) were recorded by location.

Best representative snag trees were identified based on MNRF (2017) criteria, including diameter, relative height, decay classes, canopy openness, and the relative presence, quality, location, and density of cavities, and loose bark.

3.3.5 Reptile Surveys

A turtle basking survey of the Thames River was conducted on May 31, 2021. The survey took place at 10:30 am and finished at 11:00 am. Weather conditions consisted of an air temperature of 16 °C, clear skies and calm winds. A spotting scope and binoculars were used to scan river habitat (riverbanks, water surface, basking rocks) for basking turtles upstream of the Richmond Street bridge (**Figure 2, Appendix A**).

On May 31 and June 22, 2021, instream and nearshore habitat was surveyed for reptiles in Medway Creek. This survey was completed with binoculars from the road ROW and adjacent land vantage points.

3.3.6 Wildlife and Wildlife Habitat

Wildlife habitat is defined as an area where plants, animals and other organisms live, including areas where species concentrate at a vulnerable point in their life cycle and that are important to migratory and non-migratory species. The *Significant Wildlife Habitat (SWH) Ecoregion 7E Criterion Schedule* (the Ecoregion Criteria; MNRF 2015) groups wildlife habitat into four categories:

- Seasonal concentration areas of animals
- Rare vegetation communities or specialized habitat for wildlife
- Habitat for species of conservation concern
- Animal movement corridors

Prior to field investigations, the LIO database was accessed to identify records of significant wildlife habitat for the Study Area and adjacent lands. Wildlife habitat surveys were conducted in conjunction with ELC. Wildlife habitat features identified in the MNRF's (2015) SWH Criteria Schedule for 7E were recorded if present, along with a description of the attributes and location of each feature identified.

As per the Significant Wildlife Habitat Technical Guide (OMNR 2000) and the Ecoregion Criteria, targeted species-use surveys for breeding birds and amphibians were also used to confirm the presence of SWH.

3.3.7 Species at Risk and Provincially Rare Species

Biological field data were evaluated to establish the significance of the observed natural heritage features. The provincial status of flora and fauna was provided by the NHIC. Provincial status or subnational rankings (S-RANKs) 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?)

Species at risk are classified provincially by COSSARO and federally by the COSEWIC. Classifications include:

- Extirpated – no longer occurs in the wild in Ontario
- Endangered – facing imminent danger of becoming extinct or extirpated
- Threatened – has the potential to become endangered
- Special concern – has the potential to become threatened

Species at risk protected under the ESA include species listed as threatened and endangered on the current Species at Risk in Ontario (SARO) list (O. Reg. 230/08). Federally protected species include those listed as threatened and endangered on current Schedules under the SARA.

Targeted species-use surveys for breeding birds and vegetation were used to document presence absence of species at risk and provincially rare species. Potential for species at risk with ranges overlapping with the Study Area was addressed through habitat suitability screening assessment (**Appendix C-1**).

3.3.8 Incidental Wildlife

Observations of wildlife and signs of wildlife were recorded during all field investigations and included species that were detected by sight and sound, dens, nests, burrows, browse, tracks, and scat.

3.3.9 Aquatic Habitat Assessment

Medway Creek, a tributary to Medway Creek, Tallwood Valley Creek and the Thames River are present in the Study Area (Error! Reference source not found.**, Appendix A**). Aquatic habitat assessments for Medway Creek, the tributary to Medway and Tallwood Valley Creek were completed on November 19, 2020. The unnamed tributary was also assessed on April 10, 2021, to determine flow permanency. The Thames River was assessed on May 31, 2021, from the Richmond Street bridge.

Each habitat assessment consisted of a reconnaissance review of the watercourse, (i.e., observations of dimensions, bank stability, morphology) and identification of features that typically contribute to fish and mussel habitat (i.e., in-water and riparian cover, substrate).

3.4 Species at Risk and Provincially Rare Species

Species of Conservation Concern (SOCC) may be designated at the global, national, provincial or local level. For this report, SOCC includes species that are provincially rare

(with a Provincial S-rank of S1 to S3), listed as Special Concern (SC) on the SARO list, or terrestrial species listed on Schedule 1 of SARA but not included on the SARO list.

Provincial ranks (S-ranks) are used by the NHIC to set protection priorities for rare species and vegetation communities. They are based on the number of factors such as abundance, distribution, population trends and threats in Ontario and are not legal designations. By comparing the global and provincial ranks, the status, rarity, and the urgency of conservation needs can be determined. Species with provincial ranks of S1 to S3, and those tracked by MNDMNRF, are considered SOCC. Provincial S-ranks are defined as follows:

- 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?)

Species at risk are classified provincially by COSSARO and federally by the COSEWIC. Classifications include:

- Extirpated – no longer occurs in the wild
- Endangered – facing imminent danger of becoming extinct or extirpated
- Threatened – has the potential to become endangered
- Special concern – has the potential to become threatened

Species at risk protected under the ESA include species listed as threatened and endangered on the current Species at Risk in Ontario (SARO) list (O. Reg. 230/08). Federally protected species include those listed as threatened and endangered on current Schedules under the SARA.

Targeted species-use surveys for breeding birds, reptiles and vegetation were used to document presence\absence of SAR and SOCC. Potential for SAR and SOCC with range overlap with the Study Area was addressed through habitat suitability screening assessments.

4.0 Results

4.1 Background Review

4.1.1 Landscape Context

The Study Area is in the Niagara section of the Deciduous Forest Region (Rowe 1972). This area is also known as the Carolinian Forest. The extreme southern tip of Ontario represents the maximum northern limit of Carolinian Forest. Forests in this region are dominated by broadleaved trees including sugar maple, American beech, basswood, red maple, red oak, white oak, and bur oak, butternut, bitternut hickory, rock elm, silver maple and blue beech. Species such as black cherry, black walnut, sycamore, swamp white oak, and shagbark hickory are also occasionally present. Species considered rare to the province, such as pignut hickory, tulip-tree, chinquapin oak, pin oak, black oak, black gum, blue ash, cucumber-tree, paw paw, Kentucky coffee-tree, red mulberry and sassafras are sporadically present. Needle-leaved trees such as hemlock, white pine, tamarack, eastern white cedar, eastern red cedar, and black spruce may be found in isolated patches where soil conditions are favorable.

4.1.2 Designated Areas

Map 5 of the London Plan (City of London 2016) identifies designated natural areas in the Study Area including the Medway Valley Heritage Forest Environmentally Significant Area (ESA), Medway Creek and associated unevaluated wetlands and a Significant Valleyland, the Thames River and associated unevaluated wetlands, and two unnamed watercourses, a tributary to Medway Creek and a tributary to the Thames River, known as Tallwood Valley Creek (**Figure 1, Appendix A**).

The UTRCA Regulated Area Screening Map (UTRCA 2018) shows regulated areas within the Study Area and Project Area (**Figure 1, Appendix A**). Regulated areas are found bordering natural features including Medway Creek and nearby forested areas (FOMM7, WODM4-4, FODM5/FOCM6), Tallwood Valley Creek Corridor and the Thames River.

4.1.3 Species at Risk and Provincially Rare Species

The background data review identified 21 SAR or SOCC that have the potential to be present in the Study Area. Of these, there were five (5) birds, four (4) fish, one (1) freshwater mussel, four (4) mammals, three (3) plants, and five (5) reptiles. Of the 21 species, 14 are listed as threatened, or endangered under the ESA. SAR and SOCC identified in the background review are shown in Table 3.

The bird, mammal, reptile and amphibian range maps are relatively coarse in nature and do not offer precise locations or information on concentrations / densities of records; for example, the Ontario Reptile and Amphibian Atlas records are provided in 10 kilometre (km) by 10 km square grids. The NHIC database provides more precise mapping than the atlases (1 km by 1 km squares) and is a better indicator of occurrence of significant species. DFO aquatic SAR mapping is based on records of the species in a specific watercourse/waterbody and displays if the watercourse provides Critical Habitat for aquatic SAR or occupied habitat for aquatic SAR. A habitat suitability screening assessment and potential impacts to the species listed in Table 3 are provided in Appendix C-1.

The UTRCA confirmed there are records of Queensnake (*Regina septemvittata*) and of Spiny Softshell (*Apalone spinifera*) in the Thames River near the Study Area. There are historical records of Queensnake populations in Medway Creek, however the last sighting was in 1997 and the species has not been recorded again in Medway Creek despite multiple surveys in 2002 and 2010 (COSEWIC 2010).

Agency correspondence did not identify records of species at risk bats; however, they are under-documented in the NHIC database and may also occur in the Study Area.

Table 3: Species at Risk and Species of Conservation Concern Identified as Potentially Present in the Study Area

Species	Common Name	Scientific Name	S-Rank	ESA Status	SARA Status	Data Source
Birds	Bank Swallow	*Riparia riparia*	S4B	THR	THR	eBird
	Barn Swallow	*Hirundo rustica*	S4B	THR	THR	NHIC
	Chimney Swift	*Chaetura pelagica*	S3B	THR	THR	eBird
	Common Nighthawk	*Chordeiles minor*	S4B	SC	THR	eBird
	Eastern Wood-pewee	*Contopus virens*	S4B	SC	SC	eBird

Species	Common Name	Scientific Name	S-Rank	ESA Status	SARA Status	Data Source
Fish	Black Redhorse	*Moxostoma duquesnei*	S2	THR	THR	DFO
	Northern Sunfish (Great Lakes - Upper St. Lawrence populations)	*Lepomis peltastes* pop. 2	S3	SC	SC	DFO
	Silver Shiner	*Notropis photogenis*	S2S3	THR	THR	DFO, NHIC
Mammals	Eastern Small-footed Myotis	*Myotis leibii*	S2S3	END	Not Listed	SARO
	Little Brown Myotis	*Myotis lucifugus*	S3	END	END	SARO
	Northern Myotis	*Myotis septentrionalis*	S3	END	END	SARO
	Tricolored Bat	*Perimyotis subflavus*	S3?	END	END	SARO
Mussel	Wavy-rayed Lampmussel	*Lampsilis fasciola*	S2	THR	SC	NHIC
Plants	Butternut	*Juglans cinerea*	S2?	END	END	SARO
	Eastern False Rue-anemone	*Enemion biternatum*	S2	THR	THR	NHIC
	Green Dragon	*Arisaema dracontium*	S3	SC	Not Listed	NHIC

Species	Common Name	Scientific Name	S-Rank	ESA Status	SARA Status	Data Source
Reptiles	Eastern Milksnake	*Lampropeltis triangulum*	S4	Not Listed	SC	ORAA
	Northern Map Turtle	*Graptemys geographica*	S3	SC	SC	NHIC
	Queensnake	*Regina septemvittata*	S2	END	END	NHIC, ORAA
	Snapping Turtle	*Chelydra serpentina*	S4	SC	SC	NHIC
	Spiny Softshell	*Apalone spinifera*	S2	END	END	NHIC

SRANK: Provincial status ranking
SARO: Species at Risk in Ontario
SARA: Species at Risk Act
NHIC: Natural Heritage Information Centre
DFO: Fisheries and Oceans Canada
MECP: Ministry of Environment, Conservation and Parks
S1: Critically imperiled in Ontario (often fewer than 5 populations)
S2: Imperiled in Ontario, very few populations (often 20 or fewer)
S3: Vulnerable in Ontario, relatively few populations (often 80 or fewer)
S4: Apparently Secure – Uncommon but not rare
S5: Secure – Common, widespread, and abundant in the province
S#?: Rank uncertain
SC: Special Concern
THR: Threatened
END: Endangered

4.1.4 Aquatic Habitat Data

Aquatic habitat data including SAR distribution, thermal regime, flow permanency and DFO drain classification are displayed on **Figure 1, Appendix A**.

Medway Creek is a permanently flowing watercourse with a documented coldwater thermal regime (MNRF 2021b). Medway Creek supports a diverse fish community, with 34 cool and warmwater fish species recorded in the vicinity of the Study Area (MNRF 2021b) (Table 4). Based on the species present, the coldwater thermal regime record may not be accurate. Medway Creek is known to provide Critical Habitat for the Silver Shiner (*Notropis photogenis*) and the Black Redhorse (*Moxostoma duquesnei*) and occupied habitat for the Northern Sunfish (*Lepomis peltastes*) (DFO 2021). Medway Creek also provides habitat for the Kidneyshell (*Ptychobranchus fasciolaris*) (END) and Wavy-rayed Lampmussel (*Lampsilis Fasciola*) (DFO 2021), however, these species are mapped as occupying habitat upstream from the Study Area.

The tributary to Medway Creek is mapped as a permanently flowing watercourse (MNRF2021b); however, the watercourse is also classified as a DFO Drain Class F (MNRF2021b). Class F drains have intermittent flow (DFO 2017). The watercourse is mapped as providing occupied habitat for Black Redhorse, Northern Sunfish and Silver Shiner (DFO 2021); however, this watercourse is unlikely to support fish habitat due to an intermittent flow regime, and a permanent fish barrier to Medway Creek (perched culvert connection). The perched culvert would preclude movement of fish from Medway Creek to the tributary in times of flow.

The Thames River is a Canadian Heritage River and provides habitat for a wide variety of fish and wildlife communities (UTRCA 1998) including SAR (MNRF 2021b). Within the Study Area, the Thames River is known to provide critical habitat for Silver Shiner and Black Redhorse and occupied habitat for Northern Sunfish and Wavy-rayed Lampmussel (DFO 2021). Most of the river's watershed is within the Carolinian Life Zone which is recognized as one of the most biologically significant and diverse regions in Canada (UTRCA 1998).

Tallwood Valley Creek is identified as a DFO Drain Class E (MNRF 2021b). Class E drains have permanent flow and sensitive fish species are present (species unknown) (DFO 2017).

Table 4: Fish Species Documented in Medway Creek near the Study Area (MNRF 2021b)

Common Name	Scientific Name	S-Rank
Blacknose Shiner	*Notropis heterolepis*	S5
Blackside Darter	*Percina maculata*	S4
Bluegill	*Lepomis macrochirus*	S5
Bluntnose Minnow	*Pimephales notatus*	S5
Brook Stickleback	*Culaea inconstans*	S5
Central Stoneroller	*Campostoma anomalum*	S4
Common Carp	*Cyprinus carpio*	SNA
Common Shiner	*Luxilus cornutus*	S5
Creek Chub	*Semotilus atromaculatus*	S5
Fantail Darter	*Etheostoma flabellare*	S4
Fathead Minnow	*Pimephales promelas*	S5
Golden Redhorse	*Moxostoma erythrurum*	S4

Common Name	Scientific Name	S-Rank
Greenside Darter	*Etheostoma blennioides*	S4
Johnny Darter	*Etheostoma nigrum*	S5
Largemouth Bass	*Micropterus salmoides*	S5
Logperch	*Percina caprodes*	S5
Longnose Dace	*Rhinichthys cataractae*	S5
Longnose Gar	*Lepisosteus osseus*	S4
Mimic Shiner	*Notropis volucellus*	S5
Northern Hog Sucker	*Hypentelium nigricans*	S4
Northern Pike	*Esox lucius*	S5
Northern Redbelly Dace	*Chrosomus eos*	S5
Pumpkinseed	*Lepomis gibbosus*	S5
Quillback	*Carpiodes cyprinus*	S4
Rainbow Darter	*Etheostoma caeruleum*	S4
Rock Bass	*Ambloplites rupestris*	S5
Rosyface Shiner	*Notropis rubellus*	S4
Shorthead Redhorse	*Moxostoma macrolepidotum*	S5
Smallmouth Bass	*Micropterus dolomieu*	S5
Spotfin Shiner	*Cyprinella spiloptera*	S4
Stonecat	*Noturus flavus*	S4
Striped Shiner	*Luxilus chrysocephalus*	S4
Walleye	*Sander vitreus*	S5
White Sucker	*Catostomus commersonii*	S5

4.2 Field Investigations

4.2.1 Vegetation

The Study Area is comprised of various land uses including residential, institutional and valley lands associated with the Thames River, Medway Creek and contributing tributaries. Several small and large wooded areas occur in the Study Area with the bands of woods located along the Thames River having riverine vegetation containing characteristic floodplain species, and a high diversity of plant species. High quality

vegetation along Medway Creek is present in the Medway Valley Heritage Forest ESA and other places upstream, but the vegetation in the Study Area adjacent Medway Creek is relatively disturbed. None of the vegetation communities present in the Study area are considered rare in Ontario.

Vegetation communities located in the Study Area are described in **Table 5** below and shown on **Figure 2, Appendix A**.

Table 5: Ecological Land Classification (ELC) Vegetation Types

Community	Property & ELC Vegetation Type	Community Description
Thicket Communities (THD)	**THDM2a** Dry - Fresh Deciduous Shrub Thicket	This small thicket is located along the north edge of Windermere Road on a steep slope. It is dominated by young green ash with occasional common buckthorn, riverbank grape, grey dogwood and black walnut. The ground layer is dominated by Canada goldenrod, grey dogwood seedlings, asters, and old field grasses.
	THDM2b Dry - Fresh Deciduous Shrub Thicket	This small thicket is located next to Richmond Street on both sides south of the North Branch of the Thames River. It is dominated by shrubs (staghorn sumac, ninebark, common buckthorn and exotic honeysuckle) with few tree saplings (green ash) and woody vines (riverbank grape). The ground layer contains an abundance of goldenrod and knapweed.
	THDM3 Dry - Fresh Deciduous Hedgerow Thicket	This narrow strip of trees is located on the south side of Medway Creek on the east side of Western Road. It is dominated by young trees of black locust with occasional Norway maple, exotic honeysuckle, and common buckthorn. A few larger eastern cottonwood trees are also present.
	THDM4 Dry - Fresh Deciduous Regeneration Thicket	This narrow thicket is located on the north side of Windermere Road east of Richmond Street. Black walnut saplings are common with associates of other saplings and shrubs such as white mulberry, sugar maple, green ash, black locust, common buckthorn, grey dogwood and riverbank grape. The ground layer is dominated by Canada goldenrod, New England aster, grass-leaved goldenrod, grey dogwood seedlings and woodland sedge.

Community	Property & ELC Vegetation Type	Community Description
Woodland Communities (WOD)	**WODM4-4a** Dry - Fresh Black Walnut Deciduous Woodland	This woodland is located on the north side of Windermere Road and west of Western Road. It is dominated by a semi-open canopy of mature black walnut with associates of Freeman's swamp maple, eastern cottonwood, bur oak, dead or dying ash and a few sycamore. The understory is densely dominated by exotic shrubs of Tatarian honeysuckle, common buckthorn and common privet.
	WODM4-4b Dry - Fresh Black Walnut Deciduous Woodland	This woodland is located on the north side of Windermere Road just east of Richmond Street. It is dominated by mature black walnut with a few associates of common hackberry and eastern cottonwood. The understory is dominated by alternate-leaved dogwood and exotic honeysuckle with occasional eastern redbud and cranberry viburnum. The ground layer is dominated by giant goldenrod, goutweed, Dame's rocket and garlic mustard.
	WODM5a Fresh - Moist Deciduous Woodland	This small woodland is located immediately east of Western Road along the north bank of Medway Creek. It is dominated by mature black walnut, eastern cottonwood and common hackberry and a few exotic willow. The sub-canopy layer is dominated by black walnut and common hackberry. The understory layer is dominated by exotic honeysuckles, Manitoba maple and thicket creeper. The ground layer is weedy with species such as common burdock and thicket creeper most abundant. A very narrow strip of riverbank vegetation occurs immediately adjacent Medway Creek in this area.
	WODM5b Fresh - Moist Deciduous Woodland	This narrow woodland is located on a slope adjacent the Thames River on both sides of Richmond Street. It is dominated by mature black walnut with occasional sycamore and Manitoba maple. The understory layer is dominated by riverbank grape and hedge false bindweed. The ground layer is dominated by dense spotted Joe pye weed and Himalayan balsam closer to the riverbank.

Community	Property & ELC Vegetation Type	Community Description
	WODM5 Fresh - Moist Deciduous Woodland / SWDM4 Mineral Deciduous Swamp	This woodland is situated in Tallwood Valley on the north side of Windermere Road. Wetland (swamp) pockets occur within this community along the creek. The canopy is dominated by black walnut with associates of Norway maple, eastern cottonwood, exotic willow and Manitoba maple. The understory is dominated by exotic honeysuckles, common buckthorn, green ash saplings, and choke cherry. The ground layer is dominated by giant goldenrod, Dame's rocket, garlic mustard and creeping yellow loosestrife. Wetland pockets are dominated by skunk cabbage, silky dogwood and tussock sedge.
Forest Communities	**FOMM7** Fresh – Moist White Cedar – Hardwood Mixed Forest	The canopy is dominated by semi-mature Scots pine with occasional sycamore and exotic willow. The understory is dominated by dense young white cedar, common buckthorn, exotic honeysuckles and saplings of ash and Freeman's swamp maple. A couple of low wet mucky areas in the middle of this community are dominated by wetland species such as iris, yellow marsh marigold, northern swamp buttercup, creeping yellow loosestrife and spotted water-hemlock.
	FODM5 Dry – Fresh Sugar Maple Deciduous Forest / FOCM6 Naturalized Coniferous Plantation	This forest community is located on the south side of Medway Creek immediately west of Western Road. This community was assessed from the roadside only. It is dominated by sugar maple situated on a steep slope towards the river. An old plantation of mature Norway spruce and Scots pine are interspersed within the forest. This community is part of the Medway Valley Heritage Forest ESA.

Community	Property & ELC Vegetation Type	Community Description
	FODM7 Fresh – Moist Lowland Deciduous Forest	This lowland floodplain forest is located on the south side of the Thames River immediately west of Richmond Street. The substrate is uniquely coarse sandy gravel to cobbles. The canopy is dominated by sycamore with associates of eastern cottonwood and Freeman's swamp maple. The sub-canopy is dominated by sycamore and black walnut. The understory is dominated by glossy and common buckthorn, riverbank grape and Manitoba maple. The ground layer is dominated by thicket creeper, white snakeroot, golden Alexanders, white vervain and giant goldenrod. Two regionally rare species (Ontario aster and yellow-seed false pimpernel) occur along the riverbank in this community. Another species occurring in this community that is uncommon regionally (not rare) is broad-glumed brome grass.
	FODM8-3 Fresh - Moist Cottonwood Deciduous Forest / **FODM6** Fresh – Moist Sugar Maple Deciduous Forest Ecosite)	This valley forest is dominated by mature eastern cottonwood with occasional sugar maple and black walnut. The sub-canopy is dominated by Norway maple, black locust and occasional sugar maple. The understory layer is dominated by exotic shrubs including Maack's honeysuckle, common privet and common buckthorn. The ground layer is disturbed and dominated by exotic species such as garlic mustard, orchard grass, Maack's honeysuckle, orange daylily and spiked sedge.
Marsh Communities	**MAMM3** Mixed Mineral Meadow Marsh	This small floodplain marsh is located along Medway Creek at Western Road. It is dominated by spotted Joe pye weed and young sandbar willow.

Community	Property & ELC Vegetation Type	Community Description
Swamp Communities	**SWDM4** Mineral Deciduous Swamp	This riverbank swamp area is located on the south bank of the Thames River immediately east of Richmond Street. The canopy is dominated by eastern cottonwood and sycamore with occasional exotic willow. The understory is dominated by common buckthorn and dogwoods. The ground layer is diverse with many species of wetland flora such as spotted Joe pye weed, marshpepper smartweed and giant chickweed.

4.2.1.1 Vascular Plant Species

The following is a floristic summary for the Study Area. A detailed list with all scientific plant names and species statuses is provided in **Appendix D**.

- A total of 165 species of vascular plants were recorded. This total includes taxa identified to species, subspecies (ssp.) and variation (var.) levels.
- 93 of the 165-recorded species are native to Ontario, while 72 are exotic species not native to Ontario.
- 70 native species have a provincial rank of S5, indicating they are common with a secure population in Ontario.
- 18 native species have a provincial rank of S4, indicating they are uncommon, but not rare in the province and populations are apparently secure.
- 3 native species with a provincial rank of S1 or S2 were observed in the Study Area. Two of these species (thornless honey locust and tall tickseed) do not occur naturally in the Study Area because they were planted and/or seeded in park lawn settings. These are not significant occurrences of these species. The remaining provincially rare species, a mature butternut tree (**Figure 2, Appendix A**) was observed in the WODM5 / SWDM4 community in the Tallwood Valley north of Windermere Road. It is located approximately 90m from the road and well outside any impact zone. No other rare Ontario species (S1, S2 or S3) were observed in the Study Area.
- 2 species that are considered rare in Middlesex County (Ontario aster and yellow-seed false pimpernel) were observed at the edge of the Thames River the FODM7 community.
- Other than the one butternut tree noted above, no other SAR flora were observed in the Study Area.

- 2 highly sensitive plant species with a coefficient of conservatism value of 8 were observed in the Study Area. The common hackberry tree is common in woodland communities. The sycamore tree is common on the banks of the Thames River.

4.2.2 Amphibians

Two species of amphibians were recorded in the Study Area during field investigations, Green Frog (*Lithobates clamitans*) and American Toad (*Anaxyrus americanus*). Both species are common in Ontario and have S5 provincial status rankings. Amphibians were recorded in habitat associated with slack/standing water near shore or in riparian areas in Medway Creek, the tributary to Medway Creek, the Thames River and Tallwood Valley Creek. American Toad (2 individuals) were observed during the April survey crossing Windermere Road from the FOMM7 ecosite to access Medway Creek. Results are presented below in **Table 6**.

Table 6: Amphibian Survey Results

Station ID	Survey	Date Surveyed	Species Present (Highest Call Code – Number of Individuals)
1	1	April 10, 2021	American Toad (1 – 2)
	2	May 12, 2017	-
	3	June 4, 2017	-
2	1	April 10, 2021	-
	2	May 12, 2017	-
	3	June 4, 2017	-
3	1	April 10, 2021	American Toad (2 – 3)
	2	May 12, 2017	-
	3	June 4, 2017	American Toad (1 – 2) Green Frog (1 – 3)
4	1	April 10, 2021	American Toad (1 – 2)
	2	May 12, 2017	-
	3	June 4, 2017	-
5	1	April 10, 2021	-
	2	May 12, 2017	-
	3	June 4, 2017	-

Station ID	Survey	Date Surveyed	Species Present (Highest Call Code – Number of Individuals)
6	1	April 10, 2021	-
	2	May 12, 2017	-
	3	June 4, 2017	American Toad (1 – 1)

4.2.3 Breeding Birds

Twenty-nine bird species were recorded during the breeding bird surveys, including two SAR, Barn Swallow (Hirundo rustica) and Bank Swallow (Riparia riparia). A bird SOCC, Common Nighthawk (*Chordeiles minor),* was recorded incidentally during the June amphibian survey.

Both SAR were observed at Station 5 and were foraging over the Thames River. The . The Common Nighthawk was observed aerial foraging around the Study Area and above the University Hospital. The institutional building rooftops in this area are likely being used by the Nighthawk for nesting (COSEWIC 2018). Nesting habitat for the Common Nighthawk is not present in the Study Area. The Common Nighthawk is crepuscular (active at dawn or dusk) or nocturnal (active at night) (COSEWIC 2018) and was observed during an evening survey.

The bird community included songbirds, waterfowl, birds of prey and woodpeckers. Osprey (*Pandion haliaetus*) were observed in the Study Area as flyovers. An Osprey nest was not observed in the Study Area. A Cooper's Hawk (*Accipiter cooperii*) was observed within the Tallwood Valley Creek corridor.

All species observed are common in Ontario and have S4 or S5 provincial rankings. Bird species observed in the Study Area are shown in **Table 7**.

Table 7: Breeding Bird Survey Results

Common Name	Scientific Name	S Rank	ESA Status	SARA Status	Comments
American Goldfinch	*Spinus tristis*	S5	-	-	-
American Robin	*Turdus migratorius*	S5	-	-	-
Baltimore Oriole	*Icterus galbula*	S4B	-	-	-
Bank Swallow	*Riparia riparia*	S4B	THR	THR	-
Barn Swallow	*Hirundo rustica*	S4B	THR	THR	-
Belted Kingfisher	*Megaceryle alcyon*	S5B, S4N	-	-	Flyover
Black-capped Chickadee	*Poecile atricapillus*	S5	-	-	-
Blue Jay	*Cyanocitta cristata*	S5	-	-	-
Brown-headed Cowbird	*Molothrus ater*	S5	-	-	-
Canada Goose	*Branta canadensis*	S5	-	-	-
Carolina Wren	*Thryothorus ludovicianus*	S4	-	-	-
Chipping Sparrow	*Spizella passerina*	S5B, S3N	-	-	-
Common Grackle	*Quiscalus quiscula*	S5	-	-	-
Common Nighthawk	*Chordeiles minor*	S4B	SC	THR	Incidental observation
Cooper's Hawk	*Accipiter cooperii*	S4	-	-	-

Common Name	Scientific Name	S Rank	ESA Status	SARA Status	Comments
Downy Woodpecker	*Dryobates pubescens*	S5	-	-	-
European Starling	*Sturnus vulgaris*	SNA	-	-	-
Gray Catbird	*Dumetella carolinensis*	S5B, S3N	-	-	-
Great Crested Flycatcher	*Myiarchus crinitus*	S5B	-	-	-
House Sparrow	*Passer domesticus*	SNA	-	-	-
Mallard	*Anas platyrhynchos*	S5	-	-	-
Northern Cardinal	*Cardinalis cardinalis*	S5	-	-	-
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	S4B	-	-	-
Osprey	*Pandion haliaetus*	S5B	-	-	Flyover
Red-breasted Nuthatch	*Sitta canadensis*	S5	-	-	-
Red-eyed Vireo	*Vireo olivaceus*	S5B	-	-	-
Red-winged Blackbird	*Agelaius phoeniceus*	S5	-	-	-
Song Sparrow	*Melospiza melodia*	S5	-	-	-
Warbling Vireo	*Vireo gilvus*	S5B	-	-	-
Yellow Warbler	*Setophaga petechia*	S5B	-	-	-

4.2.4 Bat Maternity Roost Assessment

Three trees were identified in the Study Area as potential bat maternity roost habitat. Two of the trees are found within the WODM4-4 ecosite and one tree in CGL2 parkland ecosite. Each tree provided potential maternity roost habitat including cavities, peeling bark and large trunk diameter. The location of the potential bat maternity roost trees is shown on **Figure 2, Appendix A**.

4.2.5 Reptile Surveys

Eleven (11) Spiny Softshell Turtle and five (5) Northern Map Turtle (*Graptemys geographica*) were observed in the Thames River, approximately 120 m upstream of the Richmond Street bridge (**Figure 2, Appendix A**). The turtles were observed basking on emergent rocks, shoreline rocks and near shore shallow water areas and in calm areas at the water surface. Correspondence with a biologist from the UTRCA (Scott Gillingwater) confirmed that this area of the Thames River is known for providing habitat for these species and others including Snapping Turtle (*Chelydra serpentina*) and Midland Painted Turtle (*Chrysemys picta marginate*) (S. Gillingwater, pers. comm. June 11, 2021).

A Snapping Turtle was observed in Medway Creek upstream of the Western Road bridge (**Figure 2, Appendix A**). Snakes were not observed along the banks of Medway Creek, however, there are historic records of Queensnake residing in Medway Creek with the last known sighting in 1997 (COSEWIC 2010).

4.2.6 Significant Wildlife Habitat Assessment

The assessment of Significant Wildlife Habitat (SWH) is provided below, addressing each component under a separate header for each of the four categories of SWH described by the Ecoregion 7E Criteria Schedule.

Seasonal Concentration Areas

Seasonal concentration areas are sites where large numbers of a species gather at one time of the year, or where several species congregate. Review of the NHIC & LIO databases did not identify any confirmed seasonal concentration areas within the Study Area. The following candidate seasonal concentration areas were identified in the Study Area:

- Bat Maternity Colonies – **Candidate**. Forest habitat was present in the Study Area within the Medway Creek, Tallwood Valley Creek and Thames River corridors. Three potential bat maternity roost trees were observed in the Study Area (Section 4.2.4).

- Turtle Wintering Areas - **Assumed Present**. Suitable overwintering habitat for turtles may be present in the Study Area in Medway Creek and the Thames River (Section 4.2.5).

Rare or Specialized Habitat

Rare Vegetation Communities or Specialized Habitats for Wildlife are defined as separate components of SWH. Rare habitats are habitats with vegetation communities that are considered rare (S1-S3) in the province. These habitats are generally at risk and may support wildlife species that are considered significant. Specialized habitats are microhabitats that are critical to some wildlife species. Rare vegetation communities and specialized habitat for wildlife were not observed in the Study Area.

Habitat for Species of Conservation Concern

Habitat for SOCC includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the remainder of the globe. Habitat was identified in the Study Area for the following SOCC:

- Eastern Wood-pewee – **Candidate**. Preferred habitat is present in the Tallwood Valley Creek and Thames River corridors. However, this species was not observed during the breeding bird surveys.
- Green Dragon – **Candidate**. Preferred habitat is present in the Tallwood Valley Creek and Thames River corridors. However, this species was not observed during the botanical surveys conducted in the Tallwood Valley corridor. Botanical surveys in the Thames River corridor did not occur.
- Northern Sunfish – **Assumed Present**. Preferred habitat is present in the Thames River and possibly in Medway Creek, however, aquatic vegetation was not present in Medway Creek within the Study Area which may limit suitable habitat for the species.
- Northern Map Turtle – **Confirmed**. Preferred habitat is present in the Thames River and Medway Creek and the species was observed during a reptile survey in the Thames River.
- Snapping Turtle – **Confirmed**. Preferred habitat is present in the Thames River and Medway Creek and the species was observed during a reptile survey in Medway Creek.

Animal Movement Corridors

Migration corridors are areas that are traditionally used by wildlife to move from one habitat to another, typically to access different seasonal habitat requirements. Corridors requiring consideration in Ecoregion 7E include Amphibian Movement Corridors. Presence of these corridors is determined once significant amphibian breeding habitat (wetlands) is identified. Amphibian breeding habitat (wetlands) was not confirmed by amphibian call surveys and therefore Animal Movement Corridors are considered absent.

4.2.7 Endangered and Threatened Species

Targeted species-use surveys for breeding birds, reptiles, and vegetation documented the following species that are listed as threatened and endangered on the current Species at Risk in Ontario (SARO) list and protected by the ESA: Bank Swallow, Barn Swallow, Butternut (*Juglans cinerea*), and Spiny Softshell Turtle. [redacted]

4.2.8 Aquatic Habitat Assessment

Medway Creek

Medway Creek is a permanently flowing watercourse and tributary of the Thames River. Some modification (hardening) of the banks has occurred west of Western Road to protect Windermere Road. Run and riffle morphology were present in the surveyed area with the run being deeper and wider (1.0 m and 20 m, respectively) and the riffle, shallower and narrower (0.2 m and 6.0 m, respectively). The run was slow flowing through a depositional area with cobble, boulder and silt substrates and the riffle was cobble, gravel, and boulder substrates. Riparian habitat included deciduous woodland, a floodplain marsh, and urban developed areas (roads). Bank erosion was present on the upstream left bank, along the woodland. Water turbidity was low. Aquatic vegetation was not present.

Medway Creek is confirmed fish habitat (MNRF 2021b), and within the Study Area, habitat is suitable for documented aquatic SAR including Silver Shiner, Black Redhorse, and Wavy-rayed Lampmussel.

Tributary to Medway Creek

The tributary to Medway Creek is an intermittently flowing watercourse that drains into Medway Creek through a perched culvert under Windermere Road. The watercourse had similar characteristics during the fall (November) 2020 survey and the spring (April) 2021 survey. The watercourse exhibited a diffuse flow with sections of confined standing water, short lengths of channel and aquatic emergent vegetation (cattail, flag iris). The drainage pattern is north/south through the woodlot and then east and parallel with Windermere Road until it flows through a culvert under the road to join Medway Creek. While flowing east, the drainage is close to or at the bottom of bank from the current sidewalk along the north side of Windermere Road. Depth was shallow, ranging from 3 to 5 cm deep. Substrate was comprised of fine organic detritus and silt. Canopy was closed providing approximately 90 % cover. This watercourse is associated with the moist white cedar forest (FOMM7 ecosite) which may have either ground water upwellings and/or receive surficial runoff/drainage from surrounding developed lands. The water is slowly released from the forest which may result in beneficial outcomes to water quality prior to discharge into Medway Creek (lowering water velocities, contaminant binding, suspended material settling). Fish were not observed, and fish habitat is not present based on flow intermittency and a permanent fish barrier (perched culvert) to Medway Creek.

Tallwood Valley Creek

Tallwood Valley Creek is a permanently flowing watercourse and tributary of the Thames River. Upstream (north) of Windermere Road the watercourse channel is unmodified and has a natural meander and floodplain. Downstream (south) of Windermere Road the watercourse has been historically channelized with gabion stone baskets on the bed and banks. At the time of the assessment the average wetted width was 1.3 m, with an average depth of 0.1 m and a bankfull width of 2.0 – 3.0 m. On the upstream side of the road, variable channel features were observed with riffle, run and pool morphology, overhanging herbaceous and aquatic emergent vegetation and small and large organic debris. On the downstream side, channel morphology and instream and bank habitat variety was homogenous due to historic modifications. Substrate was a mix of cobble, gravel and sand with silt and detritus. Watercress was present in the channel which is an indicator of groundwater upwellings. Water turbidity was low. The riparian area is a deciduous woodland, with a mostly closed canopy providing approximately 95% cover from trees. Barriers to fish migration were not observed. Based on flow permanency and connectivity to the Thames River, this watercourse is considered fish habitat.

Thames River

The Thames River is a permanently flowing large river. In the Study Area, the Thames River has a wetted width of 30 – 45 m and mostly slow flowing run morphology with shallower areas of riffle with exposed rocks. Water depth ranged from shallow, backwater areas of 0.2 m depth to more than 1.0 m depth in the run and slow-flowing areas. Substrates were a mix of materials including cobble, gravel, sand, and boulder with depositional areas of silt and detritus. The river is within a significant valleyland and riparian habitat is deciduous woodland and deciduous swamp. The Thames River is known for its diverse fish and mussel community and supporting habitat of terrestrial SAR (UTRCA 1998).

5.0 Natural Features Summary

The following natural heritage features were identified during the Background Review and Field Investigations:

- Designated Natural Features – Medway Valley Heritage Forest ESA, Medway Creek and associated unevaluated wetlands, the Thames River Significant Valleyland and associated unevaluated wetlands, and two unnamed watercourses: a tributary to Medway Creek and a tributary to the Thames River (Tallwood Valley Creek).

- Confirmed Species At Risk – Bank Swallow, Barn Swallow, Butternut, Spiny Softshell
- Suitable Habitat for Species At Risk – Silver Shiver, Black Redhorse, Wavy-rayed Lampmussel, Queensnake, endangered Bats
- Confirmed Significant Wildlife Habitat – Special concern and rare species (Northern Map Turtle and Snapping Turtle)
- Candidate Significant Wildlife Habitat - Bat maternity colonies, turtle wintering areas

6.0 Proposed Design Alternatives

The City of London is undertaking the EA and preliminary design for the improvements to Windermere Road between Western Road and Doon Drive, and along Richmond Street to the Thames Valley Parkway Trail System. The recommended alternative solution includes implementing designated cycling facilities along Windermere Road and Richmond Street, intersection improvements, and storm sewer, sanitary sewer, and sanitary force main improvements.

The proposed design alternatives are shown in **Appendix E**, and are described below:

Active Transportation Improvements

- Windermere Road east of Richmond Street – One-Way Raised Cycle Track on both sides of Windermere Road
- Windermere Road west of Richmond Street – One Way Raised Cycle Track on both sides of Windermere Road
- Richmond Street – Two-Way Raised Cycle Track on the east side of Richmond Street

At the Richmond Street bridge over the Thames River, the two-way raised cycle track and sidewalk cannot be maintained due to limited space available on the bridge. The two-way raised cycle track and sidewalk will transition to a two-way shared-use facility on the bridge. The facility will have a connection to the Thames Valley Parkway trail system on the south side of the bridge.

Intersection Improvements

- Windermere Road and Western Road intersection
  - A protected intersection for cyclists and pedestrians
  - Adjustment of the Windermere Road centreline alignment to limit property impacts to the residences on the north side of Windermere Road.
- Windermere Road and Perth Drive / Canterbury Road intersection
  - Separate cross rides and crosswalks for cyclists and pedestrians

  - Two-stage queue boxes to accommodate cyclist left turning movements.
- Windermere Road and Richmond Street intersection
  - A protected intersection for cyclists and pedestrians with cross rides
  - Adjustment of the Windermere Road centreline alignment west of Richmond Street to limit property impacts to the residences on the north side of Windermere Road
  - Median raised islands, removal of channelization islands and addition of eastbound right-turn lane
  - Provisions for future active transportation on Richmond Street north of Windermere Road

Storm Sewer, Sanitary Sewer and Force Main Improvements

Improvements will include the various replacements of the existing infrastructure within the municipal ROW.

7.0 Potential Impacts and Mitigation Recommendations

The Project Location and road improvement design was overlaid on natural feature mapping in an ArcGIS environment (**Figure 3, Appendix A**) to assess potential direct and indirect impacts, including impacts associated with construction. Direct impacts are quantifiable effects and include loss of features by area, while indirect effects are qualitative in nature and may include effects such as sedimentation and noise impacts to wildlife on adjacent lands.

The road improvements along a portion of Windermere Road and Richmond Street are primarily within the existing road allowance, with a relatively small section of encroachment into natural features. The preliminary design footprint has a low potential to negatively impact natural heritage features and species at risk given the magnitude and duration of the project and extent of the proposed improvements. However, even small areas of encroachment can have an impact on features and species, and poorly managed on-site construction or design elements can inadvertently affect adjacent areas and associated flora and fauna beyond the planned construction footprint if not properly mitigated.

This section highlights potential impacts and the recommended mitigation to be applied to proactively address these potential impacts. It should be noted that many of the environmental concerns related to this project have been mitigated through the process by which the preferred design was developed and selected. Stantec's ecosystem team worked closely with the transportation design team as field data became available, with

a focus on avoidance of features and mitigation to reduce impacts where possible. These discussions took into consideration information provided by the SAR reptile specialist at the UTRCA, and input from the general public and EEPAC representatives.

Site-specific and standard recommendations are identified below to mitigate potential impacts to natural features and enhance the natural heritage system where appropriate. Site-specific measures are recommended to address the specific natural heritage features and functions identified for the Project Location, while standard measures address strategies that are typically required for construction such as erosion and sediment control, flagging, signage, etc.

7.1 Impacts to Vegetation Communities

Loss of vegetation will occur where the Project Area overlays natural features and vegetation removal is required to facilitate construction. Stantec's ecologists and the transportation design team worked together to understand the needs of the transportation works and the ecological conditions of the lands immediately adjacent to the roadways. To the extent possible, encroachment into any of the natural areas, regardless of ecological function or designation, has been a primary consideration in the development of the preliminary design.

Permanent loss of vegetation will occur in the sidewalk footprint west of Western Road and north of Windemere Road. The area is approximately 2.0 m at it widest point tapering off over a length of approximately 100 metres. In total, 126 m^2 of natural vegetation will be displaced in three ELC ecosites. Of those ecosites, 23702 m^2 will not be impacted. These ecosites are not part of the Medway Valley Heritage Forest ESA.

The following direct loss of natural vegetation (not including maintained vegetation in the ROW) in natural ELC communities within the Project Area is shown below **Table 8**).

Table 8: Natural Vegetation Loss per Ecosite Associated with the Project

ELC Ecosite	ELC Code 2008	Vegetation Loss (m^2)	No Impact (m^2)
Fresh – Moist White Cedar – Hardwood Mixed Forest Ecosite	FOMM7	51	5837
Dry - Fresh Black Walnut Deciduous Woodland Type	WODM4-4	75	4521
	Total	126	23702

There is also small area where the road improvements extend beyond the existing road ROW on the south side of Windemere road and east of the entrance to Windemere on

the Mount facility (east of Tallwood Circle). The trees that may potentially be affect are not part of a natural area but rather trees and tree clusters that appear as landscape plantings along the roadway.

The vegetation impacts are associated with the improvement and relocation of pedestrian sidewalks on the north side of Windemere Road. The impact area is noted to be relatively small in width however extending along some of the length of the road corridor.

Planted trees and maintained vegetation ("lawn") are proposed for removal along the Windermere Road and Richmond Street ROW. There are approximately 24 trees proposed for removal within parklands, institutional lands, and road ROW.

7.1.1 Mitigation for Vegetation

7.1.1.1 General Vegetation Removal –Mitigation.

A landscape planting plan is recommended for the detailed design phase of this project. The plan should consist of native wildflowers and grasses, shrubs, and deciduous trees to offer restoration to areas disturbed by construction and to enhance the existing near road ecosystems. In some cases in urban areas, the opportunity for compensatory rehabilitation is limited; however, if land areas are available within the street ROW, or local setting a landscape planting plan would be used to guide the design and ecological integrity of the plan. It is recommended to introduce a variety of native vegetation species that are beneficial to wildlife such as nectar-bearing plants for pollinators; however, in this case, nut and berry producing species will be lower in quantity to avoid attracting wildlife to the wooded edge where there is more of a likelihood of vehicle/wildlife interaction. Plant material should be native species that are suitable for the site conditions and sourced from a local nursery that specializes in native plant material where possible. The planting plan for near-road areas should focus on a planting regime that would support edge management objectives such as, providing long term visual and noise barriers, creating a living barrier to discourage anthropogenic entry at unwanted locations, and providing shade to reduce sun scalding and woodland desiccation, etc.

It is recommended that any invasive species control be implemented at the transition zone between the active tree removal and the remaining forest to the extent possible. Invasive species management strategies should be included during the development of the detail design for the project, and should be based on best available science such as the Best Management Practices developed by the Ontario Invasive Plant Council.

7.1.2 Sediment and Erosion

Erosion and sediment (E&S) transport is possible at all construction sites. The goal of E&S mitigation is to reduce the potential for erosion and subsequent sediment release through various methods of control.

In areas where erosion (wind, rain, slope erosion) has the potential to occur, minimizing the extent of erosion and its advancement within the disturbed construction area is critical to avoiding impact to natural areas near the road improvement area.

Mitigation measures for sedimentation, erosion, and dust control should be implemented to prevent sediment and dust from entering sensitive natural features. The primary principles associated with sedimentation and erosion protection measures are to: (1) minimize the duration of soil exposure; (2) retain existing vegetation where feasible; (3) encourage re-vegetation; (4) divert runoff away from exposed soils; (5) keep runoff velocities low; and to (6) trap sediment as close to the source as possible. To address these principles, the following mitigation measures are proposed:

- Silt fencing and/or barriers should be used along all construction areas adjacent to any natural areas.
- Equipment should not be permitted to enter any natural areas beyond the vegetation protection fencing.
- All exposed soil areas should be stabilized and re-vegetated, through the placement of seed and mulching or seed and an erosion control blanket, promptly upon completion of construction activities.
- Equipment should be re-fueled a minimum of 30 m away from all watercourses to avoid potential impacts if an accidental spill occurs. Spill control materials, including absorbent barriers and mats, should be kept on site to immediately address any accidental spills.
- In addition to any specified requirements and prior to grading operations, additional silt fence should be available on site to provide a contingency supply in the event of an emergency.
- All sediment and erosion controls should be monitored regularly and properly maintained as required. Controls are to be removed only after the soils of the construction area have been stabilized and adequately protected or until cover is re-established.

- Disturbed natural areas should be restored to pre-construction conditions, or better, where areas for restoration are available locally beyond the footprint of the sidewalk and road ROW.

7.2 Potential Impacts to Wildlife

Reptiles, amphibians, and other ground-dwelling animals may occasionally enter work areas. Interaction with wildlife during construction may result in direct mortality. Wildlife interaction is more likely to occur where natural areas are present in the Study Area and ecopassages are not present, such as the forested areas west of Western Road and the Tallwood Valley forested corridor. Interaction with wildlife on Richmond Street at the Thames River bridge may also occur.

The Project does not involve any direct impact to aquatic habitat, and therefore the risk of direct impacts to aquatic dependent wildlife such as SAR turtles, fish and mussels is reduced. However indirect effects may occur from erosion and sedimentation as noted in Section 7.1.2. . Transport of sediment to, and siltation of watercourses can impact life cycle processes. Implementation of proper erosion and sedimentation control is instrumental in reducing these potential impacts.

Trees proposed for removal were not found to support habitat of SAR or SOCC wildlife species. Standard mitigation measures are available to reduce potential for interaction with wildlife.

Migratory birds and their nests are protected from harm and disturbance under the MBCA. Although nests of migratory birds were not observed during field investigations, there is potential for nests to occur in vegetation that will be cleared in the new road and sidewalk ROW.

To address restrictions of the MBCA, a timing restriction for vegetation clearing and other work that may disturb nests is recommended.

7.3 Species At Risk

The background review, information provided by the UTRCA and Stantec surveys have documented several active species at risk or potential species at risk within the study area. There are no observed species at risk in the footprint of the road improvements, such as roadside butternut or bat maternity roosts in trees in the zones where tree removal will occur. Bat maternity roosts can be difficult to confirm; however, consideration of potential bat roosting trees can be initially undertaken through a screening for trees with characteristics that are preferred by roosting bats. In all areas where greater than 10 dbh trees are being removed, a clearing timing widow should be implemented.

7.4 Mitigation to Wildlife

7.4.1.1 Avoidance of Wildlife and SAR

Sediment and erosion control fencing (geotextile fences) are effective for the temporary exclusion of amphibians and reptiles (MECP 2021). Light duty geotextile fences are suitable for construction duration lasting up to one season (MECP 2021). Heavy-duty geotextile fences are effective for up to 2 to 3 years (MECP 2021). Geotextile fencing with nylon mesh should be avoided due to the risk of entanglement by snakes.

[redacted]

Prior to work commencing in a new work area, a thorough visual search of the work area should be conducted by construction contractors to locate snakes or other wildlife, particularly between April 1 and October 31 when snakes are most active. If snakes or other wildlife are encountered during construction, work at that location will stop, and wildlife will be permitted reasonable time to flee the area on their own. If necessary, a biologist or other qualified professional can move wildlife to a location that is both safe and suitable. [redacted]

7.4.2 Bird Nests

The Regional Nesting Period (RNP) is the period when the percent of total nesting species is expected to be greater than 10%. The RNP for the Study Area is considered to fall between April 3 and August 15, although nesting also infrequently occurs outside of this period (Government of Canada 2018). No part of the Project that could result in the incidental take of bird nests should be performed within the RNP unless an avian biologist is retained to conduct nest sweeps of the Project Area a maximum of seven days prior to works. The biologist will search for nests or signs of nesting of migratory birds within and adjacent to the Project Area. Where the sweep determines that no nests are present, the Project can commence within the searched area. If the Project is delayed beyond the seven day effective window for the nest sweep, a new sweep will be required.

If a migratory bird nest is located within the work area at any time, a no-disturbance buffer will be delineated. This buffer will be maintained for the entire duration of the nest activity, which will be determined using periodic checks by the avian biologist. The radius of the buffer generally varies from 5 m – 60 m depending on the sensitivity of the nesting species. The Project will not resume within the nest buffer until the nest is confirmed to be no longer active.

7.4.3 Clean Equipment Protocol

Standard measures for erosion and sediment control, and revegetation of disturbed areas will be implemented to reduce opportunities for invasive plants. A clean equipment protocol will be implemented during construction to reduce the potential for the introduction and spread of invasive plants. The protocol should be developed in consideration of the *Clean Equipment Protocol for Industry* (Halloran et al. 2013).

7.4.4 Salt Application

A salt management plan should be prepared during detailed design to protect sensitive natural features during regular road operations. The salt management plan should reference the Ontario Good Roads Association & Conservation Ontario's *Good Practices for Winter Maintenance in Salt Vulnerable Areas* (June 2018). Detail design should also consider design approaches to reduce salt impacts, including site grading and use of vegetated swales within the right-of-way.

7.4.4.1 Species at Risk

To further reduce the likelihood of harm to bats, it is recommended that trees greater than 10 cm diameter at breast height (DBH) be removed outside the bat maternity roost season. Bats typically give birth in late May to early June, and females fly with newborn young until they become excessively heavy. Young begin to fly in mid- to late-June, at age three to four weeks. Rearing is completed by August and bats move to hibernacula in August or September (Broders et al. 2006, Cagle and Cockrum 1943, Gerson 1984). Therefore, removal of trees greater than 10 cm DBH is not recommended between May 1 to October 1. If tree clearing is required within this window, maternity exit surveys may be conducted prior to the tree removals to determine if bats are using the trees. Maternity exit surveys are conducted during the evening and include visual and acoustic surveys using accepted protocols.

Potential disturbance to Bank Swallow and Barn Swallow is mitigated by avoidance of potential nesting / roosting areas that these species utilize; however, these species do nest in the greater Study Area. Foraging and movement activities by these species are not expected to be impacted, as they are already accustomed to the day-to-day noise

and activity levels of the urban environment, including pedestrian traffic on the existing trails.

7.5 Potential Impacts to Aquatic Habitat

Potential impacts to fish habitat can include direct habitat loss or indirect impacts to habitat. Similar to the reptile species, direct habitat loss is not anticipated as the Project Area does not overlay fish habitat.

Indirect impacts may result from the potential for sediment transport from exposed soil surfaces, potential entry of construction debris (e.g., concrete slurry, dust, etc.) into the water and spills associated with refueling of equipment. Sediment introductions can affect fish due to increased turbidity of the water column, which can impair vision and subsequent feeding by fish that are sight-hunters. Suspended sediments can also abrade gill membranes leading to physical stress, and impact prey organism's behavioral changes (i.e., avoidance, etc.). Heavier sediments can deposit on bottom substrates that may be used for spawning, incubation of juvenile fish, or food production, thereby impacting those habitat functions.

Indirect impacts may occur with clearing of vegetation and construction of the new sidewalk on the edge of the FOMM7 and WODM4-4 ecosites. The unnamed tributary to Medway Creek drainage pattern is near or at the bottom of bank from the current sidewalk. At detail design, the need for encroachment into the unnamed tributary will be determined and an appropriate mitigation strategy determined. Due to the proximity of the construction to the watercourse, the proposed works may result in sedimentation or other indirect impacts to the feature which could result in downstream effects in Medway Creek and documented aquatic SAR habitat. Indirect impacts to aquatic features are generally reduced through the implementation of standard mitigation measures to protect fish and fish habitat.

7.5.1 Aquatic Species and Habitat Mitigation

Precautions should be taken to reduce the potential for erosion and sedimentation into the tributary to Medway Creek, including appropriate silt and sediment control during construction activities. Although the tributary is intermittent, occasional downstream transport of sediment and contaminants could cause harm to Medway Creek and habitat of aquatic SAR if not mitigated appropriately.

Potential indirect impacts could include eroded sediment transport from exposed soil surfaces, entry of construction debris (e.g., asphalt slurry, dust, etc.) into the tributary and spills associated with refueling of equipment. Indirect impacts are generally reduced through the implementation of sediment and erosion control measures, as described in the vegetation mitigation section, that would be designed to minimize the impact on fish

and fish habitat for areas adjacent to the road footprint or topographic areas that could convey sediment to watercourses.

7.6 Indirect Impacts and mitigation

Inadvertent encroachment of heavy equipment, siltation and/or spills of deleterious substances, noise, and dust migration into natural features were identified as potential indirect impacts from construction. These impacts may alter species composition by compacting and smothering vegetation and introducing substances that could be harmful to vegetation and wildlife, such as fuel used by construction vehicles and introduction and spread of invasive species. Additional disturbance may be required to facilitate spill clean-up activities. Where they occur, these impacts are expected to be localized to the construction area and adjacent areas.

7.6.1 Standard Measures for Mitigation Recommendations for Construction

Potential indirect effects to natural heritage features include construction phase activities such as inadvertent encroachment of heavy equipment, siltation and/or spills of deleterious substances, noise, and dust migration. These impacts may alter species composition by compacting and smothering vegetation and introducing substances that could be harmful to vegetation and wildlife, such as fuel used by construction vehicles.

Additional disturbance may be required to facilitate spill clean-up activities. Where they occur, these impacts are expected to be localized to the construction area and adjacent areas.

These potential indirect effects are common to various types of construction and can be controlled using standard mitigation measures for erosion and sediment control as discussed previously.

8.0 Permitting Requirements

8.1 Fisheries Act

As previously described in Section **Error! Reference source not found.**, the *Fisheries Act* prohibits projects causing a HADD to fish and fish habitat unless authorized by DFO. Direct fish habitat impacts are not anticipated as the Project Area does not overlay fish habitat. Indirect impacts such as sedimentation into the tributary to Medway Creek and downstream impacts to Medway Creek can be mitigated with sediment and

erosion control and other measures outlined above. When the Project design is finalized, the need for a Request for Review and DFO Consultation will be confirmed.

8.2 Endangered Species Act

As no works are proposed within potential or confirmed SAR habitat, consultation with the MECP is not required for the Project.

8.3 Conservation Authority Regulated Areas

Under O. Reg. 157/06 a permit is required for development or interference with wetlands and alterations to shorelines and watercourses. This may include the potential to interfere with the unnamed tributary to Medway Creek. If required, a permit application package may be required for submission to UTRCA that includes the following information:

- Maps and photographs showing the location of Project work relative to regulated features
- Environmental mitigation measures for sediment and erosion control, re-vegetation and seeding
- Other site-specific data as required

Consultation with UTRCA during detailed design is recommended to confirm permit application requirements.

8.4 Fish and Wildlife Conservation Act

If snakes or amphibians or fish require relocation during construction, a Wildlife Scientific Collector's Authorization or a Licence to Collect Fish for Scientific Purposes may be required from the MNDMNRF under the FWCA.

9.0 Summary and Conclusions

This EIS provides supporting documentation for the Windermere Road Improvements EA. The EIS describes applicable natural heritage policies, results of the natural heritage assessment, impact mitigation and permitting requirements.

The City of London OP identifies environmentally significant areas, watercourses, unevaluated wetlands, and significant valleylands in the Study Area. None of these features are anticipated to be significantly impacted by the Project.

The natural heritage assessment included background data collection and agency correspondence, site investigations and biological field surveys in 2021. Surveys and assessments of vegetation communities, wildlife populations, significant wildlife habitat, SAR habitat and aquatic habitat were completed.

The Study Area has a variety of thicket, woodland, forest, marsh, and swamp ecosites and rare and SAR (Butternut) plants. The majority of the Project Area is within the current ROW's and natural vegetation loss will be low. There will be minor impact to the vegetation communities and no anticipated impact to rare and SAR plants.

A diversity of provincially common wildlife was documented, and three SAR and two SOCC were identified utilizing habitat in the Study Area: The Spiny Softshell, Bank Swallow and Barn Swallow (SAR) and Northern Map Turtle and Snapping Turtle (SOCC). There are no anticipated impacts to the SAR or SOCC observed in the Study Area as the Project Area does not overlay habitat for these species.

Recommended wildlife impact mitigation from construction includes adhering to Primary Nesting Period vegetation clearing windows, erecting geotextile fabric fencing at potential wildlife crossing locations and visual searches for wildlife during construction. Other mitigation includes sediment and erosion control, clean equipment protocol, and a proposed salt management plan to be completed during the detailed design phase.

Permitting requirements include the potential for a project review under the *Fisheries Act*, a UTRCA O. Reg. 157/06 permit, and potential for a licence and/or authorization under the FWCA.

The Project is anticipated to have minimal impact to the natural habitat found within the Study Area. The proposed works do not impact significant or protected features in the Study Area, natural vegetation loss is predicted to be low and mitigation techniques can be utilized to reduce impact on wildlife. With this EIS, Stantec determines the Project complies with applicable federal, provincial, and municipal policies and is anticipated to have temporary, minor, and mitigatable impacts to the local ecosystem.

10.0 References

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APPENDIX A
Figures

Stantec

Legend

- Project Area
- Study Area
- Unevaluated Wetlands (City of London) (Approximate)
- Environmentally Significant Areas (City of London) (Approximate)
- Significant Valleylands (City of London) (Approximate)
- Regulated Areas (UTRCA)
- Constructed Drain
- Watercourse (Permanent)
- Waterbody
- Lot
- Municipal Boundary, Lower

0 100 200 m

1:5,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Regulated Areas (UTRCA) layer downloaded from UTRCA Regulated Areas Screening Map, Upper Thames Region Conservation Authority on December 8, 2021.
4. Unevaluated Welands, Significant Valleylands and Medway Valley Heritage Forest ESA (City of London) from Natural heritage Map, City of London, 2021.
5. Orthoimagery © First Base Solutions, 2021. Imagery Date, 2010.

Project Location
City of London

165001183 REV4
Prepared by KB on 2021-12-10
Technical Review by DH on 2021-12-06

Client/Project
CITY OF LONDON
WINDERMERE RD EA

Figure No.
1

DRAFT

Title
Study Area and Designated Features

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

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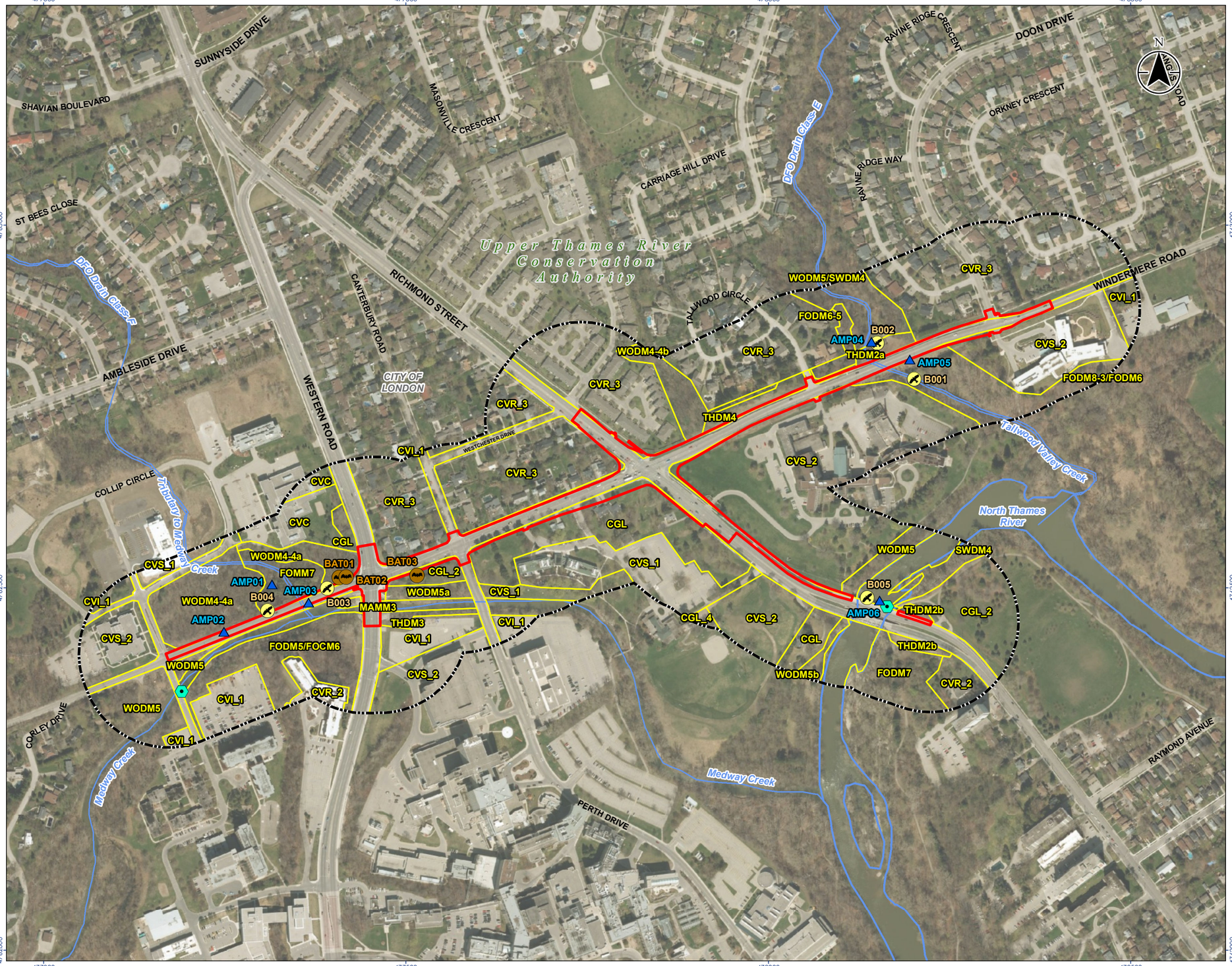

Stantec

Legend

- Project Area
- Study Area
- ELC Boundary
- Constructed Drain
- Watercourse (Permanent)
- Waterbody

Survey Locations

- Breeding Amphibian Survey Station
- Breeding Bird Survey Station
- Reptile Survey

Observations

- Butternut Location
- Potentially Suitable SAR Bat Maternity Roost
- Northern Map Turtle
- Snapping Turtle
- Spiny Softshell Turtle

ELC Description

- **CGL**: Green Lands
- **CGL_2**: Parkland
- **CGL_4**: Recreational
- **CVC**: Commercial and Institutional
- **CVI_1**: Transportation
- **CVR_2**: High Density Residential
- **CVR_3**: Single Family Residential
- **CVS_1**: Education
- **CVS_2**: Health
- **FOCM6**: Naturalized Coniferous Plantation
- **FODM5**: Dry – Fresh Sugar Maple Deciduous Forest Ecosite
- **FODM6-5**: Fresh – Moist Sugar Maple – Hardwood Deciduous Forest Type
- **FODM6**: Fresh – Moist Sugar Maple Deciduous Forest Ecosite
- **FODM7**: Fresh – Moist Lowland Deciduous Forest Ecosite
- **FODM8-3**: Fresh - Moist Cottonwood Deciduous Forest Type
- **FOMM7**: Fresh – Moist White Cedar – Hardwood Mixed Forest Ecosite
- **MAMM3**: Mixed Mineral Meadow Marsh Ecosite
- **SWDM4**: Mineral Deciduous Swamp Ecosite
- **THDM2**: Dry - Fresh Deciduous Shrub Thicket Ecosite
- **THDM3**: Dry - Fresh Deciduous Hedgerow Thicket Ecosite
- **THDM4**: Dry - Fresh Deciduous Regeneration Thicket Ecosite
- **WODM4-4**: Dry - Fresh Black Walnut Deciduous Woodland Type
- **WODM5**: Fresh - Moist Deciduous Woodland Ecosite

0 100 200 m

1:5,430 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2019.
3. Orthoimagery © First Base Solutions, 2021. Imagery Date, 2010.

Project Location
City of London

165001183 REV4
Prepared by KB on 2022-01-14
Technical Review by DH on 2021-12-08

Client/Project
CITY OF LONDON
WINDERMERE RD EA

Figure No.
2

Title
Ecological Land Classification and Field Investigations

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.

V:\01609\active_Other PCs_Active\650_Hamilton\165001183\drawing\WD\Ecosystems\EA\165001183_Fig02_ELC_Windermere.mxd Revised: 2022-01-14 By: dharvey

APPENDIX B:
Scoping Checklist

APPENDIX A

Environmental Impact Study
ISSUES SUMMARY CHECKLIST REPORT

Application Title: Windermere Road Improvements SLSR/ EIS

Date Submitted: November 3, 2020

Proponent: City of London - Transportation

Qualifications

Primary Consultant: Stantec Consulting Ltd.

Key Contact Person: Melissa Cameron / Sean Geddes

Other Consultants/field personnel:

Hydrogeology / Hydrology : _____

Geotechnical : _____

Biological - Flora _____

Biological – Fauna _____

Other: _____

Context for Background Information

Subwatershed : Medway Creek, Masonville Creek and Central London

Tributary Fact Sheet Number : _____

Planning/Policy Area: Masonville, Medway

Technical Advisory Review Team

- ☑ **Ecologist Planner**
- ☐ **Planner for the File**
- ☐ **EEPAC**
- ☑ **Conservation Authority** UTRCA
- ☐ **Ministry of Natural Resources**
- ☐ **Ministry of Energy and Environment**
- ☐ **Ministry of Municipal Affairs and Housing**
- ☐ **Ministry of Agriculture and Food**

Other Review Groups (eg. 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 photographs, preferably ortho-images, 1:2000 Ontario Base Map, NTS 1:50,000 maps)

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

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

List all supporting studies and reports available to provide background summary (e.g. *sub-watershed, hydrological, geo-technical, natural heritage etc.); check the first box if it is relevant to the subject area and surrounding landscape, and check the second box if it is determined that sufficient information is available.*

See attached scoping letter

1.2.1 Terrain Setting

☑	☑	Soils (surface & subsurface)
☑	☑	Glacial geomorphology- landform type
☑	☑	Sub-watershed
☑	☑	Topographic features
☑	☐	Ground water discharge
☐	☐	Shallow ground water/baseflow
☐	☐	Ground water recharge/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

1.2.3 **Natural Hazards**

- [x] [x] 100 year Erosion Line
- [x] [x] Floodline mapping
- [x] [x] Fill line mapping

1.2.4 **Vegetation**

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

1.2.5 **Flora**

- [x] [ ] Flora (inventory dates, source)
  3 Season required
  _____
  _____
  _____
  _____
- [x] [ ] Rare flora (National, Provincial, Regional)
  _____
  _____
  _____

1.2.6 **Fauna**

- [x] [ ] Fauna (inventory dates; source)
- [x] [ ] Breeding Birds _____
- [ ] [ ] Migratory Birds _____
- [x] [ ] Amphibians _____
- [x] [ ] Reptiles _____
- [x] [ ] Mammals _____
- [ ] [ ] Butterflies _____
- [ ] [ ] Odonata _____
- [ ] [ ] Other _____
- [ ] [ ] Bird Species of Conservation Priority
  _____
  _____
  _____
  _____
- [x] [ ] Rare Fauna
  _____
  _____
  _____
  _____

1.2.7 **Wildlife habitat**

- ☑ ☐ Species-At-Risk 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
- ☐ ☐ Hibernaculua
- ☐ ☐ 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
  Background Review Only for fish community data
  _____
  Aquatic habitat assessment included.
- ☑ ☐ Fish spawning areas
- ☑ ☐ Fish migration routes
- ☑ ☐ Thermal refuge for fish
- ☑ ☐ Thermal Regime (cold, cool, warm)
- ☐ ☐ 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. Provincial Policy Statement 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 / 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)
- ☐ ☐ Resource 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**

- ☑ ☑ Current
- ☑ ☑ Historical (past 50-100 years)
- ☑ ☑ Adjacent lands
- ☐ ☐ 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.

1.1 Environmentally Significant Areas

- ☑ Identified Environmentally Significant Areas (*Recognized in Official Plan (Schedule "B" and/or Section 15.4.1.1*
  Name Medway Valley Heritage Forest ESA
- ☐ Potential Environmentally Significant Areas – Expansion of (*Recognized in Section 15.4.1.2 and Schedule "B")*
  Name _____
- ☐ Potential Environmentally Significant Areas (*Recognized in Section 15.4.1.5 and Schedule "B")*
  Name _____

1.2 Wetlands

- ☐ Provincially Significant Wetlands
- ☐ Locally Significant Wetlands
- ☑ Unevaluated Wetlands

1.3 Areas of Natural and Scientific Interest

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

1.4 Habitat of Species-At-Risk (SAR)

- ☑ Endangered
- ☑ Threatened
- ☑ Vulnerable

1.5 Woodlands

- ☐ Significant Woodlands
- ☑ Unevaluated Vegetation Patches

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

- ☐ ground water 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

APPENDIX C:
Habitat Suitability Screening Assessment for SAR and SOCC

Habitat Suitability Screening and Species Impact Assessment for SAR and SOCC Identified as Potentially Present in the Study Area

Common Name	Scientific Name	S-Rank	ESA Status	SARA Status	Preferred Habitat	Habitat Suitability in the Project Area and Study Area and Anticipated Impact
Birds						
Bank Swallow	Riparia riparia	S4B	THR	THR	The Bank Swallow breeds on a variety of sites with vertical banks, including riverbanks, bluffs, aggregate pits and stock piles of sand and soil (COSEWIC 2013a). Sand-silt substrates are preferred (COSEWIC 2013a). Nesting sites are often near open habitats used for aerial foraging (COSEWIC 2013a). Large wetlands are used as communal roosts during post-breeding, migration, and wintering periods (COSEWIC 2013a).	No suitable habitat in the Project Area or Study Area. No anticipated impact.
Barn Swallow	Hirundo rustica	S4B	THR	THR	The Barn Swallow commonly nests on walls or ledges of barns, bridges, culverts or other man-made structures (Cadman et al. 2007). Where suitable nesting structures occur, Barn Swallow often form small colonies, sometimes mixed with other swallow species (COSEWIC 2011). The Barn Swallow feeds on aerial insects while foraging over a variety of open habitats such as pastures, lawns, meadows and fields (COSEWIC 2011). It will also frequently forage in woodland clearings, over wetland habitats or open water where insect prey are abundant (Cadman et al. 2007).	Suitable habitat is present under the Richmond Street (Thames River) bridge and Western Road (Medway Creek) bridge. Barn Swallow were observed foraging over the Thames River and are likely nesting under the Richmond Street Bridge. The Project Area does not impact the bridges, no impacts are anticipated.
Chimney Swift	Chaetura pelagica	S3B	THR	THR	Chimney Swift uses chimneys for roosting and breeding, and less commonly, nest in large hollow trees (Cadman et al. 2007). Nesting sites typically have a constant ambient temperature (COSEWIC 2007). It is an aerial insectivore, and often forages near water (COSEWIC 2007).	No suitable habitat in the Project Area or Study Area.
Common Nighthawk	Chordeiles minor	S4B	SC	THR	The Common Nighthawk is an aerial insectivore and forages at dawn and dusk. This species nests on the ground in open habitats with rocky or graveled substrate, and will even nest on gravel roofs in the city (Cadman et al. 2007). The regeneration or succession of forest clearings and the destruction of grassland habitats appear to play a major role in this species' decline along with the non-selective spraying for mosquitoes (Cadman et al. 2007).	No suitable habitat in the Project Area or Study Area. No anticipated impact.
Eastern Wood-pewee	Contopus virens	S4B	SC	SC	The Eastern Wood-peewee is found in the mid-canopy layer of deciduous and mixedwood forests with open understories, and is commonly associated with edges and clearings (MECP 2021).	Suitable habitat is present in the Tallwood Valley forested corridor. Species was not detected during the breeding bird surveys. The Project Area does not overlay habitat in the Tallwood Valley corridor. There are no anticipated impacts.
Fish						
Black Redhorse	Moxostoma duquesnei	S2	THR	THR	the Black Redhorse lives in pools and riffle areas of medium-sized rivers and streams that are usually less than two metres deep. These rivers usually have few aquatic plants, a moderate to fast current, and a sandy or gravel bottom. In the spring, it migrates to breeding habitat where eggs are laid on gravel in fast water. The winter is spent in deeper pools. Adults feed on crustaceans and aquatic insects, while the young fish feed on plankton (MECP 2021).	Suitable habitat is present in Medway Creek and the Thames River. The Project Area does not overlay aquatic habitat. There are no direct impacts anticipated to aquatic habitatt.
Northern Sunfish	*Lepomis peltastes*	S3	SC	SC	In Ontario, the Northern Sunfish lives in shallow vegetated areas of quiet, slow flowing rivers and streams, as well as warm lakes and ponds, with sandy banks or rocky bottoms. Northern Sunfish prefer to be near aquatic vegetation where they can avoid strong currents (MECP 2021).	Suitable habitat is present in Medway Creek and the Thames River. The Project Area does not overlay aquatic habitat. There are no direct impacts anticipated to aquatic habitatt.
Silver Shiner	Notropis photogenis	S2S3	THR	THR	Medium to large streams or rivers with a width of greater than 20 m with alternating riffle-pool sequences. Deep, swift-flowing riffle, run and pool habitat (MECP 2021) Regulated habitat: Category 1 - flowing pools, runs and riffles in occupied reaches. Category 2 - shallow, nearshore habitats, and areas with aquatic vegetation in occupied reaches. Category 3 - Floodplains and riparian edges adjacent to occupied reaches (MECP 2021).	Suitable habitat is present in Medway Creek and the Thames River. The Project Area does not overlay aquatic habitat. There are no direct impacts anticipated to aquatic habitatt.
Mammals						
Eastern Small-footed Myotis	Myotis leibii	S2S3	END	Not listed	The Eastern Small-footed Myotis roosts in a variety of habitats, including hollow trees, under rocks or in rock outcrops, in buildings, caves, mines and under bridges (MECP 2021). Different roosting sites may be selected each day (MECP 2021). Hibernation occurs in abandoned mines and caves (MECP 2021).	Suitable habitat is present in potential bat maternity roost trees identified in the WODM4-4 (Dry - Fresh Black Walnut Deciduous Woodland) and CGL2 (Parkland). These trees are not within the Project Area and impacts are not anticipated.
Little Brown Myotis	Myotis lucifugus	S3	END	END	The Little Brown Myotis roosts in tree cavities and abandoned buildings, and often forms roosting colonies in barns, attics and abandoned buildings (MECP 2021; COSEWIC 2013b). They have been found in a wide variety of deciduous and coniferous tree stands (COSEWIC 2013b). Hibernation typically occurs in caves and mines (MECP 2021).	Suitable habitat is present in potential bat maternity roost trees identified in the WODM4-4 (Dry - Fresh Black Walnut Deciduous Woodland) and CGL2 (Parkland). These trees are not within the Project Area and impacts are not anticipated.
Northern Myotis	Myotis septentrionalis	S3?	END	END	The Northern Myotis roosts in colonies in tree cavities (COSEWIC 2013b) in a wide variety of deciduous and coniferous forest stands. Little is known about the effect of tree density on maternity roost selection for this species, but bats tend to avoid large open areas (COSEWIC 2013b). Small forest gaps, such as over streams or ponds, are used for foraging (COSEWIC 2013b).	Suitable habitat is present in potential bat maternity roost trees identified in the WODM4-4 (Dry - Fresh Black Walnut Deciduous Woodland) and CGL2 (Parkland). These trees are not within the Project Area and impacts are not anticipated.
Tri-colored Bat	Perimyotis subflavus	S3?	END	END	The Tri-coloured Bat roosts in colonies in tree cavities (COSEWIC 2013b) in a wide variety of deciduous and coniferous forest stands. Little is known about the effect of stand composition on maternity roost selection for this species, but it is strongly associated with forest watercourses and streamside vegetation (COSEWIC 2013b).	Suitable habitat is present in potential bat maternity roost trees identified in the WODM4-4 (Dry - Fresh Black Walnut Deciduous Woodland) and CGL2 (Parkland). These trees are not within the Project Area and impacts are not anticipated.
Mussels						
Wavy-rayed Lampmussel	Lampsilis fasciola	S2	THR	SC	The Wavy-rayed lampmussel is usually found in small to medium rivers with clear water. It lives in shallow riffle areas with clean gravel or sand bottoms. The Wavy-rayed lampmussel's fish hosts are the Largemouth bass and Smallmouth bass (MECP 2021).	Suitable habitat is present in Medway Creek and the Thames River. The Project Area does not overlay aquatic habitat. There are no direct impacts anticipated to aquatic habitatt.
Plants						
Butternut	Juglans cinerea	S2?	END	END	The Butternut is a medium-sized tree that is commonly found in a variety of habitats including woodlands and hedgerows (COSEWIC 2017). Butternut is intolerant of shade and occurs singly or in small groups with a variety of associates (Farrar 1995).	One Butternut tree was observed in the Tallwood Valley Creek corridor in the WODM5/SWDM4 ecosite. The tree was approximately 90 m from the Windemere Road ROW. The Project Area does not encroach upon the natural area. No impacts to Butternut are anticipated.
Eastern False Rue-anemone	Enemion biternatum	S2	THR	THR	False Rue-anemone grows on rich, moist soil in valleys, floodplains and on ravine bottoms; often in mature maple-beech forests (MECP 2021; COSEWIC 2005). It prefers partial sun (MECP 2021).	Eastern False Rue-anemone was not observed in the Study Area. No impacts to Eastern False Rue-anemone are anticipated.
Green Dragon	Arisaema dracontium	S3	SC	Not Listed	Green Dragon grows along streams in moist to wet forests dominated by maple, Green Ash and White Elm (MECP 2021).	Green Dragon was not observed in the Study Area. No impacts to Green Dragon are anticipated.
Reptiles						
Eastern Milksnake	Lampropeltis triangulum	S4	Not Listed	SC	The Eastern milksnake can be found in a variety of habitats, but prefer open areas such as pastures, meadows, prairies, rock outcrops, right-of-ways, and agricultural land (COSEWIC 2014). They commonly hunt around old buildings and barns, where rodent populations are high (COSEWIC 2014). At the landscape scale, Milksnakes are most abundant in areas of Ontario with high overall forest cover (COSEWIC 2014). While COSSARO delisted this species in 2016, it is still designated as Special Concern by COSEWIC and the SARA.	No suitable habitat in the Project Area or Study Area. No anticipated impact.
Northern Map Turtle	Graptemys geographica	S3	SC	SC	The Northern Map Turtle inhabits rivers and lakes with suitable basking sites such as deadheads, rocks and emergent vegetation (MECP 2021; COSEWIC 2002). It requires high-quality water with abundant mollusc populations, which are the preferred prey source (MECP 2021). The map turtle overwinters in slow-moving, deep sections of river (COSEWIC 2002).	Suitable habitat is present in the Thames River and Medway Creek. The Project Area does not overlay these features and turtle nesting habitat was not observed in the Project Area. No impacts to Northern Map Turtle are anticipated.
Queensnake	Regina septemvittata	S2	END	END	The Queensnake is an aquatic snake that is seldom found more than 3 m from streams, rivers and lakes with gravelly/rocky bottoms and an abundance of crayfish (COSEWIC 2010; MECP 2021). Hibernacula are generally found in bridge abutments and bedrock crevices (MECP 2021).	Suitable habitat is present in the Thames River and Medway Creek. The Project Area does not overlay these features and project interaction with Queensnake is not anticipated as the Project does not encroach upon any natural areas and the species is rarely found more than 3 m from water during the active season and 10 m from water for hibernacula (COSEWIC 2010).
Snapping Turtle	Chelydra serpentina	S4	SC	SC	The Snapping Turtle inhabits ponds, sloughs, streams, rivers, and shallow bays that are characterized by slow moving water, aquatic vegetation, and soft bottoms (COSEWIC 2008). It prefers to stay in shallow water, where it buries itself into mud and leaf litter and has easy access to the surface for air (MECP 2021). Females nest in sand or gravel, frequently using manmade surfaces such as road shoulders and aggregate pits, in May and early June (MECP 2021; COSEWIC 2008).	Suitable habitat is present in the Thames River and Medway Creek. The Project Area does not overlay these features and turtle nesting habitat was not observed in the Project Area. No impacts to Snapping Turtle are anticipated.
Spiny Softshell	Apalone spinifera spinifera	S2	END	END	The Spiny Softshell is usually found in rivers and lakes, but ocassionally inhabits smaller waterbodies such as streams and roadside ditches (MECP 2021). The primary habitat requriement is access to open terrestrial sand or gravel sites for nesting, soft mud substrate for burrowing, basking sites and an abundance of crayfish and other prey items (MECP 2021; COSEWIC 2016). The Spiny Softshell rarely travels far from aquatic habitats (COSEWIC 2016).	Suitable habitat is present in the Thames River and Medway Creek. The Project Area does not overlay these features and project interaction with Spiny Softshell is not anticipated as the Project does not encroach upon any aquatic environment which the species is dependent upon.

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COSEWIC. 2013b. COSEWIC assessment and status report on the Little Brown Myotis Myotis lucifugus, Northern Myotis Myotis septentrionalis and Tri-colored Bat Perimyotis subflavus in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxiv + 93 pp. (www.registrelep-sararegistry.gc.ca/default_e.cfm).

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APPENDIX D:
Vegetation

VASCULAR PLANT LIST - Windermere Road EA, London, ON

Plant Species Observed in October 2020, May 2021 and September 2021

THICKET (THDM2, THDM3, THDM4)	WOODLAND (WODM4-4, WODM5)	FORESTS (FOCM6, FOMM7, FODM6 / 7 / 8)	RIVERBANK MARSH & SWAMP (MAM & SWDM4)	CONSTRUCTED AREAS (CGL, CVC, CVR, CVS)	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO & COSEWIC STATUS	REGIONAL STATUS (MIDDLESEX)	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS
					PTERIDOPHYTES (FERNS & FERN ALLIES)						
	x				Equisetum arvense	Field Horsetail	S5			0	0
	x				Matteuccia struthiopteris	Ostrich Fern	S5			5	0
					GYMNOSPERMS (Conifers)						
x					Juniperus virginiana	Eastern Red Cedar	S5			4	3
		x		x	Picea abies	Norway Spruce	SE3				5
				x	Picea pungens	Blue Spruce	SE1				3
				x	Pinus nigra	Austrian Pine	SE3				5
				x	Pinus strobus	Eastern White Pine	S5			4	3
		x			Pinus sylvestris	Scots Pine	SE5				3
				x	Pseudotsuga menziesii	Douglas-fir	SE				
		x		x	Thuja occidentalis	Eastern White Cedar	S5			4	-3
					ANGIOSPERMS (Dicots)						
			x		Acalypha rhomboidea	Three-seeded Mercury	S5			0	3
	x	x	x		Acer negundo	Manitoba Maple	S5			0	0
x		x		x	Acer platanoides	Norway Maple	SE5				5
				x	Acer saccharinum	Silver Maple	S5			5	-3
x		x			Acer saccharum	Sugar Maple	S5			4	3
	x	x			Acer x freemanii	Freeman's Swamp Maple	S5			6	-5
	x				Aegopodium podagraria	Goutweed	SE5				0
		x	x		Ageratina altissima	White Snakeroot	S5			5	3
x	x	x			Alliaria petiolata	Garlic Mustard	SE5				0
	x				Apocynum cannabinum	Hemp Dogbane	S5			3	0
			x		Arctium lappa	Great Burdock	SE5				3
x	x	x			Arctium minus	Common Burdock	SE5				3
			x		Asclepias incarnata	Swamp Milkweed	S5			6	-5
	x		x		Barbarea vulgaris	Bitter Wintercress	SE5				0
	x				Berberis thunbergii	Japanese Barberry	SE5				3
			x		Bidens cernua	Nodding Beggarticks	S5			2	-5

VASCULAR PLANT LIST - Windermere Road EA, London, ON

Plant Species Observed in October 2020, May 2021 and September 2021

THICKET (THDM2, THDM3, THDM4)	WOODLAND (WODM4-4, WODM5)	FORESTS (FOCM6, FOMM7, FODM6 / 7 / 8)	RIVERBANK MARSH & SWAMP (MAM & SWDM4)	CONSTRUCTED AREAS (CGL, CVC, CVR, CVS)	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO & COSEWIC STATUS	REGIONAL STATUS (MIDDLESEX)	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS
	x	x			Caltha palustris	Yellow Marsh Marigold	S5			5	-5
	x		x		Calystegia sepium	Hedge False Bindweed	S5			2	0
				x	Catalpa sp.	Catalpa Species	SE				
	x	x			Celtis occidentalis	Common Hackberry	S4			8	0
x					Centaurea sp.	Knapweed	SE				
	x			x	Cercis canadensis	Eastern Redbud	SX		n/a	n/a	n/a
x				x	Cichorium intybus	Wild Chicory	SE5				5
	x	x			Cicuta maculata	Spotted Water-hemlock	S5			6	-5
	x	x			Circaea canadensis	Enchanter's Nightshade	S5			2	3
x	x				Cirsium arvense	Canada Thistle	SE5				3
	x	x	x		Clematis virginiana	Virginia Clematis	S5			3	0
				x	Coreopsis tripteris	Tall Tickseed	S1S2		n/a	n/a	n/a
	x				Cornus alternifolia	Alternate-leaved Dogwood	S5			6	3
	x				Cornus obliqua	Silky Dogwood	S5			2	-3
x	x		x		Cornus racemosa	Grey Dogwood	S5			2	0
x			x		Cornus sericea	Red-osier Dogwood	S5			2	-3
			x		Cuscuta gronovii	Swamp Dodder	S5			4	-3
x	x			x	Daucus carota	Wild Carrot	SE5				5
				x	Desmodium canadense	Canada Tick-trefoil	S4			5	0
x	x				Dipsacus fullonum	Common Teasel	SE5				3
x	x			x	Erigeron annuus	Annual Fleabane	S5			0	3
	x				Erigeron philadelphicus	Philadelphia Fleabane	S5			1	-3
			x		Euonymus europaeus	European Euonymus	SE2				5
			x		Eupatorium perfoliatum	Common Boneset	S5			2	-3
x	x				Euthamia graminifolia	Grass-leaved Goldenrod	S5			2	0
	x		x		Eutrochium maculatum	Spotted Joe Pye Weed	S5			3	-5
			x		Fallopia scandens	Climbing False Buckwheat	S4S5			3	0
		x			Frangula alnus	Glossy Buckthorn	SE5				0
		x			Fraxinus americana	White Ash	S4			4	3
x	x	x	x		Fraxinus pennsylvanica	Red Ash	S4			3	-3

VASCULAR PLANT LIST - Windermere Road EA, London, ON

Plant Species Observed in October 2020, May 2021 and September 2021

THICKET (THDM2, THDM3, THDM4)	WOODLAND (WODM4-4, WODM5)	FORESTS (FOCM6, FOMM7, FODM6 / 7 / 8)	RIVERBANK MARSH & SWAMP (MAM & SWDM4)	CONSTRUCTED AREAS (CGL, CVC, CVR, CVS)	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO & COSEWIC STATUS	REGIONAL STATUS (MIDDLESEX)	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS
x					Galium mollugo	Smooth Bedstraw	SE5				5
	x				Galium odoratum	Sweet-scented Bedstraw	SE1				5
x	x	x			Geum canadense	Canada Avens	S5			3	0
	x	x		x	Glechoma hederacea	Ground-ivy	SE5				3
				x	Gleditsia triacanthos var. inermis	Thornless Honey Locust	S2?		n/a	n/a	n/a
	x	x			Hesperis matronalis	Dame's Rocket	SE5				3
	x				Impatiens capensis	Spotted Jewelweed	S5			4	-3
	x		x		Impatiens glandulifera	Purple Jewelweed	SE4				-3
	x				Juglans cinerea	Butternut	S2?	END		6	3
x	x	x	x	x	Juglans nigra	Black Walnut	S4?			5	3
x				x	Lamium purpureum	Purple Dead-nettle	SE3				5
		x			Lapsana communis	Common Nipplewort	SE5				3
	x				Leonurus cardiaca	Common Motherwort	SE5				5
x					Leucanthemum vulgare	Oxeye Daisy	SE5				5
	x	x			Ligustrum vulgare	European Privet	SE5				3
x				x	Linaria vulgaris	Butter-and-eggs	SE5				5
	x				Lindera benzoin	Northern Spicebush	S4			6	-3
			x		Lindernia dubia	Yellow-seed False Pimpernel	S4		Rare	7	-5
		x			Liriodendron tulipifera	Tulip Tree	n/a			n/a	n/a
	x	x			Lonicera maackii	Maack's Honeysuckle	SE2				5
x	x	x			Lonicera sp.	Exotic Honesuckle	SE				
	x				Lonicera tatarica	Tatarian Honeysuckle	SE5				3
	x				Lonicera x bella	(Lonicera morrowii X Lonicera tatarica)	SE				3
	x	x	x		Lysimachia nummularia	Creeping Yellow Loosestrife	SE5				-3
			x		Lythrum salicaria	Purple Loosestrife	SE5				-5
x				x	Medicago lupulina	Black Medick	SE5				3
			x		Mentha canadensis	Canada Mint	S5			3	-3
			x		Mimulus ringens	Square-stemmed Monkeyflower	S5			6	-5
x					Morus alba	White Mulberry	SE5				0

VASCULAR PLANT LIST - Windermere Road EA, London, ON

Plant Species Observed in October 2020, May 2021 and September 2021

THICKET (THDM2, THDM3, THDM4)	WOODLAND (WODM4-4, WODM5)	FORESTS (FOCM6, FOMM7, FODM6 / 7 / 8)	RIVERBANK MARSH & SWAMP (MAM & SWDM4)	CONSTRUCTED AREAS (CGL, CVC, CVR, CVS)	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO & COSEWIC STATUS	REGIONAL STATUS (MIDDLESEX)	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS
			x		Myosotis scorpioides	True Forget-me-not	SE5				-5
			x		Myosoton aquaticum	Giant-chickweed	SE3				0
	x				Nepeta cataria	Catnip	SE5				3
	x	x			Parthenocissus vitacea	Thicket Creeper	S5			4	3
			x		Persicaria hydropiper	Marshpepper Smartweed	SE5				-5
		x			Persicaria virginiana	Virginia Smartweed	S4			6	0
			x		Physalis longifolia	Long-leaved Ground-cherry	S4			1	5
x					Physocarpus opulifolius	Eastern Ninebark	S5			5	-3
	x				Pilea sp.	Clearweed Species					
x				x	Plantago lanceolata	English Plantain	SE5				3
	x	x	x	x	Platanus occidentalis	Sycamore	S4			8	-3
			x		Polygonum aviculare	Prostrate Knotweed	S4?			0	3
x	x	x	x		Populus deltoides ssp. deltoides	Eastern Cottonwood	S5			4	0
	x				Populus tremuloides	Trembling Aspen	S5			2	0
				x	Potentilla indica	Mock Strawberry	SE2				3
		x			Prunus serotina	Black Cherry	S5			3	3
	x	x			Prunus virginiana	Chokecherry	S5			2	3
	x				Pulmonaria officinalis	Common Lungwort	SE1				
				x	Quercus macrocarpa	Bur Oak	S5			5	3
	x	x			Ranunculus caricetorum	Northern Swamp Buttercup	S5			5	-5
	x				Ranunculus sceleratus	Cursed Buttercup	S5			2	-5
x	x	x			Rhamnus cathartica	European Buckthorn	SE5				0
x	x				Rhus typhina	Staghorn Sumac	S5			1	3
	x				Ribes americanum	American Black Currant	S5			4	-3
x		x		x	Robinia pseudoacacia	Black Locust	SE5				3
x	x				Rosa multiflora	Multiflora Rose	SE5				3
x	x	x			Rubus occidentalis	Black Raspberry	S5			2	5
		x	x		Rudbeckia laciniata	Cut-leaved Coneflower	S5			7	-3
			x		Rudbeckia triloba	Brown-eyed Susan	SE4				3
	x	x	x		Rumex obtusifolius	Bitter Dock	SE5				-3

VASCULAR PLANT LIST - Windermere Road EA, London, ON

Plant Species Observed in October 2020, May 2021 and September 2021

THICKET (THDM2, THDM3, THDM4)	WOODLAND (WODM4-4, WODM5)	FORESTS (FOCM6, FOMM7, FODM6 / 7 / 8)	RIVERBANK MARSH & SWAMP (MAM & SWDM4)	CONSTRUCTED AREAS (CGL, CVC, CVR, CVS)	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO & COSEWIC STATUS	REGIONAL STATUS (MIDDLESEX)	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS
			x		Salix interior	Sandbar Willow	S5			1	-3
			x		Salix nigra	Black Willow	S4			6	-5
	x	x	x	x	Salix sp.	Exotic Willow	SE				
x					Scorzoneroides autumnalis	Autumn Hawkbit	SE5				3
		x	x		Scrophularia marilandica	Carpenter's Figwort	S4			7	3
x	x				Solanum dulcamara	Bittersweet Nightshade	SE5				0
x	x	x			Solidago cf. canadensis	Canada Goldenrod	S5			1	3
	x	x	x		Solidago gigantea	Giant Goldenrod	S5			4	-3
	x	x	x		Symphyotrichum lanceolatum	Panicled Aster	S5			3	-3
x	x	x			Symphyotrichum lateriflorum	Calico Aster	S5			3	0
x					Symphyotrichum novae-angliae	New England Aster	S5			2	-3
			x		Symphyotrichum ontarionis	Ontario Aster	S5		Rare	6	0
	x				Symphyotrichum puniceum	Purple-stemmed Aster	S5			6	-5
x	x	x			Symphyotrichum urophyllum	Arrow-leaved Aster	S4			6	5
x	x				Syringa vulgaris	Common Lilac	SE5				5
x				x	Tanacetum vulgare	Common Tansy	SE5				5
x	x	x		x	Taraxacum officinale	Common Dandelion	SE5				3
				x	Tilia cordata	Little-leaved Linden	SE1				5
	x	x			Ulmus americana	White Elm	S5			3	-3
				x	Ulmus pumila	Siberian Elm	SE3				3
	x	x	x		Verbena urticifolia	White Vervain	S5			4	0
			x		Veronica anagallis-aquatica	Water Speedwell	SE				-5
	x				Veronica filiformis	Slender Speedwell	SE2				5
x	x				Veronica serpyllifolia	Thyme-leaved Speedwell	SU				0
	x				Viburnum opulus var. opulus	Cranberry Viburnum	SE4?				-3
		x			Vincetoxicum sp.	Swallowwort Species	SE				
x	x	x	x		Vitis riparia	Riverbank Grape	S5			0	0
			x		Xanthium strumarium	Rough Cockleburr	S5			2	0
		x			Zizia aurea	Golden Alexanders	S5			7	0

VASCULAR PLANT LIST - Windermere Road EA, London, ON

Plant Species Observed in October 2020, May 2021 and September 2021

THICKET (THDM2, THDM3, THDM4)	WOODLAND (WODM4-4, WODM5)	FORESTS (FOCM6, FOMM7, FODM6 / 7 / 8)	RIVERBANK MARSH & SWAMP (MAM & SWDM4)	CONSTRUCTED AREAS (CGL, CVC, CVR, CVS)	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO & COSEWIC STATUS	REGIONAL STATUS (MIDDLESEX)	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS
					ANGIOSPERMS (Monocots)						
x	x				Agrostis gigantea	Redtop	SE5				-3
x				x	Andropogon gerardi	Big Bluestem	S4			7	3
		x			Arisaema triphyllum	Jack-in-the-pulpit	S5			5	-3
			x		Bromus latiglumis	Broad-glumed Brome	S4			7	-3
x					Carex blanda	Woodland Sedge	S5			3	0
			x		Carex cristatella	Crested Sedge	S5			3	-3
			x		Carex granularis	Limestone Meadow Sedge	S5			3	-3
		x			Carex spicata	Spiked Sedge	SE5				3
	x				Carex stricta	Tussock Sedge	S5			4	-5
	x	x		x	Convallaria majalis	European Lily-of-the-valley	SE5				5
x	x	x		x	Dactylis glomerata	Orchard Grass	SE5				3
x	x			x	Elymus repens	Quackgrass	SE5				3
	x				Elymus virginicus	Virginia Wildrye	S5			5	-3
		x			Hemerocallis fulva	Orange Daylily	SE5				5
		x			Iris sp.	Iris Species					
	x				Iris versicolor	Harlequin Blue Flag	S5			5	-5
			x		Leersia oryzoides	Rice Cutgrass	S5			3	-5
			x		Leersia virginica	White Cutgrass	S4			6	-3
			x		Panicum dichotomiflorum	Fall Panicgrass	SE5				-3
	x				Phragmites australis ssp. australis	European Reed	SE				-3
x				x	Poa pratensis	Kentucky Bluegrass	S5			0	3
			x		Scirpus atrovirens	Dark-green Bulrush	S5			3	-5
x				x	Setaria pumila	Yellow Foxtail	SE5				0
	x				Symplocarpus foetidus	Eastern Skunk Cabbage	S5			7	-5

VASCULAR PLANT LIST - Windermere Road EA, London, ON

Plant Species Observed in October 2020, May 2021 and September 2021

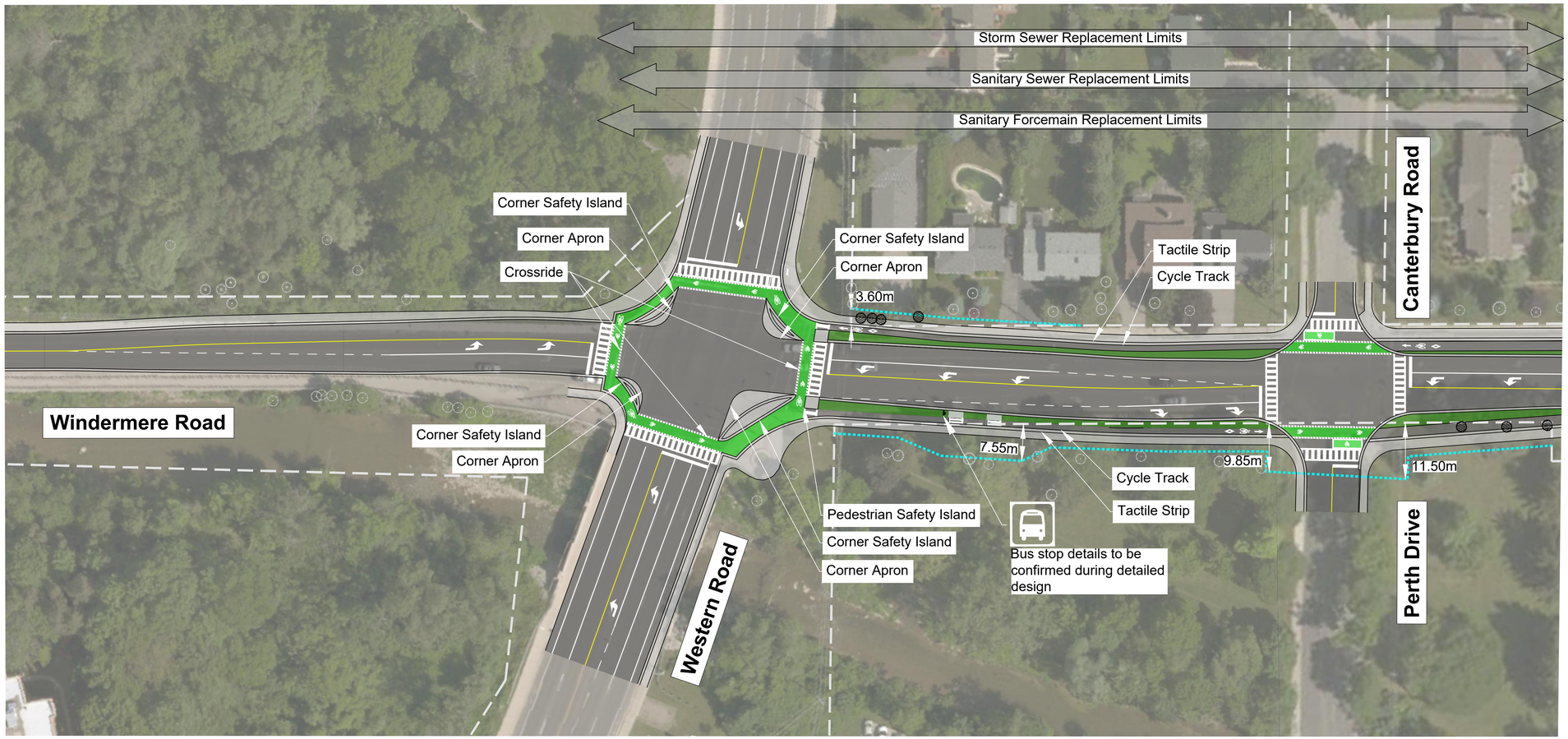
THICKET (THDM2, THDM3, THDM4)	WOODLAND (WODM4-4, WODM5)	FORESTS (FOCM6, FOMM7, FODM6 / 7 / 8)	RIVERBANK MARSH & SWAMP (MAM & SWDM4)	CONSTRUCTED AREAS (CGL, CVC, CVR, CVS)	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO & COSEWIC STATUS	REGIONAL STATUS (MIDDLESEX)	COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS

THICKET	WOODLAND	FOREST	RIVERBANK	CONSTRUCTED	FLORISTIC SUMMARY	TOTAL`
50	84	57	52	36	Total Species	165
22	49	34	38	12	Native Species	93
28	35	23	14	24	Introduced (exotic) species	72
0	1	0	0	0	Species at Risk in Ontario (END, THR or SC)	1
0	1	0	0	0	Species at Riskin Canada (END, THR or SC)	1
0	1	0	0	2	Rare in Ontario (S1, S2 or S3)	3
4	6	8	11	3	Uncommon to common in Ontario (S4)	18
17	40	26	27	6	Common to very common in Ontario (S5)	70
0	0	0	2	0	Rare in Middlesex County	2
0	2	2	1	2	Highly sensitive plant species with C value of 8, 9 or 10	2
5	27	14	30	2	Wetland Plant Species (-5, -4 or -3)	54

APPENDIX E:
Proposed Design Alternatives

Supplemental Legend:

- Proposed Roadway Platform
- Proposed Sidewalk/Median/Curb
- Proposed Boulevard/Green Space
- Proposed Crossride
- Proposed Crosswalk
- Existing ROW
- Proposed New ROW Limit
- Proposed New Bus Stop
- Proposed Tree Removal
- Existing Tree



EXISTING SERVICES	DRAWING #, SOURCE	DATE	CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN				
					DRAWN BY				
					CHECKED				
					APPROVED				
					DATE				

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ENGINEER'S STAMP

CORPORATION OF THE CITY OF LONDON

London CANADA

SCALE

TITLE

WINDERMERE RD EA

WINDERMERE ROAD

PROJECT No.

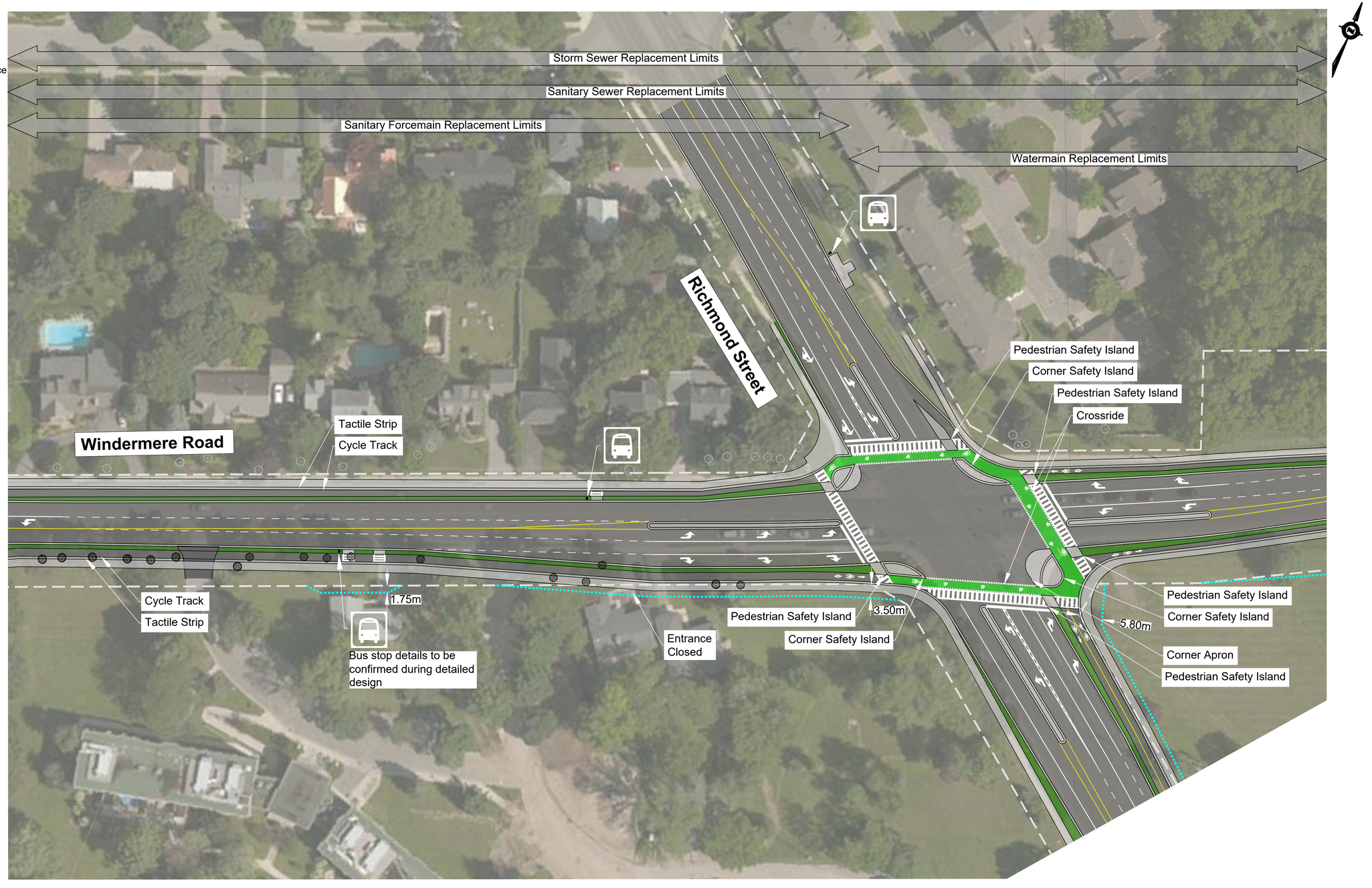
SHEET No.

01

PLAN FILE No.

Supplemental Legend:

- Proposed Roadway Platform
- Proposed Sidewalk/Median/Curb
- Proposed Boulevard/Green Space
- Proposed Crossride
- Proposed Crosswalk
- Existing ROW
- Proposed New ROW Limit
- Proposed New Bus Stop
- Proposed Tree Removal
- Existing Tree



EXISTING SERVICES	DRAWING #, SOURCE	DATE	CONSTRUCTED SERVICES	COMPLETION

DETAILS	No.	REVISIONS	DATE	CONSULTANT
DESIGN				
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CORPORATION OF THE CITY OF LONDON

London CANADA

SCALE

TITLE

WINDERMERE RD EA

WINDERMERE ROAD

PROJECT No.

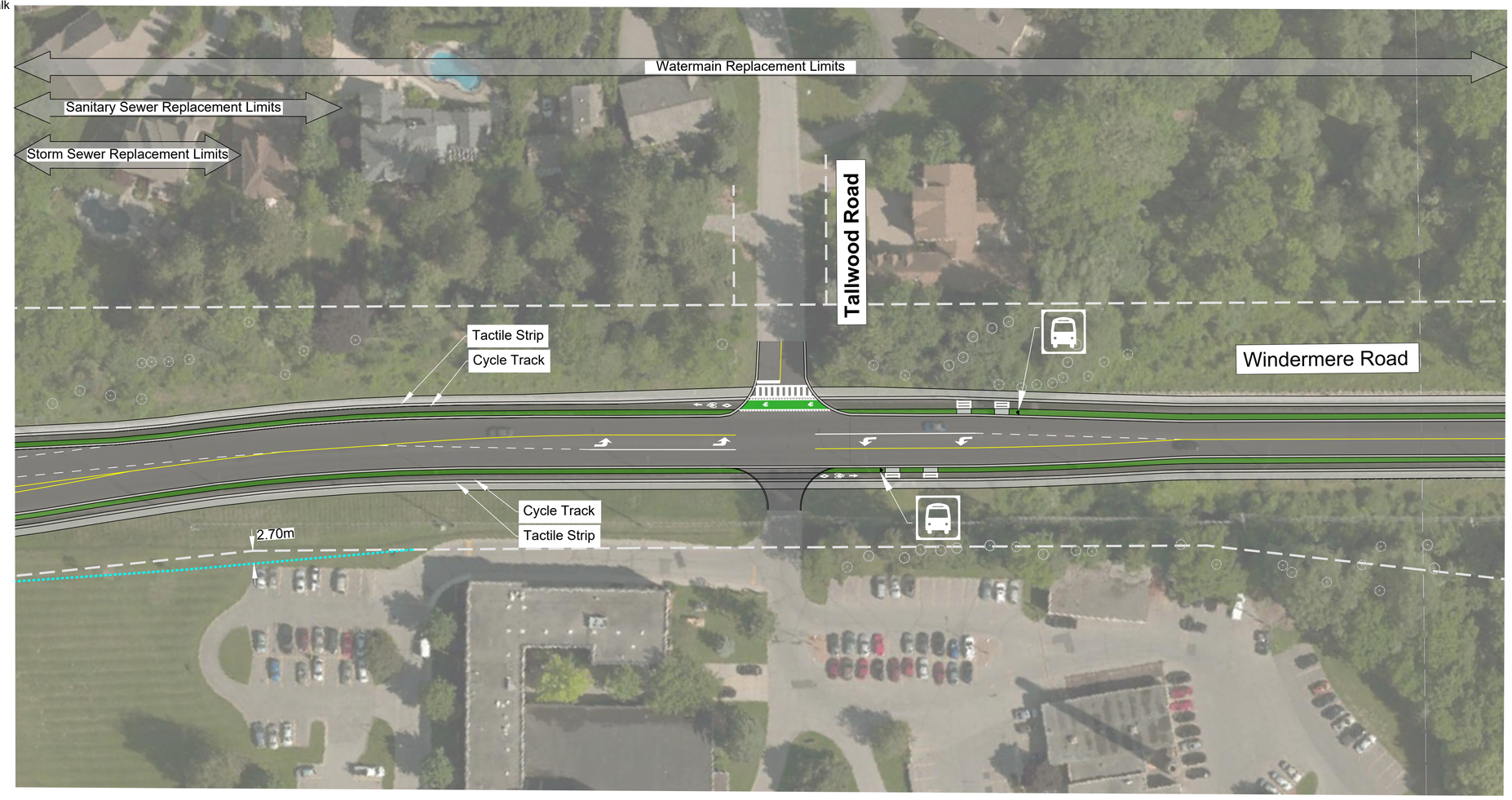
SHEET No.

02

PLAN FILE No.

Supplemental Legend:

- Proposed Roadway Platform
- Proposed Sidewalk/Median/Curb
- Proposed Boulevard/Green Space
- Proposed Crossride
- Proposed Crosswalk
- Existing ROW
- Proposed New ROW Limit
- Proposed New Bus Stop
- Proposed Tree Removal
- Existing Tree



EXISTING SERVICES	DRAWING #, SOURCE	DATE	CONSTRUCTED SERVICES	COMPLETION

DETAILS	No.	REVISIONS	DATE	CONSULTANT
DESIGN				
DRAWN BY				
CHECKED				
APPROVED				
DATE				

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ENGINEER'S STAMP

CORPORATION OF THE CITY OF LONDON

London CANADA

SCALE

TITLE

WINDERMERE RD EA

WINDERMERE ROAD

PROJECT No.

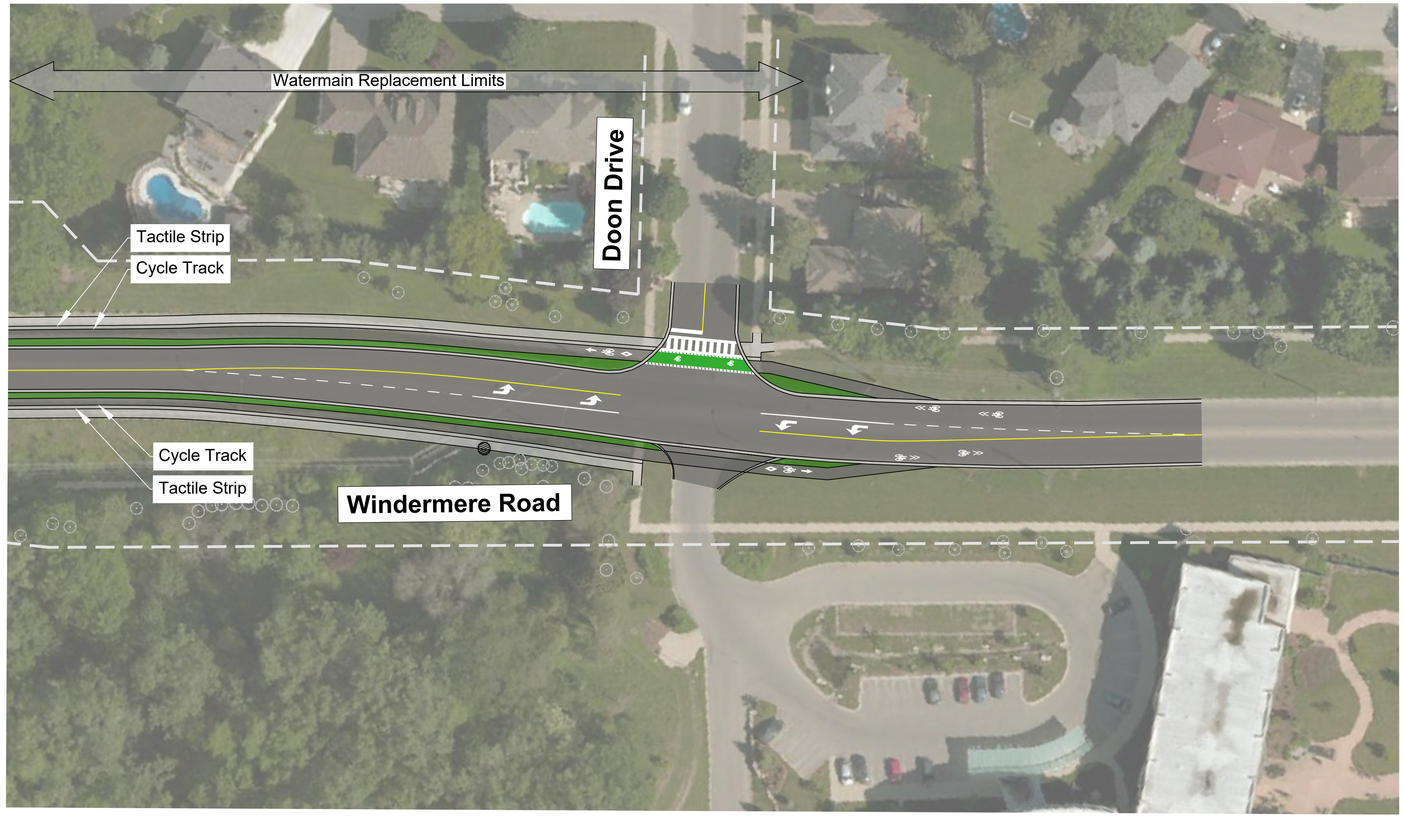
SHEET No.

03

PLAN FILE No.

Supplemental Legend:

- Proposed Roadway Platform
- Proposed Sidewalk/Median/Curb
- Proposed Boulevard/Green Space
- Proposed Crossride
- Proposed Crosswalk
- Existing ROW
- Proposed New ROW Limit
- Proposed New Bus Stop
- Proposed Tree Removal
- Existing Tree



EXISTING SERVICES	DRAWING #, SOURCE	DATE	CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN				
					DRAWN BY				
					CHECKED				
					APPROVED				
					DATE				

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ENGINEER'S STAMP

CORPORATION OF THE CITY OF LONDON

London CANADA

SCALE

TITLE

WINDERMERE RD EA

WINDERMERE ROAD

PROJECT No.

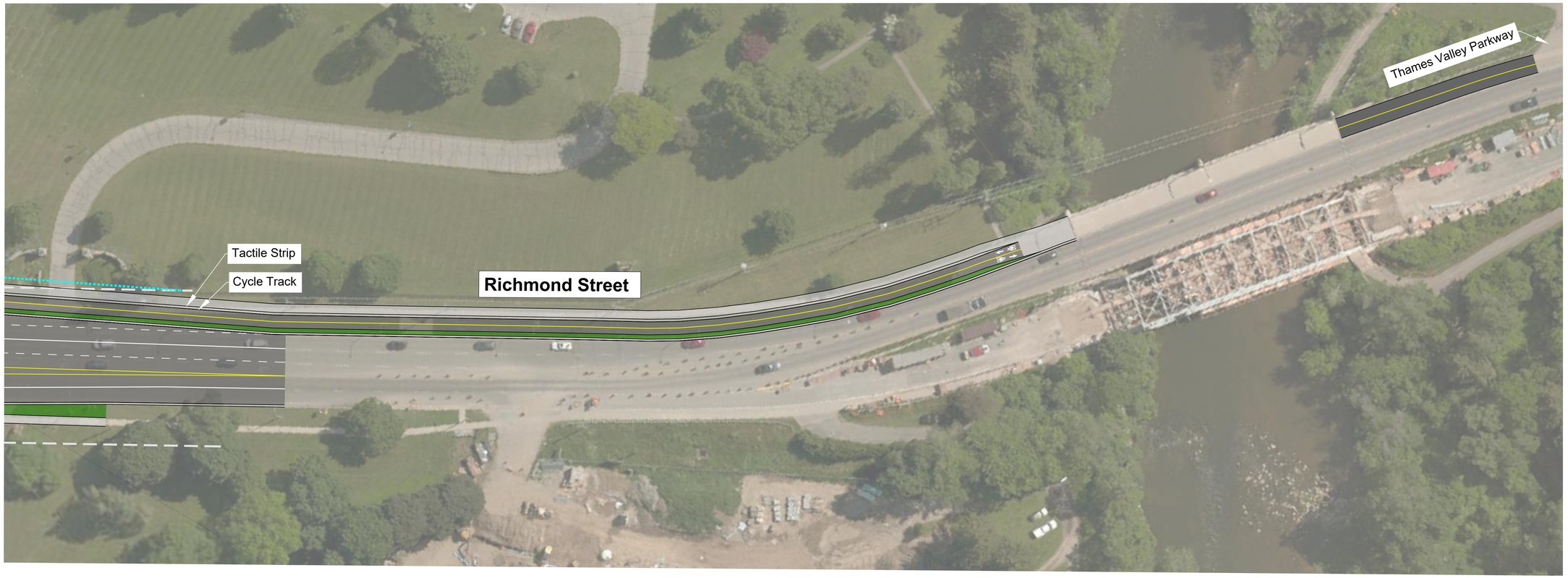
SHEET No.

04

PLAN FILE No.

Supplemental Legend:

- Proposed Roadway Platform
- Proposed Sidewalk/Median/Curb
- Proposed Boulevard/Green Space
- Proposed Crossride
- Proposed Crosswalk
- Existing ROW
- Proposed New ROW Limit
- Proposed New Bus Stop
- Proposed Tree Removal
- Existing Tree



EXISTING SERVICES	DRAWING #, SOURCE	DATE	CONSTRUCTED SERVICES	COMPLETION	DETAILS	No.	REVISIONS	DATE	CONSULTANT
					DESIGN				
					DRAWN BY				
					CHECKED				
					APPROVED				
					DATE				

CONSULTANT OR DIVISION

Stantec

600 - 171 Queens Avenue
London, ON. N6A 5J7
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ENGINEER'S STAMP

London CANADA

CORPORATION OF THE CITY OF LONDON

SCALE

TITLE

WINDERMERE RD EA

RICHMOND STREET

PROJECT No.

SHEET No.

05

PLAN FILE No.

Windermere Road Improvements

Municipal Class Environmental Assessment

EEPAC Meeting

January 20, 2022

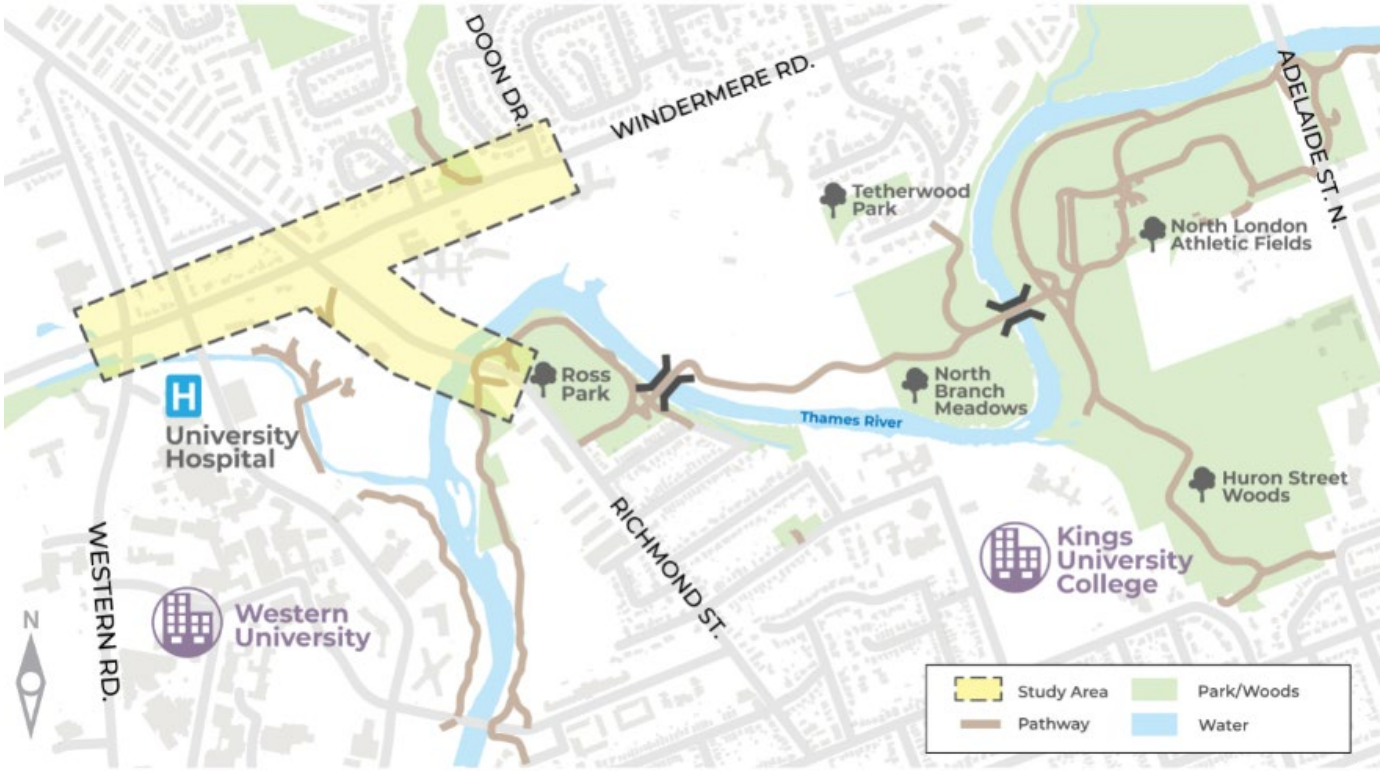
Agenda

- Project Process Overview Design and Natural Heritage
- Review EIS Studies
- Survey Findings
- Impact Assessment - Natural Heritage
- Proposed Mitigation Measures and Recommendations

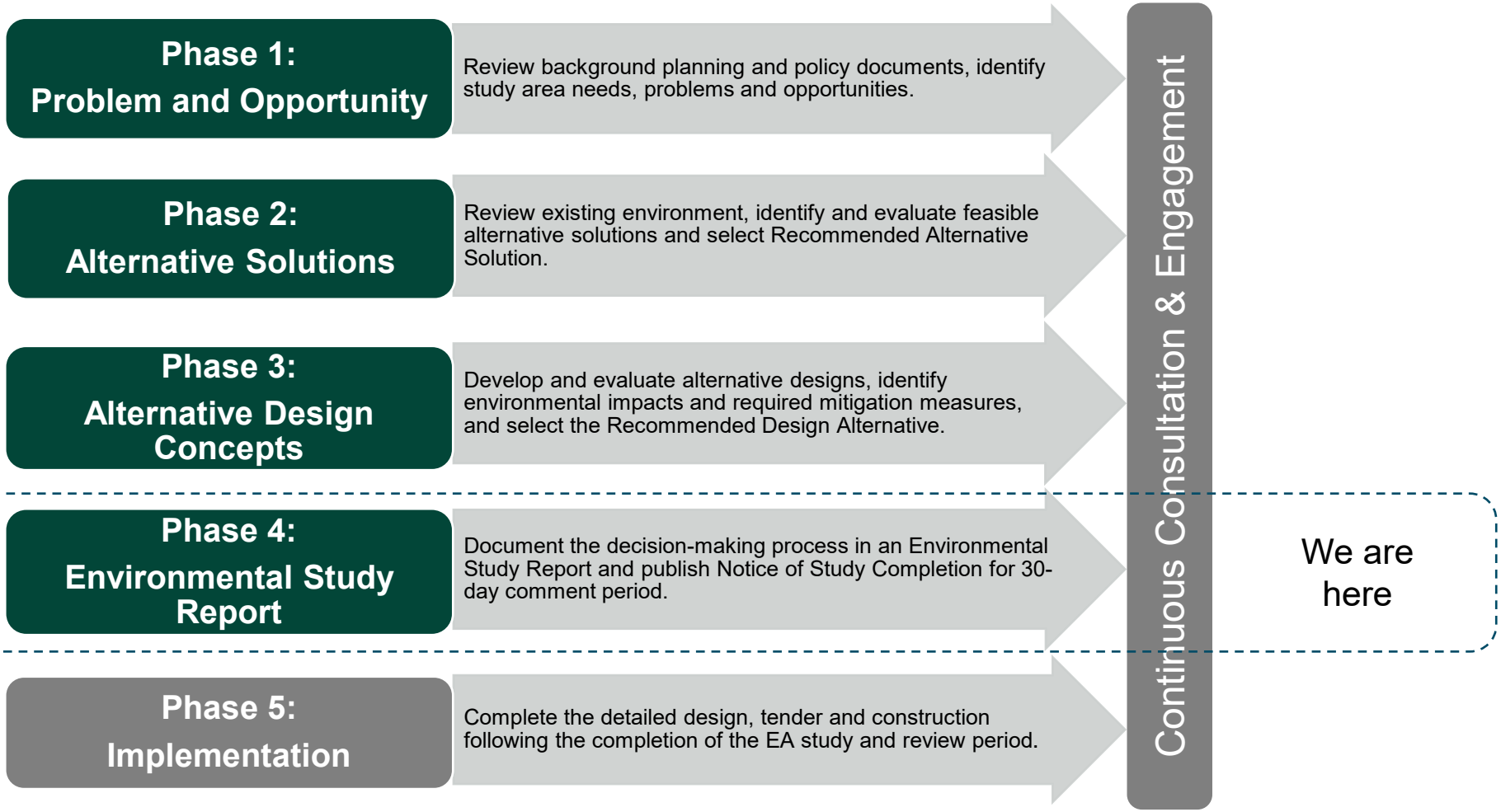
Study Area and Objectives

Study Objectives

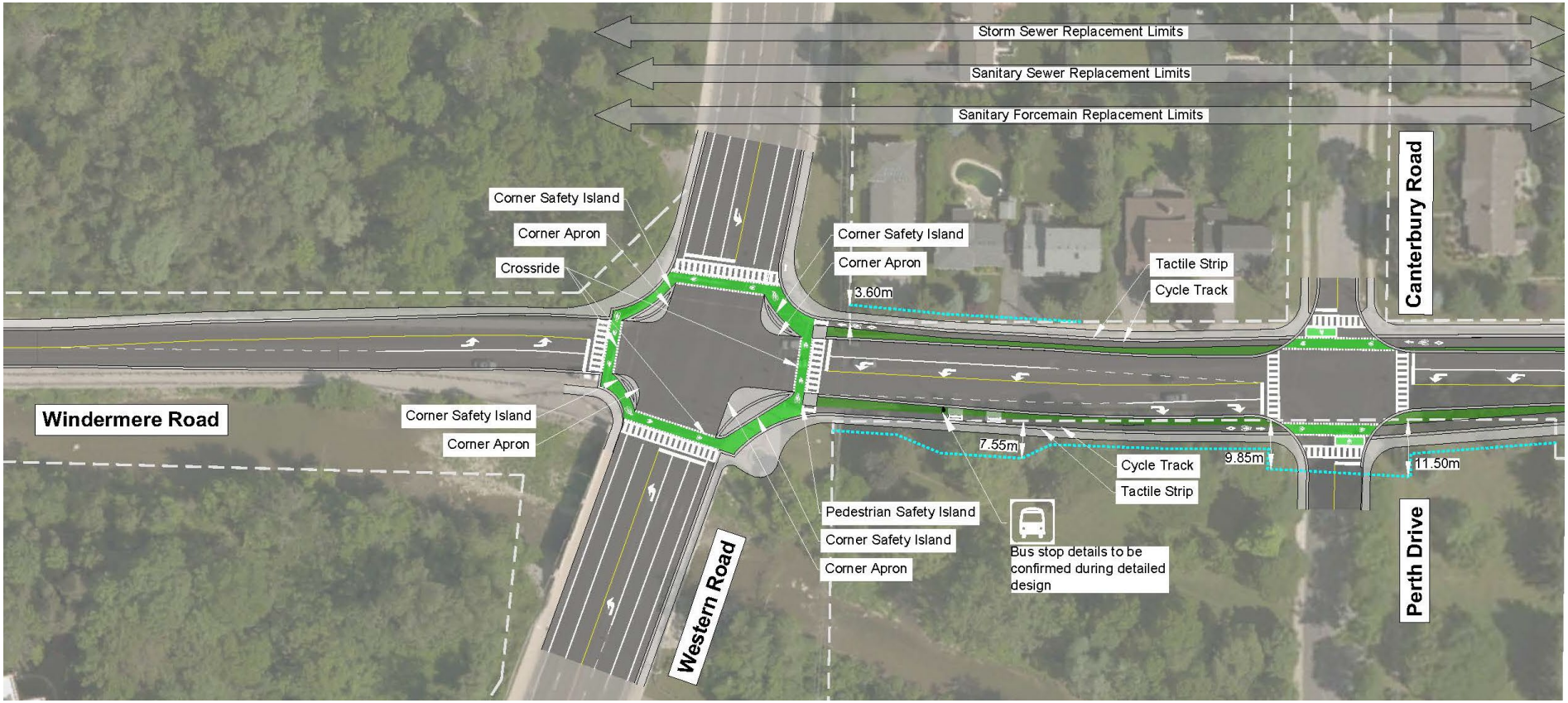
- Provide accessible conditions for all road users along the corridor within the study area.
- Identify watermains and sewers that need replacement.
- Assess the potential of an active transportation connection from Windermere Road to the Thames Valley Parkway.



Municipal Class EA Study Process



Proposed Improvements – Windermere Road west of Richmond



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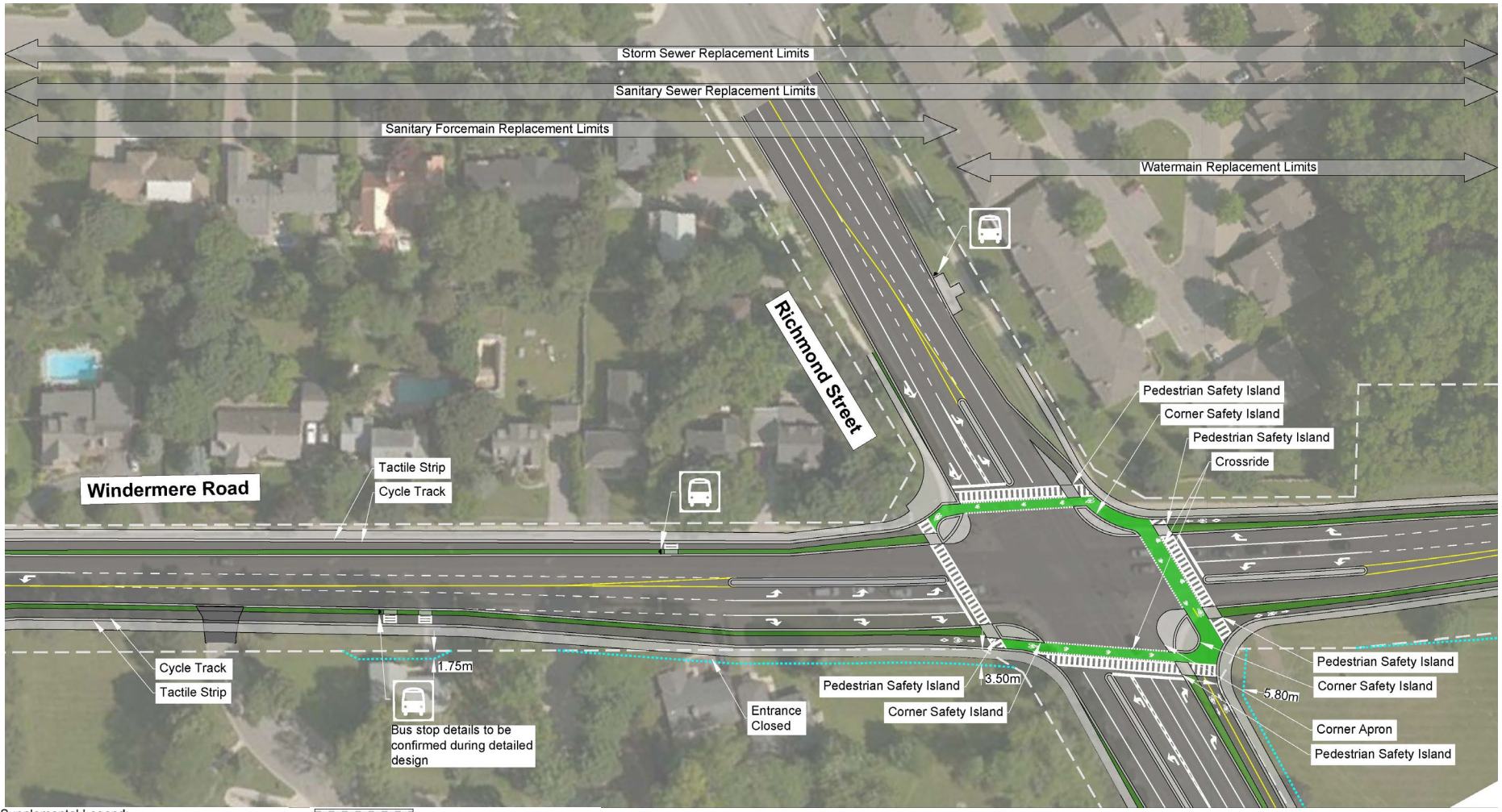
- Proposed New Bus Stop

Proposed Improvements – Richmond Street Intersection



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- Proposed Crossride
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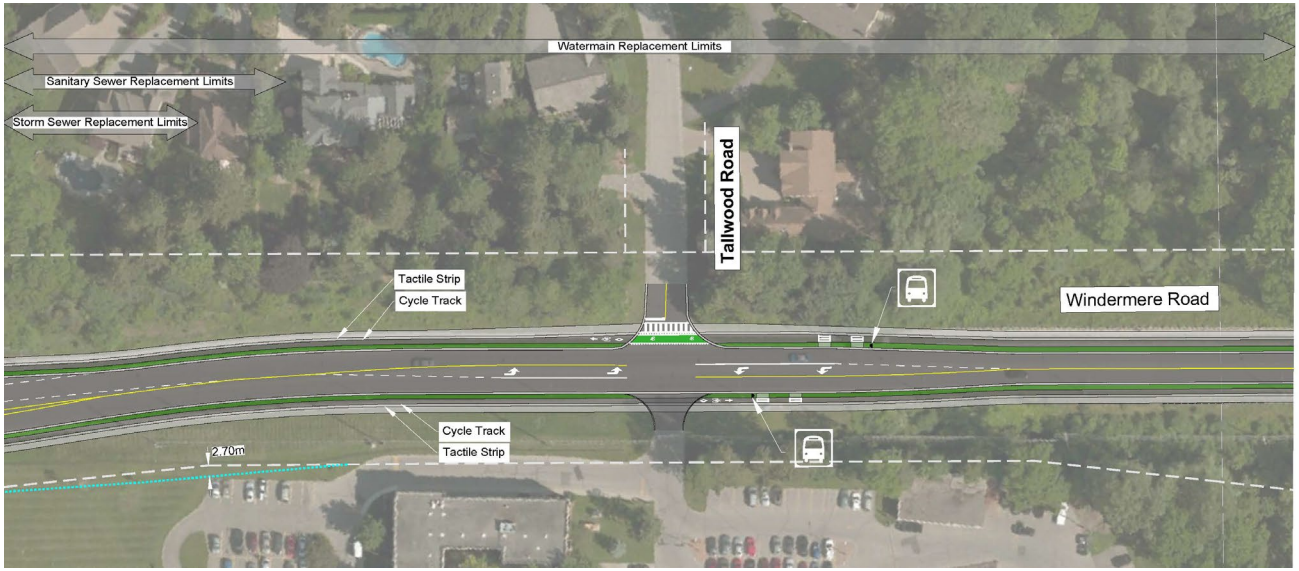
- Proposed New ROW Limit
- Proposed New Bus Stop

Proposed Improvements – Windermere Road east of Richmond



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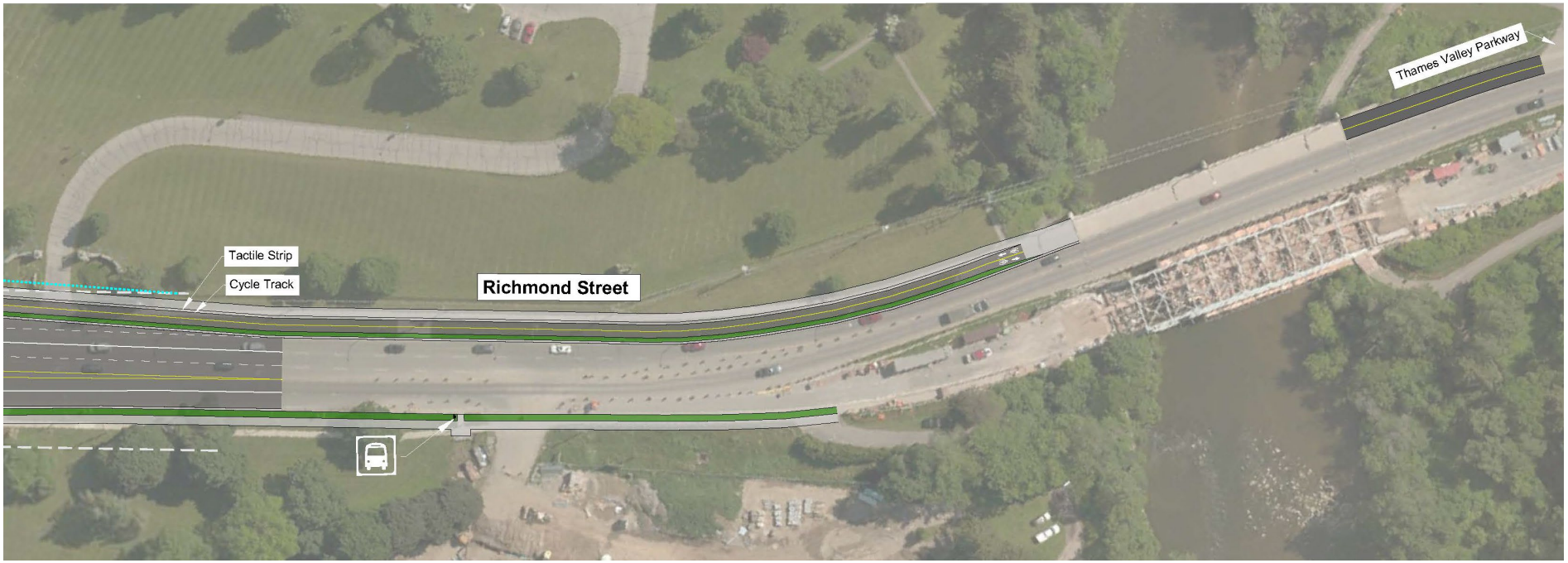
- Proposed Sidewalk/Median/Curb
- Proposed Boulevard/Green Space
- Proposed Crossride
- Proposed Crosswalk
- Existing ROW
- Proposed New ROW Limit
- Proposed New Bus Stop

Proposed Improvements – Richmond Street south of Windermere



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- Proposed Boulevard/Green Space
- Proposed Crossride
- Proposed Crosswalk
- Existing ROW
- Proposed New ROW Limit
- Proposed New Bus Stop

EIS Investigations

Background Information

- Land Information Ontario (LIO) database
- Natural Heritage Information Centre (NHIC) database
- Species at Risk in Ontario List
- DFO's Aquatic Species at Risk maps
- Various wildlife atlases, municipal Official Plan and other planning reports
- EEPAC Information
- UTRCA (S. Gillingwater)

Natural Heritage Studies Completed

Surveys 2020

- ELC vegetation communities
- Fall floristic inventory
- Bat habitat
- Fish habitat

Survey 2021

- Spring & summer flora (May and July)
- Anuran call count surveys (April, May, and June)
- Breeding bird surveys, including species at risk (late May to July)
- Habitat assessments for Species at Risk (bats, turtles, snakes, flora inventory)
- Incidental wildlife observations (during all field surveys)

Natural Heritage Existing Conditions

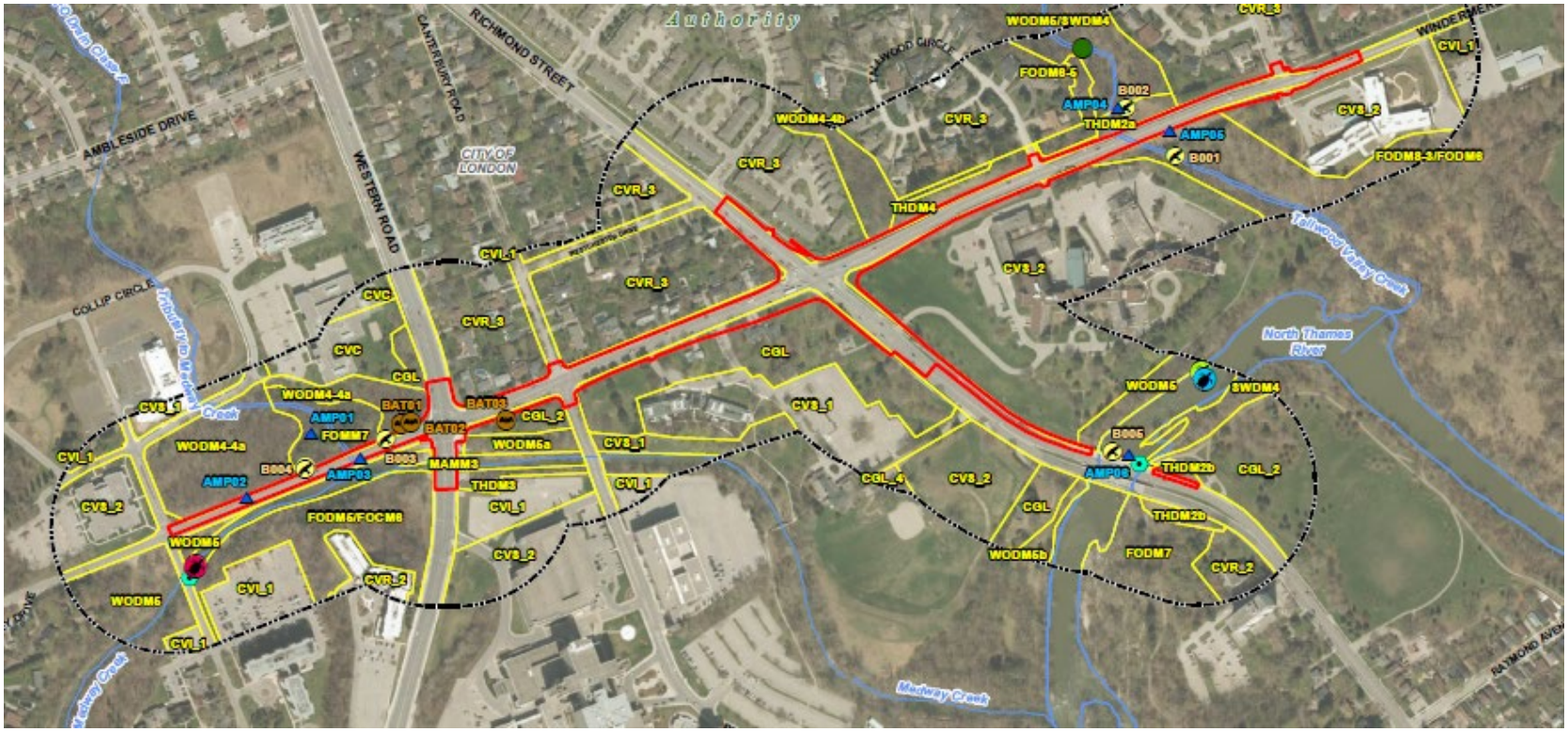
Aquatic Resources

- Tributary to Medway
- Tallwood Creek
- Thames River
- Adjacent to Medway creek
- Aquatic SAR – Fish, Reptiles, Unionids

Terrestrial Resources

- Valleylands Medway and Thames (Significant Natural Heritage Systems)
- Medway ESA
- Adjacent Woodlands (Deciduous and mixed Coniferous)
- Roadside and Landscape Trees and Shrubs
- SAR Bat Potential Maternity Roosts

Ecological Land Classification



Study Results Overview

Species At Risk

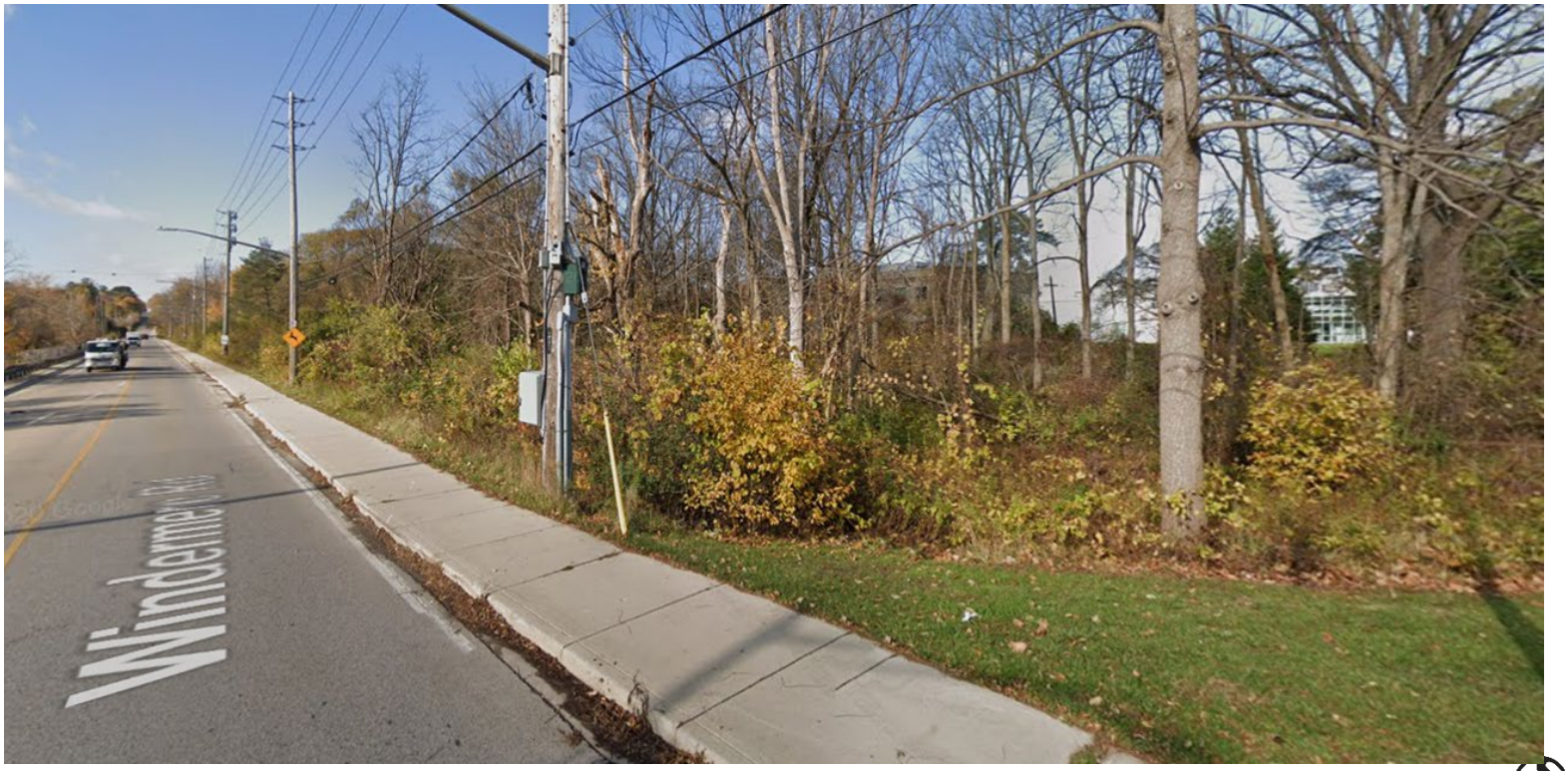
- Fish Species - Medway and Thames
- Reptiles - Medway and Thames
- Mussel Species - Medway and Thames
- Mammals - Potential Bats Roost trees – WODM

Impacts Overview

- Approximately 24 trees proposed for removal within parklands, institutional lands, and road ROW.
- Woodland/Tree removal in ELC WODM and FOMM (see specific slide)
- Breeding Bird Nest Impacts
- Bat Maternity Roost – Tree Impact
- Wildlife encounters SAR and other wildlife during construction
- Aquatic impacts to fish habitat and associated SAR habitats in the Medway and Thames – Fish, reptiles and mussels species

Vegetation Impacts

ELC Ecosite	ELC Code 2008	Vegetation Loss (m^2)	No Impact (m^2)
Fresh – Moist White Cedar – Hardwood Mixed Forest Ecosite	FOMM7	51	5837
Dry - Fresh Black Walnut Deciduous Woodland Type	WODM4-4	75	4521
	Total	126	23702



Mitigation Measures

Vegetation Mitigation

- A landscape planting plan is recommended for the detailed design phase of this project.
- Plant material should be native species that are suitable for the site conditions and sourced from a local nursery
- Planting plan for near-road areas should focus on a planting regime that would support edge management objectives - long term visual and noise barriers, creating a living barrier to discourage anthropogenic entry at unwanted locations, and providing shade to reduce sun scalding and woodland desiccation
- It is recommended that an invasive species control be implemented at the transition zone between the active tree removal and the remaining forest to the extent possible.
- Mitigation measures for sedimentation, erosion, and dust control should be implemented to prevent sediment and dust from entering sensitive natural features. Equipment should not be permitted to enter any natural areas beyond the vegetation protection fencing.

Mitigation Measures

Vegetation Mitigation (Con't)

- All exposed soil areas should be stabilized and re-vegetated, through the placement of seed and mulching or seed and an erosion control blanket, promptly upon completion of construction activities.
- Disturbed natural areas should be restored to pre-construction conditions, or better, where areas for restoration are available locally beyond, the footprint of the sidewalk and road ROW.

Mitigation Measures

Wildlife and SAR Mitigation

- Transport of sediment to, and siltation of watercourses can impact life cycle processes. Implementation of proper erosion and sedimentation control is instrumental in reducing these potential impacts.
- Trees proposed for removal were not found to support habitat of SAR or SOCC wildlife species.
- To further reduce the likelihood of harm to bats, it is recommended that trees greater than 10 cm diameter at breast height (DBH) be removed outside the bat maternity roost season. Bats typically give birth in late May to early June
- Sediment and erosion control fencing (geotextile fences) are effective for the temporary exclusion of amphibians and reptiles (MECP 2021).

Mitigation Measures

Wildlife and SAR Mitigation (Con't)

- Temporary geotextile fencing is recommended to be installed at potential wildlife crossing locations including on the north side of Windermere Road and on the north and south sides of Windermere Road at the Tallwood Valley Creek corridor. The fencing in these areas can double as standard sediment and erosion control fencing.
- Prior to work commencing, thorough visual search of the work area should be conducted by construction contractors to locate snakes or other wildlife, particularly between April 1 and October 31 when snakes are most active.
- The Regional Nesting Period (RNP) for the Study Area is considered to fall between April 3 and August 15, (Government of Canada 20180. If a migratory bird nest is located within the work area at any time, a no-disturbance buffer will be delineated.

Mitigation Measures

Aquatic Mitigation

- Aquatic impacts could include eroded sediment transport from exposed soil surfaces, entry of construction debris (e.g., asphalt slurry, dust, etc.) into the tributary and spills associated with refueling of equipment.
- Implementation of sediment and erosion control measures, as described in the vegetation mitigation section, that would be designed to minimize the impact on fish and fish habitat for areas adjacent to the road footprint or topographic areas that could convey sediment to watercourses - Medway Creek and the Thames and their tributaries

Q&A Session

DOON DR.
WINDERMERE RD.
ADELAIDE ST. N.
Tetherwood Park
North London Athletic Fields
Ross Park
North Branch Meadows
Thames River
University Hospital
Huron Street Woods
RICHMOND ST.
Kings University College
WESTERN RD.
Western University
N
Study Area
Park/Woods
Pathway
Water

Environmental and Ecological Planning Advisory Committee Report

The 1st Meeting of the Environmental and Ecological Planning Advisory Committee
December 16, 2021
2021 Meeting - Virtual Meeting during the COVID-19 Emergency

Attendance

PRESENT: S. Levin (Chair), I. Arturo, A. Boyer, S. Esan, P. Ferguson, L. Grieves, S. Hall, S. Heuchan, K. Moser, B. Samuels, S. Sivakumar, R. Trudeau, M. Wallace and I. Whiteside and H. Lysynski (Committee Clerk)

ABSENT: L. Banks, A. Bilson Darko, J. Khan, B. Krichker and I. Mohamed

ALSO PRESENT: G. Barrett, S. Butnari, C. Creighton, K. Edwards, B. Page and E. Williamson

The meeting was called to order at 5:00 PM

1. Call to Order

1.1 Disclosures of Pecuniary Interest

That it BE NOTED that M. Wallace disclosed a pecuniary interest in clauses 2.3 and 3.1, having to do with the Notices of Planning Applications relating to the properties located at 1013, 1027, 1250 and 1346 Meadowlark Ridge and 952 Southdale Road West, by indicating that the proponents of the above-noted applications are members of the London Development Institute, his employer.

2. Consent

2.1 8th Report of the Environmental and Ecological Planning Advisory Committee

That it BE NOTED that the 8th Report of the Environmental and Ecological Planning Advisory Committee, from its meeting held on November 18, 2021, was received.

2.2 Municipal Council Resolution - 8th Report of the Environmental and Ecological Planning Advisory Committee

That it BE NOTED that the Municipal Council resolution adopted at its meeting held on December 7, 2021, with respect to the 8th Report of the Environmental and Ecological Planning Advisory Committee, was received.

2.3 Notice of Planning Application - 1013, 1027, 1250 and 1346 Meadowlark Ridge

That it BE NOTED that a Notice of Planning Application for a Zoning By-law Amendment dated November 17, 2021, relating to the properties located at 1013, 1027, 1250 and 1346 Meadowlark Ridge, was received.

2.4 Notice of Planning Application - 520 Sarnia Road

That it BE NOTED that a Notice of Planning Application for Official Plan and Zoning By-law Amendments dated November 15, 2021, relating to the property located at 520 Sarnia Road, was received.

3. Sub-Committees and Working Groups

3.1 Working Group Report - 952 Southdale Road West

That the Working Group report relating to the property located at 520 Southdale Road West BE FORWARDED to the Civic Administration for consideration.

4. Items for Discussion

4.1 Notice of Planning Application - 4519, 4535, 4557 Colonel Talbot Road

That a Working Group BE ESTABLISHED consisting of S. Levin, B. Krichker and R. Trudeau, to review and report back at the next meeting with respect to the Notice of Planning Application for a Zoning By-law Amendment dated November 15, 2021, relating to the properties located at 4519, 4535 and 4557 Colonel Talbot Road.

4.2 Bird Friendly Brochure

That the proposed "London's Bird-Friendly Skies" brochure BE AMENDED to include images of bird friendly residential windows and an explanation of why the markers are important; it being noted that the Environmental and Ecological Advisory Committee held a general discussion with respect to this matter.

5. Adjournment

The meeting adjourned at 5:23 PM.

Proposed Townhouse Development-Site Plan
4519, 4535 & 4557 Colonel Talbot Road, Lambeth, ON

Site Plan's Environmental Impact Study (EIS), Preliminary Stormwater Management (SWM), Geotechnical Reports-August 1921 and Hydrogeological Assessment Report-July, 2021 received by EEPAC in December 2021.

Reviewers: Sandy Levin, Randy Trudeau and Berta B. Krichker

Submitted to January 20,2022 meeting of EEPAC

Overview - *Minimize and Mitigate Potential Adverse Impacts from Proposed Townhouse Development 4519, 4535 & 4557 Colonel Talbot Road*

1. Ensure that the proposed 30 m buffer/setbacks intended to be created between the property line of the subject property and the UTCA 250 flood lines will be maintained without any future reductions and/or any potential encroachment on the Flood, Erosion Hazardous Areas and/or the Mapped Highly Vulnerable Aquifer Area and Significant Recharge Areas that were identified in the EIS will be minimized.

2. Monitor the water quality drainage/stormwater (surface) discharges from the subject site to the Dingman Creek under the baseline-pre, post and during the construction conditions.

3. Provide required erosion control storage/dissipation mitigation measures for the proposed post-construction storm/drainage flow discharges, eliminate the existing erosion and slope stability deficiencies and to minimize and mitigate any potential adverse impacts on both eroded and vulnerable Dingman Creek banks along the subject properties.

4. Provide more detailed evaluations/calculations on the pre and post-development water balance assessment and support detailed information on the proposed SWM water quality, quantity and additional infiltration LID system (s).

Item #1-Proposed 30 m Buffer

EIS's recommended 30 m buffers/setbacks that are required to be created to protect important water resources, environmental/ecological conditions, natural heritage features from adverse effects of nearby development in accordance with City's EMG requirements. A 30 m buffer from Dingman Creek and the wetlands (SWTM3 and MAMM I-3) is proposed for this development as a mechanism to protect all these ecological functions. The current proposed development plan includes encroachments by the City's desire for a Multi-Use Trail (3 m wide) and SWM pond within the 30 m wetland and watercourse buffer. Page 31 shows the multi-use trail but it appears not to link to anything. The figure after page page 37 shows the multiuse trail encroaching into both the woodland buffer and the 6 m erosion setback (the latter by 1 m).

These encroachment areas reduce the identified and very critical buffers/setbacks and may adversely impact the existing natural features and functions.

EEPAC recommends to minimize any encroachments or any potential reductions of the proposed buffers/setbacks and to ensure the proposed development will be in compliance with EMG (2021) buffers/setback requirements, the City's London Plan Policies and requirements, completed and accepted by the City Council, Subwatershed and Municipal Class EA studies for the subject area, MOECP and UTRCA Acts, Regulations and requirements. In accordance with the OWRA definitions, storm drainage and SWM systems, including the SWM Facilities, are consider to be a sewer system. Therefore, the permanent location, maintenance activities and SWM Facility and the Multi-Use Trail and construction activities may impact adversely existing environmental /ecological conditions. It being noted that the previous EMG says there should be a 30 m buffer from the high water mark of the watercourse or 30 m + 0.5 m per 1% of slope.

EEPAC also recommends as a condition of development, that units on the west and north side of the property be fenced with no gates which will aid in reducing the impact on the Significant Wildlife Habitat identified for Terrestrial Crayfish.

EEPAC also recommends as a condition of development that plants suitable for the site be planted within the buffer to reduce encroachment by residents.

Item #2-Monitor the pre (baseline), post and during construction water quality conditions for drainage/stormwater (surface) discharges

The EIS recommended a Water Quality Monitoring Program (WQMP) for drainage/stormwater (surface) discharges from the subject site into the Dingman Creek under the post-construction conditions be implemented. However, neither the water quality parameters and methodology/monitoring protocol, nor duration for this WQMP for this program was identified. Also, the preliminary SWM Report recommends that a WQMP for drainage/stormwater (surface) discharges during the construction activities will be implemented for the subject site. However, once again neither the water quality parameters and methodology/monitoring protocol, nor duration for this WQMP was identified.

EEPAC recommends that WQMPs be undertaken for the subject site for existing and proposed drainage/stormwater (surface) discharges from the subject site into the Dingman Creek under the (baseline)-pre, post and during construction conditions that will include, but will not be limited to, the water quality parameters and methodology/monitoring protocol and WQMPs durations for all identified conditions. These WQMPs will be required to comply with MECP's Provincial Water Quality Objectives (PWQO) under OWRA, the City's Environmental Management Guidelines (EMG), By-Laws, policies to ensure that existing ecological/environmental conditions, including, but not limited to baseflow, banks slope stability and erosion, water quality, as well as fishery, aquatic habitat will not be adversely impacted by the proposed site plan development.

***Item #3-Implement* maintenance and mitigation measures and design requirements to improve the existing Dingman Creek banks erosion and slope stability deficiencies and provide energy dissipation requirements for the storm flows outlet (s)**

The EIS identified that both banks were considered to be eroded and vulnerable within the study area. Several groundwater seeps were absorbed along the North bank during the assessments. Seeps are an indicator of groundwater being present and the groundwater contributes to the existing baseflow conditions.

The south and west portions of the subject property are located within the UTRCA's regulation limits, which includes Dingman Screening and Flood Hazardous Areas. The property is located within the UTRCA mapped Highly Vulnerable Aquifer Area and Significant Recharge Area. EEPAC also notes the UTRCA does not support storm outlets in erosion hazard areas.

The preliminary SWM Report identifies the preliminary design requirements of water quality and water quantity, but does not identify the required erosion storage requirements that are needed to mitigate potential erosive adverse impacts of the increased post-construction flows and velocities and to address, mitigate and improve existing erosion and slope stability deficiencies on both banks of the Dingman Creek .

EEPAC recommends that the applicable maintenance, mitigation measures and design requirements be incorporated into the site plan with approval requirements to include:

a) address, mitigate and eliminate the existing erosion and slope stability deficiencies on both banks of the Dingman Creek along the subject site;

b) effective erosion storm drainage storages and/or energy dissipation measures/systems to minimize and/or eliminate adverse effects of additional (post-construction) storm/drainage surface peak flows that will outlet into the Dingman Creek, due to increases in peak flows and velocities (energy of discharges) that may adversely effect this portion of the Dingman Creek existing erosion slope stability conditions . Also the developer's consultant engineer should be required to undertake a stream morphology evaluation in order to efficiently address all the above described deficiencies for this portion of the Dingman Creek, as recommended by the City-Alanna Riley email dated August 20, 2020, that included in the Preliminary SWM report for this site plan.

Item #4-Provide more detailed evaluations/calculations on the pre and post-development water balance assessment and support detailed informations on the proposed SWM water quality, quantity and additional proposed infiltration LID system.

As identified in EIS and SWM reports, the required diversion of the surface/storm flows, increases in impervious services that prevent infiltration (an average runoff coefficient on this site from 0.25-0.35 was approximately increases to 0.64-0.7) and reduction in the trees, vegetation sustainability and all this substantially modified the water balance. The EIS notes on pages 7 and 8 that the 2015 MECP bulletin requires LID to the greatest extent possible.

*EEPAC recommends that the **final SWM report include** more detailed evaluations/calculations on the pre and post-development water balance assessment meet 80% of the pre-development water balance conditions, with the provision of more detailed design information on the proposed SWM water quality, quantity and additional infiltration in the SWM Facility and LID system (s) to support the required water balance calculations will be developed in this final SWM report and will be submitted for the further review by EEPAC.*

Item #5 – Construction Impacts

EEPAC notes there is no information at this time about the timing of or length of construction of the private SWM facility and outlet (which notably would be outside the Urban Growth Boundary).

EEPAC recommends that construction be limited to a period where it is least likely to have rain or rapid snow melt events. This would reduce the impacts on the slope and avoid, as much as possible, sediment control failures.

Item #6 – Post development

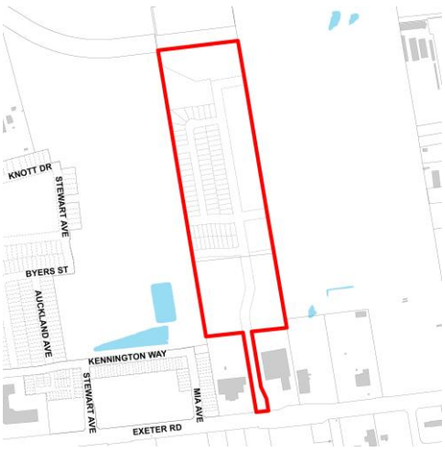
The Planner letter mentions de-icing salts but there is nothing in EIS regarding the possible impact on the aquatic habitat as the melting snow will end up in the Creek. As there are no clear standards for private snow removal it is likely the development pre and post assumption will use the least expensive ("saltiest") option for snow and ice removal. There is no data regarding wter quality.

EEPAC recommends the City develop a standard for snow management for developments adjacent to its Natural Heritage System and use this development as a test site to study the effectiveness of such a standard.

NOTICE OF PLANNING APPLICATION

Draft Plan of Subdivision, Official Plan and Zoning By-law Amendments

1160 Wharncliffe Road South



File: 39T-21507 and OZ-9450
Applicant: 2793774 Ontario Inc. and Goldfield 1 Ltd.

What is Proposed?

Draft Plan of Subdivision, Official Plan and Zoning amendments to allow:

- 78 single detached residential lots
- 3 medium density, multi-family residential blocks
- 3 open space blocks
- 4 reserve blocks
- 5 new streets

LEARN MORE & PROVIDE INPUT

Please provide any comments by **January 28, 2022**
Alison Curtis
acurtis@london.ca
519-661-CITY (2489) ext. 4497
Planning & Development, City of London, 300 Dufferin Avenue, 6th Floor,
London ON PO BOX 5035 N6A 4L9
File: 39T-21507 and OZ-9450
london.ca/planapps

You may also discuss any concerns you have with your Ward Councillor:
Elizabeth Peloza
epeloza@london.ca
519-661-CITY (2489) ext. 4012

If you are a landlord, please post a copy of this notice where your tenants can see it. We want to make sure they have a chance to take part.

Date of Notice: January 6, 2022

Application Details

Requested Draft Plan of Subdivision (please refer to attached Draft Plan)

Consideration of a Draft Plan of Subdivision consisting of 78 single detached lots (Lots 1 - 78); three (3) medium density blocks (Blocks 79 - 81); three (3) open space blocks (Blocks 82 - 84); and, four (4) reserve blocks (Blocks 85 – 88) serviced by five (5) new streets (Streets A - E)

Requested Amendment to the 1989 Official Plan

Requested Amendments Schedule "A" Land Use Map:

- Redesignate Blocks 79 – 81 from Low Density Residential to Multi-Family, Medium Density Residential to permit cluster housing.
- Extend the Multi-Family, Medium Density Residential designation to include Block 81.
- Designated Blocks 82 – 84 Open Space to conserve natural features in the 'complete corridor'.

Requested Amendments to the Southwest Area Secondary Plan:

- Redesignate Blocks 79 – 81 from Low Density Residential to Multi-Family, Medium Density Residential to permit cluster housing.
- Extend the Multi-Family, Medium Density Residential designation to include Block 81.
- Designate Blocks 82 – 84 to Open Space and Environmental Review to accommodate the 'complete corridor'.

Requested Amendment to The London Plan (New Official Plan)

To change the designation of the property to include the Green Space Place Type to permit recreational uses associated with the passive enjoyment of natural features, and conservation, mitigation and rehabilitation works. This Place Type will accommodate the 'complete corridor'.

Requested Zoning By-law Amendment

Requested Zoning (Please refer to attached map)

Possible Amendment to Zoning By-law Z.-1 to change the zoning from an Urban Reserve UR1, Environmental Review ER and Light Industrial LI1/LI7 Zone to:

- Residential R1 (R1-4) Zone (Lots 1-78) - to permit single detached dwellings on lots with a minimum lot area of 360 square metres and minimum lot frontage of 12 metres;

- Residential R6 Special Provision (R6-5(*)) Zone (Blocks 79 - 81) – to permit various forms of cluster housing including single detached, semi-detached, duplex, triplex, fourplex, townhouse, and stacked townhouse dwellings up to a maximum density of 35 units per hectare and maximum height of 12 metres;

- Open Space OS4 Zone (Block 82 - 84) – to permit such uses as conservation lands, conservation works, golf courses, public and private parks, recreational buildings associated with conservation lands and public parks, campgrounds, and managed forests.

The City may also consider applying holding provisions in the zoning to ensure adequate provision of municipal services, that a subdivision agreement or development agreement is entered into, and to ensure completion of noise assessment reports and implementation of mitigation measures for development in proximity to arterial roads.

Both Official Plans and the Zoning By-law are available at london.ca.

Planning Policies

Any change to the Zoning By-law must conform to the policies of the Official Plan, London's long-range planning document. These lands are currently designated as Low Density Residential and Multi-Family, Medium Density Residential in the 1989 Official Plan, which permits single-detached, semi-detached, duplex, row houses or cluster houses; low-rise apartment buildings; rooming and boarding houses; emergency care facilities; converted dwellings; and small-scale nursing homes, rest homes and homes for the aged as the main uses.

The subject lands are in the Neighbourhood Place Type in The London Plan, permitting a range of residential uses in the form of single-detached, semi-detached and townhouse dwellings.

How Can You Participate in the Planning Process?

You have received this Notice because someone has applied for a Draft Plan of Subdivision and to change the Official Plan designation and the zoning of land located within 120 metres of a property you own, or your landlord has posted the notice of application in your building. The City reviews and makes decisions on such planning applications in accordance with the requirements of the Planning Act. The ways you can participate in the City's planning review and decision making process are summarized below.

See More Information

You can review additional information and material about this application by:

- Contacting the City's Planner listed on the first page of this Notice; or
- Viewing the application-specific page at london.ca/planapps
- Opportunities to view any file materials in-person by appointment can be arranged through the file Planner.

Reply to this Notice of Application

We are inviting your comments on the requested changes at this time so that we can consider them as we review the application and prepare a report that will include Planning & Development staff's recommendation to the City's Planning and Environment Committee. Planning considerations usually include such matters as land use, development intensity, and form of development.

Attend a Community Information Meeting

A community information meeting will be held in your neighbourhood to present this proposal and obtain input from interested members of the public. The meeting has not yet been scheduled, but will be in advance of the Future Public Meeting described below. You will receive a separate notice inviting you to this meeting. The Community Information Meeting is not the public meeting required by the Planning Act and attendance at this meeting does not create a right to appeal the decision of Council to the Local Planning Appeal Tribunal.

Attend a Future Public Participation Meeting

The Planning and Environment Committee will consider the requested Draft Plan of Subdivision and zoning changes on a date that has not yet been scheduled. The City will send you another notice inviting you to attend this meeting, which is required by the Planning Act. You will also be invited to provide your comments at this public participation meeting. A neighbourhood or community association may exist in your area. If it reflects your views on this application, you may wish to select a representative of the association to speak on your behalf at the public participation meeting. Neighbourhood Associations are listed on the Neighbourgood website. The Planning and Environment Committee will make a recommendation to Council, which will make its decision at a future Council meeting. The Council Decision will inform the decision of the Director, Planning & Development, who is the Approval Authority for Draft Plans of Subdivision.

What Are Your Legal Rights?

Notification of Council and Approval Authority's Decision

If you wish to be notified of the Approval Authority's decision in respect of the proposed draft plan of subdivision, you must make a written request to the Director, Planning & Development, City of London, 300 Dufferin Ave., P.O. Box 5035, London ON N6A 4L9, or at developmentservices@london.ca. You will also be notified if you provide written comments, or make a written request to the City of London for conditions of draft approval to be included in the Decision.

If you wish to be notified of the decision of the City of London on the proposed official plan and/or zoning by-law amendment, you must make a written request to the City Clerk, 300 Dufferin Ave., P.O. Box 5035, London, ON, N6A 4L9, or at docservices@london.ca. You will also be notified if you speak to the Planning and Environment Committee at the public meeting about this application and leave your name and address with the Secretary of the Committee.

Right to Appeal to the Ontario Land Tribunal

If a person or public body does not make oral submissions at a public meeting, if one is held, or make written submissions to the City of London in respect of the proposed plan of subdivision before the approval authority gives or refuses to give approval to the draft plan of subdivision, the person or public body is not entitled to appeal the decision of the Director, Planning & Development to the Ontario Land Tribunal.

If a person or public body does not make oral submissions at a public meeting, if one is held, or make written submissions to the City of London in respect of the proposed plan of subdivision before the approval authority gives or refuses to give approval to the draft plan of subdivision, the person or public body may not be added as a party to the hearing of an appeal before the Ontario Land Tribunal unless, in the opinion of the Tribunal, there are reasonable grounds to do so.

If a person or public body would otherwise have an ability to appeal the decision of the Council of the Corporation of the City of London to the Ontario Land Tribunal but the person or public body does not make oral submissions at a public meeting or make written submissions to the City of London before the proposed official plan amendment is adopted, the person or public body is not entitled to appeal the decision.

If a person or public body does not make oral submissions at a public meeting or make written submissions to the City of London before the proposed official plan amendment is adopted, the person or public body may not be added as a party to the hearing of an appeal before the Ontario Land Tribunal unless, in the opinion of the Tribunal, there are reasonable grounds to add the person or public body as a party.

If a person or public body would otherwise have an ability to appeal the decision of the Council of the Corporation of the City of London to the Ontario Land Tribunal but the person or public body does not make oral submissions at a public meeting or make written submissions to the City of London before the by-law is passed, the person or public body is not entitled to appeal the decision.

If a person or public body does not make oral submissions at a public meeting or make written submissions to the City of London before the by-law is passed, the person or public body may not be added as a party to the hearing of an appeal before the Ontario Land Tribunal unless, in the opinion of the Tribunal, there are reasonable grounds to do so.

For more information go to https://olt.gov.on.ca/appeals-process/forms/.

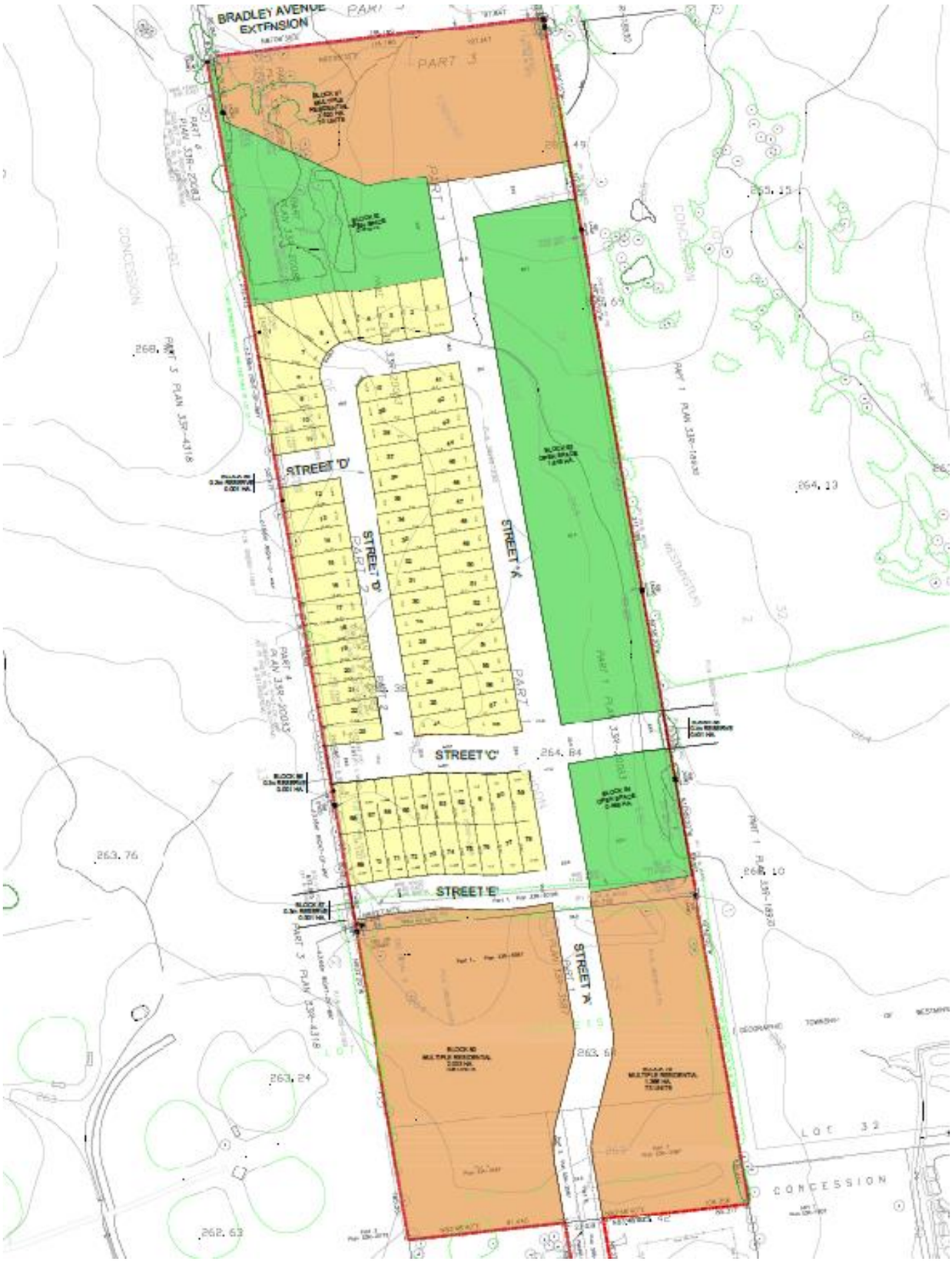
Notice of Collection of Personal Information

Personal information collected and recorded at the Public Participation Meeting, or through written submissions on this subject, is collected under the authority of the Municipal Act, 2001, as amended, and the Planning Act, 1990 R.S.O. 1990, c.P.13 and will be used by Members of Council and City of London staff in their consideration of this matter. The written submissions, including names and contact information and the associated reports arising from the public participation process, will be made available to the public, including publishing on the City's website. Video recordings of the Public Participation Meeting may also be posted to the City of London's website. Questions about this collection should be referred to Cathy Saunders, City Clerk, 519-661-CITY(2489) ext. 4937.

Accessibility

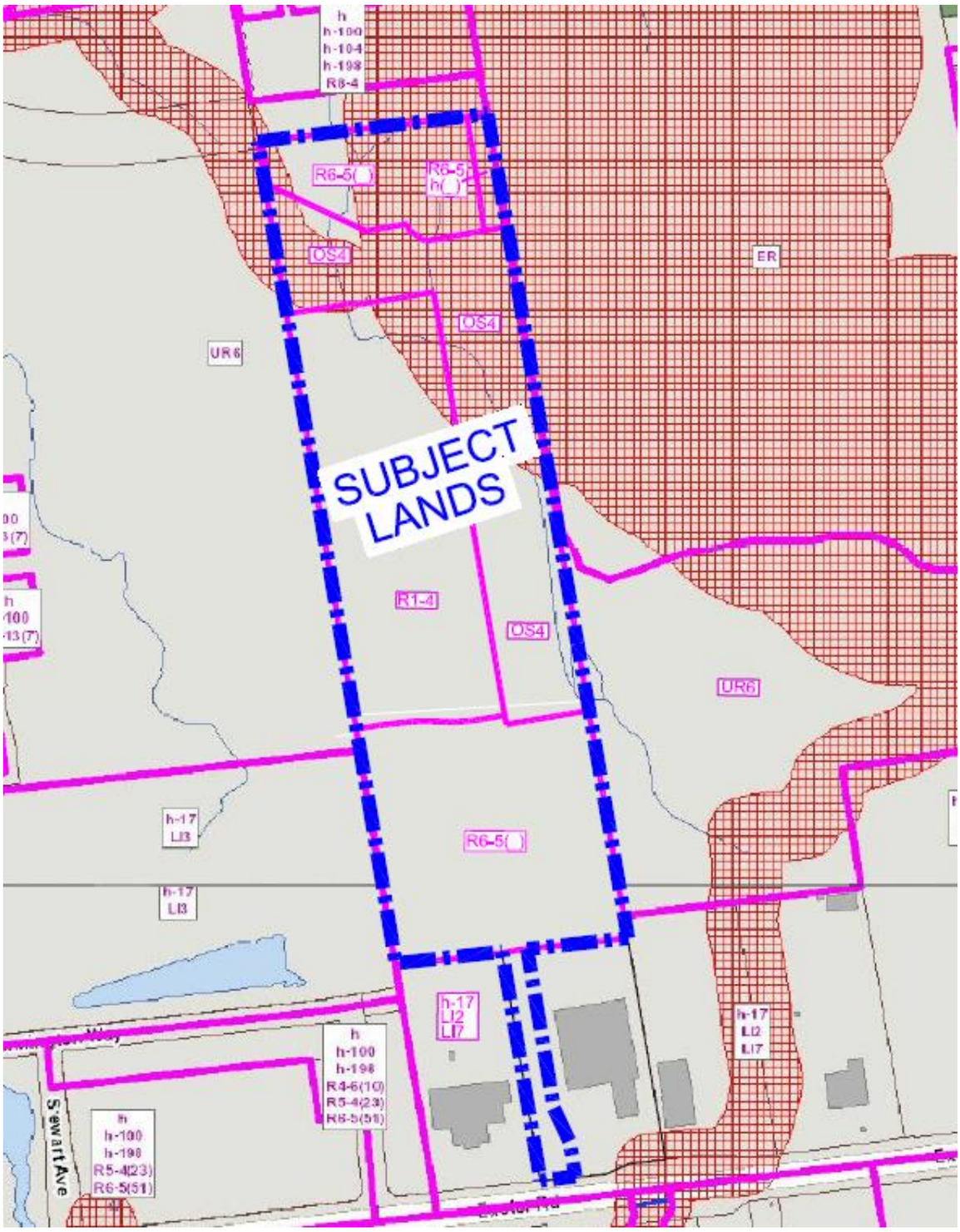
Alternative accessible formats or communication supports are available upon request. Please contact developmentservices@london.ca for more information.

Requested Draft Plan of Subdivision and Official Plan Designations



The above image represents the applicant's proposal as submitted and may change.

Requested Zoning



The above image represents the applicant's proposal as submitted and may change.

Goldfield 1
Scoped Environmental Impact Study

NATURAL RESOURCE SOLUTIONS INC.

Prepared for:
Incon – Goldfield 1
7-521 Nottinghill Road
London, ON N6K 4L4

Project No. 2073 | October 2021

Goldfield 1
Scoped Environmental Impact Study

Project Team:

Katharina Richter	Project Manager, Senior Biologist
Nick Allen	Aquatic Biologist
Ashley Cantwell	Aquatic Biologist
Patrick Deacon	Terrestrial & Wetland Biologist
Joseph Lance	Terrestrial & Wetland Biologist, Certified Arborist
Amy Reinert	Terrestrial & Wetland Biologist
Charlotte Teat	Terrestrial & Wetland Biologist
Kaitlin Filippov	GIS Analyst

Report submitted on October 13, 2021

Katharina Richter
Project Manager
Senior Biologist

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1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained in April 2018 by the former landowner to complete an Environmental Impact Study (EIS) for proposed medium and low-density residential development, located in the City of London, Ontario. This EIS has been developed in accordance with the City of London's Environmental Management Guidelines (2007) and in agreement with the scoping meeting held with agency staff on April 18, 2018 (MacKay pers. comm. 2018). The EIS is being submitted on behalf of the current landowner, Incon.

For the purposes of this report, the term "subject lands" refers to the two adjacent properties owned by Incon (Map 1). The term "study area" refers to the subject lands plus lands within approximately 1km. Detailed biological surveys were undertaken by NRSI on the subject lands. Legacy data collected from background sources and agency consultation encompassed the study area to ensure that all surrounding natural features were considered.

The subject lands (Map 1), approximately 14ha in area, are located in south London and are bounded by Wharncliffe Road South, Exeter Road and White Oak Road within the City's Southwest Area Secondary Plan (City of London 2019a) area (Part of Lot 33, Concession 2, in the City of London). At the time that the natural heritage surveys were undertaken in 2018, the surrounding landscape was comprised of commercial businesses fronting onto Exeter Road to the south with agricultural lands to the west ("Richardson Farms" and Pincombe SWM Block #3) and north, and a natural feature to the east ("Johnstone Lands"). The lands to the north and west (Richardson Farms) are now being developed and have undergone grading and servicing. The future extension of Bradley Avenue borders the northern extent of the property.

The subject lands are largely in annual row crop agriculture with cultural features and small wetlands in the northwest and south within the Exeter Road parcel. Headwater drainage features originate to the north and northwest of the property, which merge immediately south of the plantation. The drainage channel traverses the agricultural field and continues to the southeast of the property. Tree Protection Areas, which are

indicated on Schedule D-11 of the City's Tree Protection By-law (no. C.P.-1515-228) (City of London 2017), are present in the northwest and southern portions of the subject lands. The woodlot that once existed in the southern portion of the subject lands was cleared in full sometime after 2006; likely in 2008 or 2009. The removal of topsoil in this area may have resulted in the formation of the two small wetland areas which are present today. The natural feature to the immediate east of the subject lands is also considered a Tree Protection Area, as well as an area of "Environmental Review" in the London Plan (City of London 2019b). The lands to the immediate east are also identified as 'Unevaluated Veg Patch', with a 'Potential Upland Corridor' and 'Unevaluated Corridor' in the Southwest Area Plan (2019a). The London Plan (2019b) identifies that area as 'Woodlands' with 'Valleylands', 'Unevaluated Wetlands', and a 'Potential Naturalization Area'. 'Significant Valleyland' is located immediately south of Exeter Road.

Refer to Map 1 for the study area and aerial imagery of the site. The study area is located within Ecoregion 7E.

The subject lands are zoned as Low-Density Residential and Multi-Family, Medium Density Residential with no areas identified as Open Space or Environmental Review in the Southwest Area Plan (City of London 2019a). The London Plan (City of London 2019b) does not indicate any Natural Heritage System components within the subject lands (wetlands, woodlands, unevaluated vegetation patches, etc.). The natural feature to the east is identified as an unevaluated vegetation patch and is being considered for designation as an Environmentally Significant Area as indicated during the scoping meeting with agency staff (MacKay pers. comm. 2018).

This report summarizes background information on natural heritage features, as well as results of original field surveys of vascular flora, breeding birds, herpetofauna, mammals and aquatic habitat for the subject lands. An analysis of impacts is based on a comparison of the Draft Plan of Subdivision to the characterization of the natural features found within the subject lands.

Tree inventories have been completed. Two reports have been prepared, due to the subject lands being evaluated in separate components over the years. The Tree Inventory Report prepared by NRSI in 2018 provides detail on the trees at the south end of the subject lands, as well as a few trees along the Bradley Road extension in the northwest. The Tree Inventory Report prepared by NRSI in 2020 provides detail on the trees in the northwest quadrant of the subject lands, including the 7 trees inventoried in the 2018 report. The two Tree Inventory Reports will be consolidated at detailed design. Both reports outline the health and condition of inventoried trees on site at the time of assessment. As a formal grading plan has not yet been developed, a retention analysis, tree protection measures and recommended compensation are not included in these reports. A Tree Protection Plan will be required once the extent of grading is known. Although this EIS will refer to components of the Tree Inventory Reports, the reader is directed to the separate reports for further information pertaining to the inventoried trees within the subject lands.

Proposed Undertaking

Incon is proposing to develop the subject lands as a medium and low-density residential subdivision. The development is being coordinated with proposed developments both to the east and west of the Goldfield 1 lands. The extension of Bradley Avenue will border the northern edge of the proposed subdivision. Natural heritage features are to be partially protected in the northwest portion of the subject property, but otherwise compensated for within a proposed 'complete corridor'. The complete corridor, in accordance with the *Dingman Creek Subwatershed: Stormwater Servicing Study Master Plan and Schedule B Municipal Class Environmental Assessment* (i.e. "Dingman EA"; Aquafor Beech Ltd 2020), is to manage stormwater, provide recreational opportunities (i.e. walking trail), and compensate for small wetland areas to be removed through the course of development.

Project Scoping

In order to determine a study approach for the EIS, existing natural heritage information was first gathered and reviewed to identify key natural heritage features and species that are reported from, or have potential to occur within the study area. Background

information on the natural environmental features within the study area was gathered from the following sources:

- Upper Thames River Conservation Authority (UTRCA)
- City of London
- Natural Heritage Information Centre (NHIC) database (MNRF 2020a)
- Land Information Ontario (LIO) data base mapping
- Southwest Area Secondary Plan (City of London 2019a)
- Middlesex Natural Heritage System Study (UTRCA 2014)
- Dingman Creek Watershed Report Card (UTRCA 2017)
- Dingman Creek Subwatershed Study (Delcan 2005)
- Dingman Creek Subwatershed: Stormwater Servicing Study Master Plan and Schedule B Municipal Class Environmental Assessment (Aquafor Beech Ltd 2020)
- The London Plan (City of London 2019b)
- Species at Risk in Ontario (SARO) List (MECP 2020)
- Fisheries and Oceans Canada's Aquatic Species at Risk Maps (DFO 2020a)
- Ontario Breeding Bird Atlas (OBBA) (BSC et al. 2006)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2020)
- Atlas of the Mammals of Ontario (Dobbyn 1994)
- Ontario Butterfly Atlas (MacNaughton et al. 2020)
- Ontario Odonata Atlas (MNRF 2020b)

Initial wildlife species lists were compiled to provide information on species reported from the vicinity of the subject lands using the various atlases listed above. Currently, the NHIC does not have any rare species records for the square overlapping the subject lands. The atlases provide data based on 10x10km survey squares; information on species from the square that overlaps the study area was compiled (square 17MH75). These initial species lists informed the scope and type of wildlife field surveys required as outlined in the following sections.

Based on the initial species lists, a number of Species at Risk (SAR) and Species of Conservation Concern (SCC) were identified as having records from within the vicinity of subject lands. SAR are those listed on the Species at Risk in Ontario List (MECP 2020).

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* (ESA), 2007, which includes protection to their habitat, and are referred to herein as “regulated SAR”.

Species considered 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 the 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.

Species at Risk and Species of Conservation Concern Habitat Screening

A preliminary screening exercise was conducted on these species to identify which species have suitable habitat within the study area. This involved cross-referencing the preferred habitat for reported SAR with habitats known to occur within the subject lands or adjacent lands. This was completed to ensure that the potential presence of all SAR and SCC within the study area was adequately assessed in this EIS. The preliminary screening exercise was subsequently updated following completion of all field surveys to provide a more fulsome assessment of significant species and their habitats within the subject lands. The screening table is provided in Appendix I.

Significant Wildlife Habitat Screening

A preliminary screening for the presence of Significant Wildlife Habitat (SWH) was also completed for the study area. The Significant Wildlife Habitat Technical Guide (SWHTG) is a guideline document that outlines the types of habitats that the Ministry of Natural Resources and Forestry (MNRF) considers significant in Ontario, as well as criteria to identify these habitats (OMNR 2000, MNRF 2015). The SWHTG groups SWH into five

broad categories: seasonal concentration areas, rare vegetation communities, specialized wildlife habitat, habitats of Species of Conservation Concern, and animal movement corridors. Following completion of all field studies, the screening document was updated to verify which SWH types had been confirmed as present or absent, or remain as candidate habitats. The SWH screening tables are provided in Appendix II.

EIS Scope

Based on the approach described above, the scope of the EIS was discussed during a consultation meeting held on April 18, 2018 between NRSI, UTRCA, City of London, and the City of London's Environmental and Ecological Planning Advisory Committee (EEPAC). The scope of the EIS was determined to include the following:

- 3 season vegetation inventory
- 2 breeding bird surveys
- 1 migratory bird survey
- 3 anuran call counts
- Incidental wildlife observations for reptiles, mammals, and insects (cover board surveys not necessary)
- SAR and SWH assessments
- Aquatic habitat assessment (electro-fishing not necessary)
- Assessment of valleylands, linkages, and significant woodlands

In addition, it was noted that an archaeological study and fulsome hydrogeological assessment was needed within the subject lands. Another scoping meeting with the new project team was held February 17, 2021 and the Scoping Checklist was confirmed with agency staff via email and circulated March 17, 2021. The Scoping Checklist is attached in Appendix III.

2.0 Relevant Policies, Legislation, and Planning Studies

For the purposes of this report, information relating to the natural heritage features within the subject lands and adjacent areas was collected and assessed for significance. To help inform suitable land-use concepts, guide the layout of development, and identify areas to be protected, these features are evaluated against the following relevant policies, legislation, and planning studies as outlined in Table 1 below.

Table 1. Relevant Policies, Legislation and Planning Studies

Policy/Legislation/ Plan	Description	Project Relevance

Provincial Policy Statement (OMMAH 2020)	• Issued under the authority of Section 3 of the Planning Act and came into effect on May 1, 2020, replacing the 2014 PPS.
	• 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'.
	• The Natural Heritage Reference Manual (MNR 2010) and the SWHTG (MNR 2000) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS.
	• Development and/or site alteration is not permitted within Provincially Significant Wetlands. Development and/or site alteration is not permitted within other significant features or on adjacent lands to the natural heritage features and areas unless it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.
		• Based on the analysis completed for this study, natural features were identified within the study area which have implications under the PPS, include:
		  • Wetlands,
		  • Woodlands,
		  • Habitat for Endangered and Threatened species, and
		  • Significant Wildlife Habitat

Endangered Species Act (2007)	• The ESA came into effect in 2007. • The ESA prohibits killing, harming, harassing or capturing Endangered and Threatened species and protects their habitats from damage and destruction.	• Regulated SAR were identified as having the potential to occur within the study area based on the habitats present. • Field surveys determined that two cavity trees are present in the hedgerow which may constitute habitat for roosting SAR bats. • The removal of these trees would require that bat acoustic surveys be conducted in June of any given year, prior to removal. • SAR grassland birds were documented off-property and their habitat protection does not affect the subject lands.
Canadian Fisheries Act (1985, amended August 2019)	• Manages threats to all fish and fish habitats in Canada. • The Act prohibits harmful alteration, disruption or destruction of fish habitat (HADD). • DFO has developed an online, self-assessment tool, where proponents can determine whether their projects require DFO	• The approach to stormwater management may have implications on fish habitat downstream of the subject lands.

Policy/Legislation/ Plan	Description	Project Relevance
	review based on the type of water body the work is occurring in and the nature of the proposed activity.	• The feature through the field offers limited to no use as fish habitat and only conveys spring flows for a short period. • Channel realignment would need to follow mitigation and best practices as per DFO recommendations to avoid serious harm.

The London Plan (2019b)	• The City of London's new Official Plan, 'The London Plan', outlines current policies for the protection of natural features within the City of London and which represent a constraint to development.
	• The London Plan was adopted by Council and the Province in 2016 and consolidated in 2019.
	• All wetlands, regardless of size, are protected under the Natural Heritage System policies.
	• Environmental Policy 1334 (subject to LPAT appeal) notes that the City, in consultation with the UTRCA, may consider replacement of wetlands, where appropriate, to achieve no net loss in wetland area.
		• An EIS is required as development is proposed to occur within 120m of designated natural heritage features identified on Map 5 (Natural Heritage) of The London Plan, that include:
		  • Unevaluated Wetland,
		  • Unevaluated Vegetation Patch,
		  • Valleyland, and
		  • Potential Naturalization Area

Southwest Area Plan (2019a)	• The Southwest Area Plan is a Secondary Plan that applies to lands in the southwest area of the City of London and was created to guide long-term management and approval of growth. • It generally provides a greater level of detail than the London Plan/Official Plan. • The Southwest Area Plan was prepared in 2016 and updated in 2019.	• Serves as a review of planning applications which is used in conjunction with the other policies in the Official Plan. • The subject lands are zoned entirely as residential. • The natural feature to the east of the subject lands is identified as Open Space and Environmental Review and the Draft Plan of Subdivision will need to include appropriate buffers for this feature.
Dingman Creek Subwatershed Study (2005)	• Applies to lands in the Dingman Creek subwatershed area, including lands in the south portion of the City of London • To develop a plan for the protection, enhancement and restoration of natural heritage features under present conditions as land use changes occur.	• Establishes goals and objectives for various subwatershed components, including natural heritage features, in order to maintain and enhance the ecological health of the Dingman Creek system.

Policy/Legislation/ Plan	Description	Project Relevance
		• Goals relating to enhancing the hydrologic regime, protecting surface water quality and establishing a healthy terrestrial ecosystem will all be achieved through buffering and naturalization within the subject lands.
Dingman Creek Environmental Assessment (Aquafor Beech Ltd. 2020)	• The "Dingman EA" provides a stormwater servicing strategy for the Dingman Creek subwatershed, considering flooding, erosion, groundwater, wildlife, aquatic habitat, and natural corridor development. • Water quality and quantity control is recommended through both Low Impact Development (LID) and end-of-pipe facilities.	• The subject lands fall within the White Oaks – East tributary area. • The drainage feature within the subject lands is identified as a 'complete corridor'. The complete corridor is to be designed to convey water, people, and wildlife.
City of London Environmental Management Guidelines (2007)	• Outlines policy guidelines, standards, process and procedures for the preparation and review of Environmental Impact Studies, determination of buffers and setbacks, evaluation of significant woodlands, and stormwater management facilities as required by the province and the City of London. • The Environmental Management Guidelines are currently being updated.	• As this development application will occur within 120m of a significant natural heritage feature, an EIS is required and as such, the Environmental Management Guidelines are to be followed through the project steps including data collection standards and guidelines for determining setbacks and ecological buffers.
UTRCA Regulation 157/06	• Regulation issued under Conservation Authorities Act, R.S.O. 1990. • Through this regulation, the UTRCA has the responsibility to regulate activities in natural and hazardous areas (i.e. areas in and near rivers, streams, floodplains, wetlands, and slopes).	• UTRCA Regulated Areas fall within the subject lands as a result of wetland on the adjacent property to the east and a portion of the watercourse which bisects the agricultural field. • The Regulation identifies that "*no person shall undertake development or permit another person to undertake development in or on the areas within the jurisdiction of the Authority (UTRCA)*" such as wetland, river or stream valleys. • A permit is required from the UTRCA to undertake work within the Regulation Limit.

Policy/Legislation/ Plan	Description	Project Relevance
		• Channel realignment will require that water balance is maintained for the channel and the overall subject lands. • Timing windows for channel works will apply.

3.0 Field Methods

Terrestrial and aquatic field surveys were undertaken within the subject lands 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 10 field visits were completed between April and October 2018, with additional field work completed in early 2020. Property access was restricted to the northern 3/4 in the early spring, but was later granted for the southern Exeter Road parcel as well (south of the east-west hedgerow). Surveys completed June 11, 2018 and later were completed within the entire subject lands. Details of the field surveys are summarized in Table 2. The locations of specific monitoring stations are shown on Map 2. Surveys were completed in accordance with provincial and local guidance documents.

During the field work program, all observations of mammals, herpetofauna, butterflies, dragonflies, and damselflies 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.).

Table 2. Field Survey Summary

Survey Type	Protocol	Date
2018		
Calling Anuran Survey 1	BSC 2009	April 26
Ecological Land Classification; Spring Vascular Flora Inventory; Bat Habitat Assessment, Snake Area Search	Lee et al. 1998; Systematic search by ELC polygon; OMNR 2011/MNRF 2017	May 11
Calling Anuran Survey 2	BSC 2009	May 26
Breeding Bird 1; Summer Vascular Flora Inventory; Snake Area Search	OBBA 2001; Systematic search by ELC polygon	June 11
Breeding Bird 2; Snake Area Search	OBBA 2001	June 21
Calling Anuran Survey 3	BSC 2009	June 23
Wetland Boundary and Dripline GPS Survey; Snake Area Search	OWES 2014	October 4
Fall Vascular Flora Inventory; Aquatic Habitat Assessment, Snake Area Search	Search by ELC polygon	October 13
Tree Inventory; Bat Habitat Assessment	Tree Protection By-law 2016; Tree Planting and Protection Guidelines 2018; OMNR 2011/MNRF 2017	October 15-16
2020		
Tree Inventory of woodland in northwest corner of subject lands		January 17, 21, 31
Aquatic Habitat Assessment		February 1

3.1 Terrestrial Surveys

3.1.1 Vegetation Surveys

Vegetation community delineation was completed using aerial photography and field investigations, and was refined during the 3-season vascular plant inventory. Vegetation communities were delineated according to the standard Ecological Land Classification (ELC) System for southern Ontario (Lee et al. 1998) and are shown on Map 2. ELC vegetation communities are consistent with the surveyed feature boundaries as described in Section 3.1.6 of this report. Details of each vegetation community were recorded including species composition, dominance, uncommon species or features, and evidence of human impact. All observed species of vascular flora were recorded during the spring, summer, and fall surveys.

3.1.2 Breeding Bird Surveys

Breeding bird surveys were completed according to standardized protocol which consisted of point count surveys at two locations, at least 250m apart, within the subject lands (Map 2). Surveys occurred between dawn and 1000hrs. Two surveys were undertaken at least 10 days apart and during suitable weather conditions. All visual and auditory observations of birds were recorded throughout the subject lands, as well as the highest level of breeding evidence exhibited for each species observed (OBBA 2001). Incidental observations of birds were noted on most other surveys as well.

3.1.3 Reptile Surveys

Although suitable habitat for SAR snakes is not present within the subject lands, five area search surveys were completed to search for snakes and to inform whether any hibernaculum are present. Biologists conducted systematic searches of all ELC communities focusing on areas which provide suitable basking and cover habitat.

3.1.4 Amphibian Surveys

Evening anuran (frog and toad) call surveys were conducted according to the standardized Marsh Monitoring Program protocol (BSC 2009) at 4 stations (Map 2). Monitoring focused on calling frogs and toads during 3-minute call counts, which included call intensity and an estimated number of individuals. Additional information, including survey time, air and water temperature, pH, wind speed, and cloud cover were recorded at each survey station. Vernal pools which may provide salamander habitat are not present on the property.

3.1.5 Mammal Surveys

Surveys for bat roosting habitat were conducted within the subject lands. Little Brown Myotis (*Myotis lucifugus*), a SAR, is known from the vicinity and roosts in tree cavities, hollows, or under loose bark, as well as within buildings (OMNR 2000). To address potential bat habitat presence within treed areas of the subject lands, NRSI staff undertook an assessment of suitable tree habitat features, including snags, cavities, exfoliating bark, and leaf clusters, in accordance with MNRF standardized protocol (OMNR 2011, MNRF 2017). The bat habitat assessment was completed during both leaf-on and leaf-off conditions. No structures (i.e. buildings) which could provide bat roosting habitat are present within the subject lands.

Information considered (and recorded, where applicable) for cavity trees included tree species, location, diameter at breast height (DBH), canopy cover, tree height, decay class according to 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.

3.1.6 Natural Feature Boundary Delineation

The woodland dripline and the wetland boundary in the northwest of the site were delineated and surveyed by NRSI biologists on October 4, 2018. The wetland features in the south of the property were surveyed April 12, 2021. The boundaries of these features were not verified by agency staff, but were identified and surveyed by NRSI biologists certified in the Ontario Wetland Evaluation System (OWES) process. All appended mapping reflects the boundaries and their buffers as surveyed by NRSI.

3.1.7 Aquatic Surveys

Aquatic habitat assessments were conducted on October 13, 2018 and February 1, 2020 to characterize the drainage feature within the subject lands. Air photography was reviewed to assess the location and conditions of the feature where it extends off property to the west and east. The following information was recorded during the assessments:

- substrate type,
- depth, width, etc.,
- bank stability,
- aquatic vegetation cover.

A fulsome headwater drainage feature assessment according to the appropriate protocol was not required for the subject lands, nor was sampling of habitat for fish or benthic macroinvertebrates (personal correspondence with UTRCA staff).

4.0 Existing Conditions

4.1 Soils, Terrain and Drainage

The study area lies within the Upper Thames River watershed, which falls under the jurisdiction of the UTRCA. The Upper Thames watershed is 3,420km^2 (UTRCA 2017), and contains 28 subwatersheds. The Dingman Creek subwatershed, where the subject lands are located, has many areas that are considered significant groundwater recharge areas and highly vulnerable aquifers. Map 6 of the London Plan (City of London 2019b) indicates that there are no identified Significant Groundwater Recharge Area (SGRA) or Highly Vulnerable Aquifer area (HVA) designations within the subject lands.

The drainage feature/headwater drainage feature which bisects the agricultural field originates to the northwest of the site near Wharncliffe Road South, flows across the subject lands and southward down the eastern property boundary. The feature eventually passes beneath Exeter Road and connects with Dingman Creek approximately 1.5km to the south of the subject lands.

Topography within the site is gently sloping to the south with existing elevation in the northern extent of the property approximately 269masl and 264masl in the southern extent. Surface flows drain to the southeast via the headwater drainage feature. Small wetland features are present within localized topographic depressions in the northwest and far south of the subject lands. Grades in the southern portion of the subject lands have been altered due to previous clearing and topsoil removal which resulted in rutting, the creation of a soil berm, and exposure of underlying clay subsoil.

The surficial soils within the study area are generally described as silt loam and silty clay loam with varying permeability (Hagerty and Kingston 1992). Soil cores collected on-site during ELC surveys identified effective textures as predominantly silt loam. The marsh in the northwest contains a shallow profile of organic soils (3-5cm), while the wetland features in the south have established on low-permeability mineral soils which were exposed during the grading activities.

4.2 Designated Natural Areas

According to The London Plan (City of London 2019b), there are no designated natural areas located within the subject lands. The property to the immediate east contains an Unevaluated

Wetland, Unevaluated Vegetation Patch, Valleyland, and is identified as a Potential Naturalization Area (City of London 2019a and b).

The Dingman EA has identified a “complete corridor” across the subject lands. The complete corridor is to be designed as a continuous natural area to convey water, people, and wildlife, with a width of 50-100m (Aquafor Beech 2020).

4.3 Vegetation

4.3.1 Vegetation Communities

The majority of the subject lands consist of a large agricultural field, with cultural plantation, thicket and meadow communities located in the northwest and south portions of the property. A summary of ELC vegetation communities identified within the subject lands and adjacent lands is provided in Table 3. ELC communities are shown on Map 2.

Table 3. Vegetation Communities Identified Within the Subject lands

ELC Ecosite Type	ELC Description	Environmental Characteristics
Wetland		
MAM2	Mineral Meadow Marsh Ecosite	Two other areas of marsh are present within the subject lands; the first in the northwest within the conifer plantation and the second in the southeast. The northern feature contains Reed-canary Grass along with Broad-leaved Cattail (*Typha latifolia*), Fox Sedge (*Carex vulpinoidea*), American Great Bulrush (*Schoenoplectus tabernaemontani*), and Lined Bulrush (*Scirpus pendulus*). The southern feature has bare soils likely resulting from grading and is comprised of Reed-canary Grass, Common Water-plantain (*Alisma plantago-aquatica*), and Common Reed (*Phragmites australis* ssp. *autralis*). Both features contain hydric soils with mottling at 10-25cm, confirming wetland conditions. The northern feature directs surface flow to the south and into the headwater drainage feature that crosses the agricultural field. The southern feature is isolated and collects surface water from a small catchment. Terrestrial Crayfish chimneys, a Significant Wildlife Habitat type, were observed in the southern MAM2 feature.
SWT2	Mineral Thicket Swamp Ecosite	This community is dominated by a dense shrub layer of Pussy Willow, Slender Wilow (*Salix petiolaris*), and Peach-leaved Willow (*S. amygdaloides*).
Cultural		
CUP	Cultural Plantation	A mid-age stand of Colorado Spruce (*Picea pungens*) and Norway Spruce (*P. glauca*) is present in the northwest corner

ELC Ecosite Type	ELC Description	Environmental Characteristics
		of the subject lands. The trees are generally in good health but are planted in a high density resulting in limited cover of shrubs and herbaceous species. The foundation of a structure is present on the northern edge of this plantation.
CUT	Cultural Thicket	The southern portion of the subject lands contains an area of cultural thicket. Red Panicled Dogwood (*Cornus foemina* ssp. *racemosa*) is the dominant shrub throughout this community with Willow shrubs and scattered Eastern Cottonwood (*Populus deltoides*) beginning to establish. The Willow species scattered throughout this community (Slender Willow, Pussy Willow, etc.) can be found in both wetland and fresh-moist upland communities; however, soil mottling and an analysis of the associate species in these locations indicated fresh-moist upland conditions and not wetland. The western extent of thicket would have existed as deciduous forest prior to the clearing that occurred after 2006 and ruts caused by heavy machinery are present throughout.
CUM	Cultural Meadow	Cultural meadow is present in both the northern and southern portions of the subject lands. In the north, this habitat is dominated by Smooth Brome (*Bromus inermis*) with other non-native species such as Canada Thistle (*Cirsium arvense*) and Dame's Rocket (*Hesperis matronalis*) throughout. In the south, the meadow areas are a mixture of Reed-canary Grass, Tall Fescue (*Festuca arundinacea*), Canada Goldenrod (*Solidago canadensis*), and Bird's-foot trefoil (*Lotus corniculatus*). Heavy machinery has created ruts throughout the meadow and a topsoil berm is present along the north edge (to the south of the hedgerow). Monarch butterflies (*Danaus plexippus*) were observed within the southern meadow area.
H1	Hedgerow	A mid-age deciduous hedgerow is present and spans west-east across the subject lands at the south end of the agricultural field. This hedgerow may be a remnant from the larger forest that was removed to the south in approximately 2006. The hedgerow is approximately 20m wide and shows some woodland-like qualities with canopy structure and woodland understory. Tree composition within this feature is dominated by American Basswood (*Tilia americana*) with large numbers of Sugar Maple (*Acer saccharum*) and Bitternut Hickory (*Carya cordiformis*) also present. White Ash (*Fraxinus americana*) and Hop Hornbeam (*Ostrya virginiana*) occur sporadically throughout the feature. Along the southern edge of the hedgerow, young to mid-age Trembling Aspen (*Populus tremuloides*) and Eastern Cottonwood (*P. deltoides*) have established forming a transition into the cultural thicket community. The shrub layer is dominated by European Buckthorn (*Rhamnus cathartica*) and saplings of American Basswood and White Ash. The groundcover is sparse and includes Garlic Mustard (*Alliaria petiolata*), White Avens

ELC Ecosite Type	ELC Description	Environmental Characteristics
		(*Geum canadense*), and Canada Enchanter's Nightshade (*Circaea canadense*). The hedgerow contains piles of field stones with the topsoil berm present to the south of the feature.

The agricultural field within the subject lands was planted in soybeans in 2018. The property to the immediate east was not accessed, but was verified from the property line as predominantly non-native thicket with an area of non-native thicket swamp and graminoid marsh present in the central-western portion of the feature. The lands to the west of the subject lands are comprised of agricultural field and bare soil.

4.3.2 Vascular Flora

A total of 97 vascular plant species were inventoried within the subject lands, of which 59 species are considered native to Ontario. A complete list of these species is appended to this report (Appendix IV).

Problematic non-native invasive species which are widespread within the site include European Buckthorn and Glossy Buckthorn (*Frangula alnus*). European Buckthorn is most abundant among the native trees which comprise the hedgerow, while Glossy Buckthorn occurs sporadically throughout the cultural thicket community. Both species compromise natural habitats dominated by native species resulting in lowered species diversity and degraded wildlife habitat.

No federally or provincially significant plant species were observed within the subject lands. The details for two regionally significant vascular plant species which were observed are provided in Table 4 below and indicated on Map 3.

Table 4. Regionally Significant Vascular Flora Observed in the Subject Lands

Scientific Name	Common Name	S-Rank[1]	Location of Species Observation
Rosa carolina	Carolina Rose	S4	CUT – within Exeter Road parcel south of hedgerow
Ulmus thomasii	Rock Elm	S4?	H1 – hedgerow along eastern boundary of Exeter Road parcel

[1]MNRF 2020a

S-Rank	
S4	Apparently Secure
S#?	Rank Uncertain

Several Carolina Rose shrubs were observed throughout the cultural thicket community that is present to the south of the hedgerow. This species is typically found in dry forests, fields and fencerows (Reznicek et al. 2011). The grading which has occurred in the southern portion of the subject lands has removed much of the topsoil and in turn created wetter conditions at the surface which are not conducive to this species, which likely reflects drier conditions that were present prior to the clearing and disturbance which occurred.

A single Rock Elm was noted from the far southeast corner of the subject lands, within the hedgerow (Map 3). The tree was surveyed as part of the tree inventory and was noted to be in good condition and has a 15cm DBH. This species has a distinctive ridged, corky bark and prefers mixed hardwood forests and rich forests along rivers (Reznicek et al. 2011).

4.4 Wildlife

4.4.1 Birds

A total of 91 species are reported from the vicinity of the subject lands based on the OBBA (BSC et al. 2006). The OBBA data includes those species that have been observed in the area (10 x 10km range), are known to nest in the area, and/or have exhibited some evidence of breeding in the area. A total of 30 species were documented within the subject lands during NRSI field surveys. Of the birds observed, 20 species exhibited signs of breeding, such as males singing, individuals on a territory, pairs and agitated individuals. A Great-Horned Owl pellet was found in January 2020, as well as a stick nest within the plantation (CUP). The stick nest did not appear in use in 2020 (NRSI, field work for adjacent landowner). Refer to Appendix V for a list of bird species found in the study area.

Background information and a SAR and SCC screening that was conducted to inform the background review indicated that eight significant bird species are reported from within the study area (Appendix I). Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*) were observed during breeding bird surveys in 2018 from lands adjacent to the the subject lands. Both species are listed as Threatened provincially, affording individuals and their habitat protection under the ESA. Suitable habitat for these species is not found within the subject lands, as the cultural meadow habitat (CUM) on which they rely, is too small to meet their needs.

Bobolink

NRSI biologists observed one Bobolink, a singing male, on June 11, 2018. The bird was present in the vicinity of the overgrown baseball diamonds to the west of the subject lands. The bird was not observed within the subject lands. By October 2018 it was noted that the baseball diamonds had been graded in full and the habitat is no longer present. Breeding bird surveys completed in 2020 for the adjacent lands did not observe this species.

Eastern Meadowlark

A single Eastern Meadowlark was documented approximately 300m to the north of the subject lands on June 21, 2018. The singing male was observed in a small cultural meadow located between Paul Peel Avenue and the Tepperman's commercial building to the north. The bird was not observed within the subject lands. The property from which it was observed is being developed by others.

4.4.2 Herpetofauna

According to the Ontario Reptile and Amphibian Atlas (Ontario Nature 2020), 26 species of herpetofauna are reported from within 10km of the subject lands. NRSI biologists documented approximately 9 Western Chorus Frogs (*Pseudacris triseriata*) calling from wetlands within the property to the east on April 26, 2018. This species is considered threatened federally (COSEWIC 2020), but is not considered at risk provincially (MNRF 2020a). As noted in Section 1.2, species which are considered threatened federally but are not listed provincially are considered a Species of Conservation Concern which is protected as SWH under the Provincial Policy Statement (OMMAH 2020).

No other observations of reptiles or amphibians were made during the course of the 2018 surveys. Standing water was not observed within the subject lands in May or June. Similarly, standing water was not observed in the Exeter Road parcel in June; however it is possible that the two small marsh features may have contained standing water earlier in the spring (parcel was not included in project scope prior to June 11; i.e. no property access provided on Exeter Road parcel prior to June 11). A complete list of herpetofauna reported from the study area is included in Appendix VI.

Background information indicated that 7 significant herpetofauna species are reported from within the study area (Appendix I). Suitable habitat is not present within the subject lands for any of these species, other than Western Chorus Frog, but that species was not observed on site.

4.4.3 Mammals

According to the Mammal Atlas of Ontario (Dobbyn 1994), 32 mammal species are reported from within 10km of the subject lands. During field surveys, 5 of these species were observed within the subject lands including Coyote (*Canis latrans*), Eastern Cottontail (*Sylvilagus floridanus*), Eastern Gray Squirrel (*Sciurus carolinensis*), Raccoon (*Procyon lotor*), and White-tailed Deer (*Odocoileus virginianus*). An active Coyote den was present within the berm of topsoil located near the hedgerow in 2018, as well as in the plantation in January 2020. A complete list of mammals reported from the study area, based on background information and observations made as part of this study, is included in Appendix VII.

An assessment of trees which could provide bat roosting habitat was conducted during the leaf-off and leaf-on conditions (April and October 2018). It was determined that two trees which could provide suitable bat roosting habitat are present within the hedgerow in the southern portion of the property. Specifically, these are Tree 758 (Sugar Maple) and Tree 828 (American Basswood). These trees are shown on Map 3. Suitable features include holes or deep cracks in the stem of a tree as well as clusters of leaves in the canopy of oak trees. The presence of suitable habitat features for SAR bats are subject to the regulations of the ESA.

4.4.4 Insects

Lepidoptera

According to the Ontario Butterfly Atlas (Macnaughton et al. 2020), 58 butterfly species are reported from the study area (with 2 additional potential species observed to the genus level

only). NRSI biologists observed 5 butterfly species during field surveys within the subject lands including Monarch, which is a SCC. Other species observed included Cabbage White (*Pieris rapae*), Clouded Sulphur (*Colias philodice*), Northern Crescent (*Phyciodes cocyta*), and an unidentified Duskywing species (*Erynnis* sp.). Monarch was observed incidentally on two occasions within the cultural meadow in the Exeter Road parcel. The host plant, Common Milkweed (*Asclepias syriaca*), is present in small numbers within this area and along the edges of the agricultural field. A complete list of butterfly species reported from the study area is provided in Appendix VIII. Further discussion of Monarch is provided in Section 5.5.

Odonata

According to the Ontario Odonata Atlas database (MNRF 2020b), 34 dragonfly and damselfly species are reported from the study area. NRSI biologists observed a single Common Green Darner (*Anax junius*) within the small marsh feature in the southwest portion of the property. A complete list of species reported from the study area is provided in Appendix IX.

4.5 Aquatic Habitat

Headwater features contribute to the overall health and function of a watershed and include non-permanently flowing drainage features that may not have defined bed or banks, first-order and zero-order intermittent and ephemeral channels, swales, and headwater wetlands. A headwater feature originates approximately 400m northwest of the subject lands near Wharncliffe Road South. The drainage feature passes through the conifer plantation in the northwest of the subject lands, receiving surface water from the meadow marsh wetland and continues across the agricultural field in a southeast direction. Within the plantation and marsh, the drainage channel appears to be dug, with vertical edges. At the eastern boundary of the subject lands, the channel runs in a north-south direction before directing flows off-site to the southeast. This headwater feature ultimately connects with Dingman Creek approximately 1.5km south of the subject lands. Although NRSI biologists were not on site prior to April 26, 2018, this channel was dry with small, isolated pools of water present throughout the course of the 2018 surveys. Spring freshet conditions were evident as indicated by pooling and muddy substrates. Approximately 250m to the south of the property, in the vicinity of Exeter Road, the drainage feature appears to contain a greater depth of water for much of the year and functions as a permanent watercourse.

Reach 1 originates northwest of the Goldfield 1 Lands. At the time of assessment, February 1, 2020, water entered the conifer plantation along the west edge, flowing southeast through the

marsh (MAM2), and exiting the plantation along the south edge, where it merges with Reach 2 (refer to Map 2). Several large pools are present within the plantation, which are 1.0-1.5m deep and approximately 2.0m across. These pools appear to be caused by broken farm tiles, which are approximately 0.3m in diameter. The water from the tiles is eroding the soil as it flows to the surface, creating the pools/sink holes. Reach 1 exits the marsh at its southeast corner, where it is eroding soil and flows south for a short distance. Although the Reach 1 channel is visible through the field, the feature was dry on February 1, 2020, as the main flow was noted to go underground just south of the plantation. Approximately 20m south of the plantation, the water resurfaces for a short distance (30m) before going underground and flowing through tile drains once again. The dry channel turns to the south and flows along the eastern property boundary. Here, Reach 1 flows through a channel with established terrestrial grasses that connects a series of pools. Just north of the east-west hedgerow (H1, Map 2), Reach 1 turns and flows east onto neighbouring lands. Fish habitat is not present within Reach 1 due to its poor connectivity, terrestrial grasses within the channel, and extensive tile drainage. Approximately 1km downstream of the subject lands, near Blakie Road, the UTRCA conducted fish sampling in the summer of 2019. These surveys found three species with cool water preference: Brook Stickleback (*Culaea incontans*), Creek Chub (*Semotilus atromaculatus*), and White Sucker (*Catostomus commersoni*), (Pratt pers. comm. 2021).

Reach 2 drains the lands to the north of the subject lands and historically would have been ploughed and cropped as active agricultural land. Reach 2 has undefined flows from the lands to the north, which become channelized at the northern property boundary. Here, the channel is well defined, but intermittent in nature, based on the lack of vegetation, lack of iron staining or visible groundwater inputs, and infilling of fine sediments. Reach 2 ranges in width from 0.15-0.70m and in depth from 0-0.30m. It meanders with a 2-3m amplitude, for approximately 57m in a series of pools and flats before it becomes indistinct overland flow for approximately 55m. It channelizes again upon entering the marsh, at approximately the mid-way point within the plantation. Within the marsh, Reach 2 merges with the Reach 1 (Map 2). Reach 2 does not provide fish habitat.

Photographs of the subject lands, including the channel are provided in Appendix X.

5.0 Significance and Sensitivity of Natural Features

The natural environment constraints analysis is used to identify natural features that are sensitive to disturbance based on the rarity or significance of the feature and its functions, as well as policies inhibiting development within them. These areas are identified as "constraints" and are discussed in the context of natural heritage policies governing their protection. Conversely, opportunities for development may occur outside of these natural environment constraints within the subject lands. Results of this analysis have been provided as input to the proposed development plan in order to avoid and reduce impacts to natural features and functions. A summary of this analysis for the subject lands is discussed below. Significant species and natural features as documented during field studies or determined through this analysis are shown on Map 3. Based on discussion with City staff during the pre-consultation meeting (MacKay pers. comm. 2018), the natural feature to the east of the subject lands is to be regarded as significant.

5.1 Wetlands

Wetland mapping available through the MNRF (MNRF 2020a) does not indicate the presence of any evaluated Provincially Significant Wetland on or adjacent to the subject lands. UTRCA mapping (UTRCA 2018) indicates the presence of wetland associated with the watercourse on the property to the east. The extent of this wetland, using data obtained from the UTRCA, is shown on Map 3. Although NRSI biologists did not access this property to observe the feature, air photography interpretation suggests it is comprised of a graminoid marsh with a fringe of thicket swamp; presumably non-native thicket swamp given the prevalence of European Buckthorn visible from the property line. The wetland unit on the adjacent parcel was previously identified as containing Forb-Mineral Meadow Marsh (MAM2-10), Deciduous Swamp (SWD), and Thicket Swamp (SWT) (Earth Tech Canada Inc. 2008). During 2018 surveys it was noted that the edge of the feature appears to be characterized by a band of Hawthorn Thicket at the field edge and in this sense, the wetland extent as shown on Map 3 takes a conservative approach to wetland buffering. It is noted that Map 5 of the London Plan (City of London 2019b) shows a much smaller wetland on the adjacent parcel with the extent of wetland restricted to the valleyland of the mapped watercourse.

Through field surveys, three small wetland features were identified in the northwest and south portions of the subject lands. While the southeast marsh feature provides SWH (terrestrial crayfish habitat) and the northwest marsh conveys surface water to the channel, none of the on-

site wetlands are considered significant or have reason for inclusion of these units into an existing Provincially Significant Wetland (PSW) complex based on their small size, distance from a PSW, and absence of SAR habitat. The boundaries of the wetlands on the subject lands were delineated and surveyed with a sub-metre accuracy GPS unit by NRSI biologists. The wetland off site to the east was not surveyed, and in this area the existing UTRCA wetland boundary layer was utilized (Map 3).

The marsh (MAM2) in the northwest portion of the subject property is 0.133ha in size; the southeastern marsh (MAM2) is 0.089ha; and the southeastern swamp thicket (SWT) is 0.134ha in size.

5.2 Significant Woodlands

The London Plan (2016c) identifies Significant Woodlands, however none are identified within the subject lands.

The cultural plantation (CUP, Map 2) is approximately 0.5ha in area and was assessed for significance using the framework outlined in the Guidelines for the Evaluation of Ecologically Significant Woodlands (City of London 2006). Plantation forests may qualify as significant and are deemed such if one 'high' criteria standard or five 'medium criteria standards are met.

The plantation fulfills a high value for Criterion 1 (Site Protection) due to the presence of the marsh within the plantation and the role of this marsh as a headwater feature. A review of the remaining criteria does not indicate that other items are fulfilled; however, based on the hydrological feature alone, the plantation is considered significant.

The dripline in the northwest was delineated and surveyed by an NRSI biologist, as well as the dripline along the eastern subject lands boundary.

5.3 Environmentally Significant Areas

The City of London recognizes Environmentally Significant Areas (ESA), which are shown on Map 5 (Natural Heritage) of The London Plan (City of London 2019b) and is consistent with the ESA mapping provided in the original Dingman Creek Subwatershed Study (Delcan 2005). No ESAs are identified within the subject lands, but the adjacent property to the east is identified as an Unevaluated Vegetation Patch and is zoned as Environmental Review. This parcel is being considered for ESA designation and this EIS has assumed the feature to be significant.

The Natural Heritage Study completed by AECOM (2010) for the Southwest Area Plan stated the following about this area, identified as Patch #10094: "*[The patch] is considered to be [a] significant component of the natural heritage system with three (3) High scores and one (1) Medium. Furthermore, we would predict that with site-specific field information patch no. 10094 would likely be considered an Environmentally Significant Area (ESA).*"

5.4 Significant Wildlife Habitat

Based on background information review, desktop analysis, and field studies, one SWH type for was confirmed for the subject lands: Habitat for SCC (Terrestrial Crayfish). Although two cavity trees are present within the hedgerow along the southern subject lands limit, SWH for Seasonal Concentration Areas (Bat Maternity Colony) is only considered for forest ELC types (FOD and FOC) and not hedgerows. The significance of these trees is addressed as potential SAR habitat under Section 5.6. All other candidate SWH types were ruled out as not occurring within the subject lands. Full results of the SWH assessment are provided in Appendix II.

5.4.1 Seasonal Concentration Areas

No seasonal concentration areas are found within the subject lands.

5.4.2 Rare Vegetation Communities

No rare vegetation communities are found within the subject lands.

5.4.3 Specialized Wildlife Habitat

No Specialized wildlife habitat types are found within the subject lands.

5.4.4 Habitat for Species of Conservation Concern

Terrestrial Crayfish

Surveys conducted in 2018 identified numerous Terrestrial Crayfish chimneys located in the MAM2 marsh feature in the southeast corner of the subject lands. This low-lying area contains hydric soils which provide suitable crayfish habitat. At least 10 of the chimney structures were observed by NRSI biologists. The marsh is identified as SWH for Terrestrial Crayfish.

Special Concern and Rare Wildlife Species (Monarch)

Monarch butterflies were observed on two occasions within the cultural meadow in the Exeter Road parcel. This species is listed as Special Concern provincially (MECP 2020). This species requires Milkweed (*Asclepias* spp.) as a host plant and nectars on a variety of wildflower

species. Common Milkweed is present in small numbers within the cultural meadow and along the agricultural field margins. Given the low numbers of Milkweed and the disturbed nature of the subject lands including the meadow, SWH for Monarch is not present.

5.4.5 Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (OMNR 2000). The potential for animal movement corridors to occur in the subject lands is contingent on confirming Amphibian Breeding Habitat (Wetland) SWH or Deer Wintering Habitat SWH (MNRF 2015); neither of these confirmed habitats were identified within the subject lands and as such the SWH type is not present.

5.5 Habitat of Endangered and Threatened Species

Confirmed habitat for Bobolink and Eastern Meadowlark was observed adjacent to the subject lands during breeding bird surveys. A singing male Bobolink was observed in the vicinity of the overgrown baseball diamonds to the west of the subject lands. As of October 2018, this area had been graded and the habitat destroyed.

A singing male Eastern Meadowlark was observed to the north of the subject lands, in the small field to the south of the Tepperman's building on Wharncliffe Avenue South. This field is 200m north of the subject lands and implications of the ESA do not have bearing on the proposed development.

As noted in Section 4.4.3, two cavity trees which may provide habitat for roosting SAR bats were documented within the east-west hedgerow (H1) within the subject lands. The Alymer District MECP should be contacted as they may require acoustic and visual monitoring of the trees during the maternity roosting period (June).

5.6 Fish and Fish Habitat

The channel on the subject lands is intermittent and was noted to contain only sporadic shallow pools of water between April and October during 2018 field surveys. As a headwater feature to Dingman Creek, the section of channel on site does not constitute direct fish habitat. The Class EA for the White Oak Area (AECOM 2014) identifies the feature on the subject lands as a Class F Drain which connects with an ephemeral flow feature originating on the property to the east. Permanent fish habitat is found east of the subject lands, where this drainage feature connects

with a watercourse. Field surveys by the UTRCA downstream (south) of the subject lands found fish species that prefer cool water habitat (see Section 4.5).

It is not anticipated that the realignment of the channel within the subject lands would result in harm to fish. As an intermittent feature, the channel relays spring flows only for a short period of time and does not offer use as spawning, rearing, or foraging habitat for fish. SAR mapping available through the Department of Fisheries and Oceans website (DFO 2018a) indicates that neither the tributary nor Dingman Creek (at its confluence with the tributary) provide SAR habitat.

6.0 Buffers

Buffers are generally required for natural heritage features such as woodlands, wetlands, and SWH to protect them from impacts during development. Wetland and woodland buffers are required to protect the form and function of these features and protect the species that inhabit them. The UTRCA has required a 10m woodland dripline buffer and 15m wetland buffer for the features within the subject lands, which are agreed to in principle. However, natural heritage features are not being retained within the subject lands, but will be recreated within the complete corridor. The buffers are shown on Map 3, for information purposes only, as they relate to compensation, as discussed below.

Buffers are recommended from the woodland and wetland complex located immediately to the east of the subject lands. Those lands are going through a development application as well, but as no decisions have yet been made, appropriate buffers are recommended based on current conditions of those lands. Should development be approved east of the Goldfield 1 subject lands, buffers will not be required on the Goldfield 1 property. Currently, an extension of Paulpeel Avenue is proposed immediately east of the Goldfield 1 subject lands. If this road extension is approved, this would negate the need for buffers on the Goldfield 1 subject lands.

7.0 Complete Corridor

The Dingman Creek Subwatershed Municipal Class Environmental Assessment (DCEA) identified a "complete corridor" across the subject lands, within an area identified as White Oak 3 – West area. As per the DCEA (p. 155 and 173),

> *"The complete corridor approach is intended to provide sufficient width to accommodate both aquatic and terrestrial ecological function within the corridor (in addition to stormwater, planning, and other similar considerations). It typically encompasses a minimum of 30 m on either side of a watercourse for a total corridor width of 60 m (Environment Canada, 2013). However, exact corridor widths must be established based on-site conditions (i.e., the ecological features and functions present) and the specific goals/targets for the site."*
>
> *"For the purposes of this EA study, the complete corridor associated with the White Oak 3 - West pond shall be objectives-based and shall incorporate the following components:*
> - *A multi-use pedestrian pathway linking with the subdivision to the north;*
> - *All buffer requirements, subject to the significance of the channel and adjacent Natural Heritage Features;*
> - *All minimum compensation requirements included in the subdivision and stormwater infrastructure EISs;*
> - *Relocation/compensation for any additional features found within the development lands identified through the Planning Act process to be mitigated;*
> - *Headwater Drainage Feature protection and mitigation;*
> - *Restoration efforts as appropriate to the watercourse channel and the riparian corridor, to improve upon existing habitat and enhance connectivity between natural heritage features located along the corridor; and,*
> - *Stormwater volume control requirements […].*
>
> *"In the City's Official Plan, urban channel corridor widths may have a minimum width of 30 m and significant corridors have a minimum width of 60 m. Including the buffers and pathway, the corridor is anticipated to range in width between 50 m and 100 m in width."*

Stantec has prepared a complete corridor concept, which integrates a naturalized and restored watercourse corridor with stormwater management (SWM), a trail, and compensation for wetland and tree removal. It also integrates compensation for the removal of a headwater drainage feature on the Goldfield property immediately to the north. The proposed corridor width through the subject lands is 60m.

8.0 Impact Analysis and Recommendations

This EIS has been prepared for the subject lands with reference to the proposed Draft Plan of Subdivision (MHBC, July 12, 2021). The proposed development is shown on Map 4.

8.1 Description of the Proposed Undertaking

The proponent is proposing to develop a subdivision comprised of high, medium, and low-density housing, as well as associated roadways, servicing and SWM. The northern extent of the development will connect with the future extension of Bradley Avenue. A street will connect to Exeter Road in the south. The proposed Draft Plan is shown on Map 4. The high density block located at the north end of the subject lands is anticipated to include mid- and/or high-rise apartment buildings. The low density development is planned for the central portion of the subject lands and will be comprised of 115 lots. Two medium density blocks are planned for the south end of the subject lands, which are proposed as cluster townhouse development for 130 units in total. A complete corridor, as envisioned in the DCEA (Aquafor Beech 2020), is a minimum of 60m across and is located across the northern portion of the site, and along the eastern boundary of the subject lands. The complete corridor will contain the realigned intermittent channel that currently crosses the subject lands. The plantation, wetlands, SWH, and trees are all proposed for removal, but will be compensated for within the complete corridor.

A preliminary SWM strategy has been prepared by Stantec (2021) and is to mimic pre-development conditions. SWM will include a third pipe sewer, rear-yard infiltration galleries, a dry SWM facility, oil-grit separators (OGS), and on-site controls for the medium density blocks. The third pipe system will collect clean runoff from single-family lots and discharge this water to the realigned channel. Shallow infiltration galleries are proposed for most single-family lots to meet water balance objectives. The dry SWM facility will collect all road runoff from the traditional storm sewer system and handle all major flows from the single lots. OGS will provide enhanced level water treatment before water discharges into the SWM facility. The SWM facility will outlet to the realigned channel.

The medium density blocks will receive onsite SWM controls. Block 70 and 81 will discharge to the realigned channel with enhanced water quality treatment. Block 80 will discharge to the Exeter Road sewer system, also after meeting enhanced water quality treatment.

8.2 Approach to Impact Analysis

Potential impacts arising from the proposed development are determined by comparing the details of the proposed development with the characteristics of the existing natural features and their functions. The following is a description of the types of impacts which will be discussed.

- Direct impacts to the natural features within the subject lands and adjacent lands associated with disruption or displacement caused by the actual proposed ‘footprint’ of the undertaking.
- Indirect impacts associated with changes in site conditions such as drainage and water quantity/quality.
- Induced and cumulative impacts associated with impacts after the development is constructed such as subsequent demand on the resources created by increased habitation/use of the area and vicinity over time.

8.3 Evaluations of the Potential Effects, Mitigation and Net Effects

Impacts, mitigation measures and net effects associated with the proposed development are detailed in Table 5.

Table 5. Impact Assessment and Net Effects

Source of Potential Impact	Direct or Indirect Impact	Ecological Feature or Function Effected	Potential Impact	Mitigation Measures	Net Impact
Land Use Impacts					
Land use designation Development design and location Increased edge effects Interruption or change of surface water and ground- water flows (water balance) Increased hard surface/decrease in infiltration Interruption of corridors Flora	Direct	Significant Woodland Wetland Trees SWH Intermittent drainage channel Groundwater resources Removal of significant flora	-Removal of natural heritage features (woodland, wetlands, SWH, drainage channel) -Wetland removal: 0.36ha NW: 0.133ha SW:0.134ha SE: 0.089ha With buffers: 1.53ha NW: 0.579ha SW:0.550ha SE: 0.399ha -Tree removal: approx. 800 trees in fair to excellent condition (Tree Preservation and Protection Plan to be completed at detailed design) -Changes to water balance, increased runoff due to increased impermeable surface area -Changes to hydrology relating to the removal of drainage tile	-Appropriately designed SWM and drainage on-site to maintain the water balance to acceptable standards. -Implementation of LID measures included in SWM strategy to capture, treat, and infiltrate flows to mitigate effects of post-development water balance. -Increased topsoil depth of 300-400mm in yards and greenspace areas is recommended to reduce runoff, promote infiltration and vegetation growth. -Dense restoration plantings in buffer area adjacent to wetland and woodland to the east to limit public incursion into the natural feature, if applicable (i.e., if no development is approved to the east). -Fencing of east side of high-density Block 81 adjacent to buffer (if applicable). -Preparation of a TPP to identify tree protection and compensation. -Compensation of woodland, wetland, and tree removal within complete corridor. A Compensation Plan is to be prepared and integrated with the design of the complete corridor. -Wildlife salvage prior to wetland removal (e.g. relocation of Terrestrial Crayfish to newly created wetlands in complete corridor). -Transplant significant flora (Carolina Rose and Rock Elm) into complete corridor. -Compensation of HDF from Goldfield property (north of Bradley Avenue extension) within complete corridor to account for 0.114ha (see Appendix XI).	Through implementation of recommended mitigation measures, the development will not have a significant negative impact on natural features.
Construction Impacts			-	-	
Site grading, during construction activities (erosion from runoff and sedimentation)	Indirect	Local watercourses, natural features on- and off-site	-Potential for soil erosion and sedimentation of channel and downstream watercourse, as well as natural features -Potential impact to tree root zones	-An Erosion and Sediment Control (ESC) plan is recommended to be prepared to help control and reduce the sediment load of runoff which may flow towards nearby surface water features. -Regular monitoring of sediment fences and other ESC measures during construction, particularly following large rain events. -Monitoring of construction activities to ensure no additional ESC concerns. -Implement sediment control measures at the discharge point of any dewatering systems for servicing trenches/excavations.	The implementation of an ESC plan will limit the potential for negative impacts to natural features.
Site clearing and vegetation removal Drainage of wetlands Fragmentation of habitat and linkages	Direct and Indirect	Natural features on-site	-Disruption to migratory birds and their nests -Soil instability, resulting in erosion and sedimentation -Tree removal -Disruption to local wildlife	-Vegetation removal is recommended to occur outside of the breeding and nesting season for migratory birds, approximately April 1 to August 31 for bird species in wetland and open habitats (CWS 2017a,b). -Should vegetation removal be required during the nesting season for migratory birds, surveys for nesting birds may be undertaken to permit vegetation removal should breeding bird absence be confirmed. -Stabilize soils following vegetation removal and grading, by seeding the area with appropriate cover crop (e.g. Annual Rye, *Lolium multiflorum*) to reduce the potential for sedimentation and erosion. Maintain vegetation wherever possible. -Restoration plan for complete corridor to include suitable native trees, shrubs, and/or seed mixes that are appropriate to site conditions. Seed mix is recommended to include plant species favorable to Monarch butterfly such as Milkweed, Goldenrod, and Aster. -Bat habitat assessment should be undertaken on the two cavity trees within the hedgerow. Additional surveys, and/or habitat compensation (i.e. bat box installation) to be discussed with MECP and City of London should any confirmed SAR bat habitat be proposed for removal. -Compensation for wetland and tree removal as identified above. -Complete corridor will provide a linkage for wildlife and connection between habitat features.	The completion of vegetation removal outside of wildlife timing windows and the installation of naturalized plantings will not have a significant negative impact on natural features. The potential removal of SAR bat habitat would implement mitigation outlined in the associated permitting. Compensation measures identified for wetland and tree removal will mitigate negative impact.

Source of Potential Impact	Direct or Indirect Impact	Ecological Feature or Function Effected	Potential Impact	Mitigation Measures	Net Impact
Land Use Impacts					
Scarring and damage to vegetation by machinery Decreased health of vegetation from dust and sedimentation Introduction of non-native species	Direct and Indirect	Natural features off-site	-Damage to vegetation from construction activities	-Buffer to woodland and wetland located to the east (if applicable). -Prepare TPP at detailed design to identify tree protection measures. -Install silt fencing at grading limits to demarcate construction zone and establish separation to adjacent natural features. -Develop and implement an ESC plan. -Follow City of London's Clean Equipment Protocol to minimize risk of spreading invasive species. -Import clean fill only to prevent introduction of invasive species.	The implementation of an ESC plan and TPP will limit the potential for negative impacts to trees and their root zones. Adherence to the Clean Equipment Protocol and avoiding introduced fill will minimize potential for non-native species introduction.
Machinery maintenance	Direct and Indirect	Natural features on- and off-site	-Potential contamination of soil, vegetation, water	-All machinery maintenance to be done in a designated area at a high elevation point on-site, where possible. -Implement Best Management Practices, spill action response plan, and spill contingency plan for fuel handling, storage, and on-site equipment maintenance activities. -Contractors on-site should ensure construction equipment is in good working order. Equipment operators should have spill containment kits available.	Adherence to best management practices for re-fueling and materials storage and having spill contingency measures in place at all times will result in no significant negative impact on natural features.
Stormwater Management Development Impacts			-	-	
Erosion and sedimentation related to construction	Indirect	Local watercourses, natural features off-site	-Potential for soil erosion and sedimentation of local watercourses and natural features	-Develop and implement an ESC plan. -Develop and implement a stream restoration plan for relocating and naturalizing the intermittent drainage channel into the complete corridor.	The implementation of an ESC plan will limit the potential for negative impacts to natural features.
Alterations to surface water flow patterns and groundwater properties Impact on receiving watercourse	Direct	Local watercourses and groundwater resources	-Changes to water balance, increased runoff -Increased water temperature to downstream watercourse -Potential for sedimentation of watercourse	-Inclusion of LID measures in SWM strategy, to capture, treat, and infiltrate flows to achieve water balance, as well as to mitigate temperature increases. -Robust erosion and sediment control is recommended during and after construction to prevent uncontrolled sediment release into the newly created drainage feature. -Channel realignment works to adhere to DFO best practices (DFO 2018b) including work in dry conditions, use of sufficient erosion and sediment control and re-vegetation of the excavated soils of the new channel through the implementation of a restoration plan. -Turbidity monitoring to be undertaken during any dewatering activities.	The channel realignment and installation of naturalized buffer plantings will not have a significant negative impact on natural features. Channel works will result in an increase in native species cover and connectivity of wildlife habitat.
Roads and Utility Corridor Impacts				-	
Drainage Mortality of wildlife	Direct and Indirect	Groundwater resources Wildlife	-Changes to water balance -Wildlife mortality	-Appropriately designed SWM and drainage on-site to maintain the water balance to acceptable standards. -Use of LID measures proposed to capture and infiltrate runoff, thereby reducing the variation between pre-development and post-development conditions. -Appropriate culverts to provide wildlife movement opportunities at road crossings of complete corridor -Limiting speed along roads	Proper SWM design and the use of LID will ensure that the development does not have a significant negative impact on site drainage. Significant wildlife movement in this urban area is not reported, but ensuring wildlife crossings are integrated with road crossings of complete corridor will ensure impact to wildlife is low.
Land Use Management Impacts			-	-	

Source of Potential Impact	Direct or Indirect Impact	Ecological Feature or Function Effected	Potential Impact	Mitigation Measures	Net Impact
Land Use Impacts					
Property maintenance Yard waste disposal Non-native species planting Domestic pets Lighting Property encroachments	Indirect	Local environment	-Potential impact to complete corridor and natural feature to east	-Buffer to woodland and wetland to east (if applicable). -Implement Best Management Practices for lighting infrastructure to effectively direct light and minimize disruption to local wildlife. -Limit use of commercial fertilizers in landscaped areas. -Limit use of salts or other additives for ice and snow control on the roadways. -Native tree species should comprise a large portion of street tree planting. -Fencing of lots backing onto complete corridor -Fencing of east side of high-density Block 81 adjacent to buffer (if applicable) -Homeowner education package to provide best management practices with regards to the natural environment -Provide educational signage within the complete corridor to educate residents on the corridor and natural heritage. Sign topics may include: complete corridor design and purpose, along with wetlands and best management practices for homeowners	The naturalized channel will improve filtering of runoff which flows toward Dingman Creek during spring freshet. No significant negative impacts are anticipated.

9.0 Environmental Management and Monitoring Plan

The primary objective of the Environmental Management and Monitoring Plan is to restore the function and structure of features which are removed and to enhance the buffer areas on-site. The existing channel which crosses the agricultural field will be realigned within the complete corridor. The complete corridor will integrate natural channel design with stormwater management, wetland and tree compensation, and recreation (i.e. trail).

A monitoring plan is intended to protect the natural heritage system during and post-construction by ensuring tree protection and sediment fencing are installed properly and maintained. Monitoring will also ensure that naturalization plantings achieve a target rate of survival.

9.1 Restoration and Enhancement

The following recommendations are provided for the enhancement of buffer areas and the complete corridor.

- Buffer areas within existing agricultural field, where applicable, should be naturalized through the planting of native trees, shrubs and herbaceous groundcover. The complete corridor is also to be naturalized in the same way. All species should be native to Middlesex County, commercially available and suited to early succession conditions. A mixture of caliper, potted and plug stock is recommended. Guidance for species selection is outlined in the *Guide to Plant Selection for Natural Heritage Areas and Buffers* (City of London 1994). Tender documents should stipulate a target survival rate of 70% of all tree and shrub stock at the end of two years following installation with no bare soils and representation of the seeded native herbaceous species evident. The inclusion of a diversity of native trees and shrubs in these naturalization plantings will improve diversity within the adjacent natural features.
- The complete corridor should be naturalized to include meanders and native species plantings. The naturalized channel will enhance wildlife habitat and act to filter sediment and pollutants from the surface water which ultimately flows into Dingman Creek.

9.2 Monitoring

The following are recommendations for monitoring to be conducted on site prior to, during and following construction:

- Inspection of all Tree Protection Zone and Construction Delineation Area fencing prior to commencement of grading to ensure that fence placement reflects the extent of the identified natural feature buffers, where applicable.
- Regular monitoring of tree protection fences, sediment fences and other ESC measures, particularly following large rain events, to be completed during construction.
- Inspection of planted tree and shrub stock and herbaceous vegetation to evaluate survival and success of establishment and identify need for replacement plantings for any dead material, to be completed post-construction, 2 years following the date of installation.
- Monitoring of the realigned channel for the establishment of Common Reed coinciding with monitoring of the naturalization plantings. Management activities to be recommended, should Common Reed be detected during this two-year period.

An environmental monitoring program is to be prepared and include items identified in Section 8 of the Hydrogeological Assessment (LDS 2021).

10.0 Summary

Recommendations for impact avoidance, as well as mitigation measures have been provided herein. Assuming the recommendations and mitigation measures provided in this report are followed, negative impacts to the natural environment will be avoided.

Species at Risk

- Bat acoustic surveys are required for Trees 758 and 828, prior to removal. In the event that a tree has confirmed use by a SAR bat species, permitting and compensation measures (bat box installation) will be required through the Aylmer District MECP.

Vegetation Removal and Site Grading

- Prepare a TPP to identify tree protection, removal, and compensation.
- Vegetation removal to occur outside of the breeding and nesting season for migratory birds and bats, approximately April 1 to October 31.
- A nest search allowing for clearing within 48 hours of the search may be completed should vegetation clearing need to occur within the April 1 to August 31 window where there is no bat habitat.
- Transplant significant species into complete corridor.
- Wildlife salvage and relocation into complete corridor (e.g. Terrestrial Crayfish)

Construction Activities

- A sediment and erosion control plan is to be prepared and implemented.
- Install silt fencing at construction limits to demarcate construction zone.
- Channel realignment works to be completed between June and August to avoid spring freshet and allow time for revegetation prior to winter.

Stormwater Management

- Site grading and channel realignment to maintain conveyance of flows and surface water contribution to downstream watercourse.
- Standard mitigation measures relating to erosion and sediment control implemented prior to, during, and after construction.
- Maintain water balance of the site, including the realigned channel and wetland compensation areas.

Ecological Restoration and Enhancement

- Develop a Compensation Plan to mitigate for wetland removal, tree removal, and to provide compensation for the Goldfield HDF that was removed.
- Native species plantings in the complete corridor and buffer areas, where applicable, to enhance and protect natural features adjacent to future development. Seed mixtures for restoration areas is recommended to include plant species favorable to pollinators such as Milkweeds, Goldenrods (*Solidago* spp.), and Asters (*Symphyotrichum* spp.), among others.

Monitoring

- Inspection of Tree Protection Zone and Construction Delineation Area fencing prior to site clearing and grading to ensure buffers (where applicable) have been properly delineated.
- Regular monitoring of sediment fences and other ESC measures, particularly following large rain events.
- Monitoring of native species plantings in the complete corridor and buffer areas (where applicable) at the end of two years following the planting to determine success.
- Monitor realigned channel for potential establishment of Common Reed and make recommendations for management if it is detected within two years following the installation of the tree and shrub plantings.

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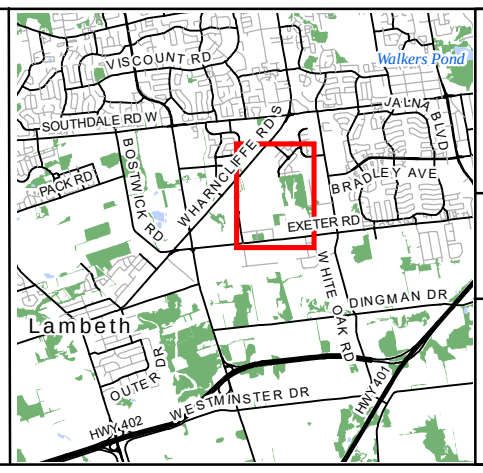
MAPS

Legend

- Subject Lands
- Surveyed Headwater Drainage Feature
- Permanent Watercourse/Drainage Feature
- Intermittent Watercourse/Drainage Feature
- Wooded Area
- Tree Protection Area (City of London Tree Protection Bylaw, Schedule D)



Map 1

Goldfield 1

Study Area

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 50 100 150 200 250 300 Meters

N

Project: 2524
Date: October 6, 2021
NAD83 - UTM Zone 17
Scale 1:5,000 (11x17")

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478400 478600 478800 479000

4753200 4753000 4752800 4752600 4752400 4752200

Reach 2
CUM
BMB-001
ANR-002
CUP
MAM2
CUM
CUM
ANR-001
CUM
Reach 1
MAM2
ANR-003
Reach 1
ANR-004
H1
CUT
CUM
BMB-002
SWT2
MAM2
CUT
Graded / Bare
CUT
EXETER ROAD

478400 478600 478800 479000

Legend

- Subject Lands
- Surveyed Headwater Drainage Feature
- Permanent Watercourse/Drainage Feature
- Intermittent Watercourse/Drainage Feature
- Reach Break
- Anuran Monitoring Station (ANR)
- Breeding Bird Monitoring Station (BMB)
- Ecological Land Classification (ELC)
  - (CUM) Cultural Meadow
  - (CUP) Plantation
  - (CUT) Cultural Thicket
  - (H1) Hedgerow
  - (SWT2) Mineral Thicket Swamp Ecosite
- ELC Inclusion
  - (CUM) Cultural Meadow
  - (MAM2) Mineral Meadow Marsh Ecosite

Map 2

Goldfield 1

Vegetation Communities and Monitoring Stations

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 50 100 150 200 Meters

N

Project: 2524
Date: September 27, 2021
NAD83 - UTM Zone 17
Scale 1:3,000 (11x17")

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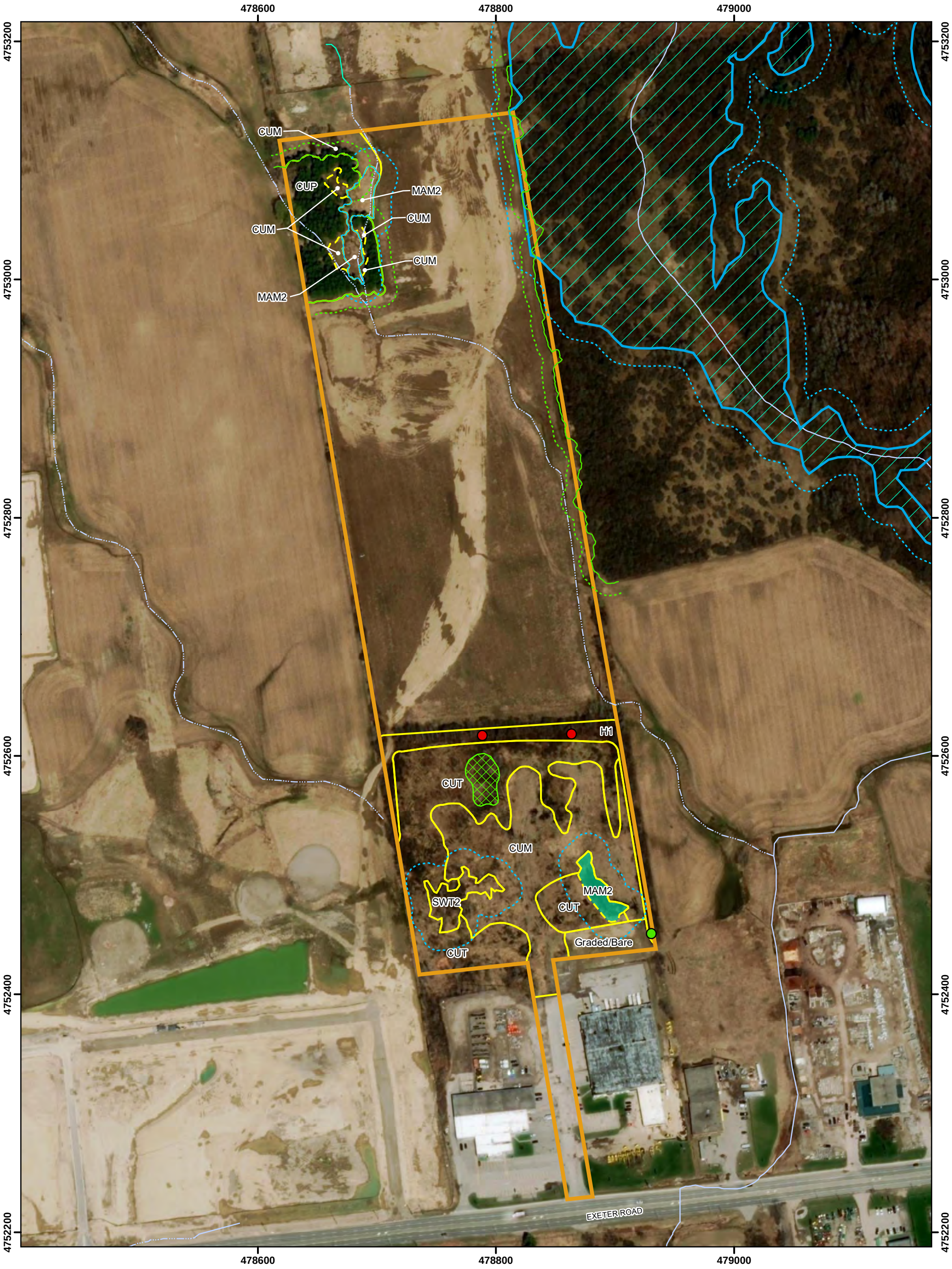

Legend

- Subject Lands
- Wetland (UTRCA)
- Surveyed Dripline
- Surveyed Wetland Boundary
- 10m Dripline Buffer
- 15m Wetland Buffer
- Surveyed Headwater Drainage Feature
- Permanent Watercourse/ Drainage Feature
- Intermittent Watercourse/ Drainage Feature
- Ecological Land Classification (ELC)
- ELC Inclusion

Constraints

Regionally Significant Species

- Rock Elm
- Carolina Rose

SAR Habitat

- Cavity Tree (Bat Habitat)

Confirmed SWH

- Terrestrial Crayfish Habitat
- Special Concern Wildlife (W. Chorus Frog)

Map 3

Goldfield 1

Opportunities and Constraints

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 50 100 150 200 Meters

N

Project: 2524
Date: October 6, 2021
NAD83 - UTM Zone 17
Scale 1:3,000 (11x17")

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Legend

- Subject Lands
- Surveyed Headwater Drainage Feature
- Permanent Watercourse/Drainage Feature
- Intermittent Watercourse/Drainage Feature
- Reach Break
- Draft Plan of Subdivision
- Adjacent Plan
- Complete Corridor
- Ecological Land Classification (ELC)
- (CUM) Cultural Meadow
- (CUP) Plantation
- (CUT) Cultural Thicket
- (H1) Hedgerow
- (SWT2) Mineral Thicket Swamp Ecosite
- ELC Inclusion
- (CUM) Cultural Meadow
- (MAM2) Mineral Meadow Marsh Ecosite

Map 4

Goldfield 1

Draft Plan of Subdivision

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 50 100 150 200 Meters

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Project: 2524
Date: October 7, 2021
NAD83 - UTM Zone 17
Scale 1:3,000 (11x17")

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Path: X:\2073_BradleyAvenueScopedEIS\NRSI_2524_Map4_DraftPlan_3K_2021_10_06_MV.mxd

APPENDIX I

Species at Risk and Species of Conservation Concern Screening

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA[4]	Background Source	Observed by NRSI	Habitat Preference[5,6]	Suitable Habitat Present	Carried Forward to EIS?	Rationale
Plants											
Castanea dentata	American Chestnut	S1S2	END	END	Schedule 1	NHIC 2020	No	Moist to well drained forests on sand, occasionally heavy soils.	Possible	Yes	Species is not present. All trees were inventoried.
Birds											
Chaetura pelagica	Chimney Swift	S4B, S4N	THR	T	Schedule 1	BSC et al. 2006	No	Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water.	No	No	Suitable habitat is not present within the subject property.
Chordeiles minor	Common Nighthawk	S4B	SC	T	Schedule 1	BSC et al. 2006	No	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs.	No	No	Suitable habitat is not present within the subject property.
Contopus virens	Eastern Wood-pewee	S4B	SC	SC		BSC et al. 2006	No	Prefers mid-age forest with clearings and edges.	No	No	Suitable habitat is not present within the subject property.
Riparia riparia	Bank Swallow	S4B	THR	T		BSC et al. 2006	No	Sand, clay or gravel river banks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits, road-cuts, grassland or cultivated fields that are close to water; nesting sites are limiting factor for species presence.	No	No	Suitable habitat is not present within the subject property.
Hirundo rustica	Barn Swallow	S4B	THR	T		BSC et al. 2006	No	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	No	No	Suitable habitat is not present within the subject property.
Hylocichla mustelina	Wood Thrush	S4B	SC	T		BSC et al. 2006	No	Carolinian and Great Lakes-St. Lawrence forest zones; undisturbed moist mature deciduous or mixed forest with deciduous sapling growth; near pond or swamp; hardwood forest edges; must have some trees higher than 12 m.	No	No	Suitable habitat is not present within the subject property.
Dolichonyx oryzivorus	Bobolink	S4B	THR	T	No Schedule	BSC et al. 2006	Yes	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha.	**Yes**	**Yes**	Cultural meadow is present within the subject property, which is in close proximity to additional meadow adjacent to the property.
Sturnella magna	Eastern Meadowlark	S4B	THR	T	No Schedule	BSC et al. 2006	Yes	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size.	**Yes**	**Yes**	Cultural meadow is present within the subject property, which is in close proximity to additional meadow adjacent to the property.
Herpetofauna											
Graptemys geographica	Northern Map Turtle	S3	SC	SC	Schedule 1	Ontario Nature 2020	No	Large bodies of water with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water.	No	No	Suitable habitat is not present within the subject property.
Pseudacris triseriata pop. 2	W. Chorus Frog *(GLSL Pop.)*	S3	NAR	T	Schedule 1	Ontario Nature 2020	Yes	Inhabits forest openings, ponds, damp meadows, swamps and ditches.	Yes	Yes	Individuals were documented from the central portion of the natural feature to the east of the subject property.
Chelydra serpentina serpentina	Common Snapping Turtle	S3	SC	SC	Schedule 1	Ontario Nature 2020	No	Permanent or semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddybanks or bottoms. The species often uses soft soil or clean dry sand on south-facing slopes for nest sites and may nest at some distance from water.	No	No	Suitable habitat is not present within the subject property.
Emydoidea blandingii	Blanding's Turtle (Great Lakes/St Lawrence population)	S3	THR	T	Schedule 1	Ontario Nature 2020	No	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; basks on logs, stumps or banks; surrounding natural habitat is important in summer as they frequently move from aquatic habitat to terrestrial habitats; hibernates in bogs; not readily observed.	No	No	Suitable habitat is not present within the subject property.

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA[4]	Background Source	Observed by NRSI	Habitat Preference[5,6]	Suitable Habitat Present	Carried Forward to EIS?	Rationale
Pantherophis gloydi (pop. 1)	Eastern Foxsnake (Georgian Bay Population)	S3	THR	E	Schedule 1	SAR Ontario	No	Individuals from the Georgian Bay population are usually found within 150 metres of the shore in rocky habitats spotted with trees and shrubs. During the winter, Eastern Foxsnakes hibernate in groups in deep cracks in the bedrock and in some man-made structures.	No	No	Suitable habitat is not present within the subject property.
Heterodon platirhinos	Eastern Hog-nosed Snake	S3	THR	T	Schedule 1	Ontario Nature 2020	No	The Eastern Hog-nosed Snake specializes in hunting and eating toads, and usually only occurs where toads can be found. Eastern Hog-nosed Snakes prefer sandy, well-drained habitats such as beaches and dry forests where they can lay their eggs and hibernate. They use their up-turned snout to dig burrows below the frost line in the sand where eggs are deposited.	No	No	Suitable habitat is not present within the subject property.
Regina septemvittata	Queensnake	S2	END	E	Schedule 1	Ontario Nature 2020	No	The Queensnake is an aquatic species that is seldom found more than a few metres from the water. It prefers rivers, streams and lakes with clear water, rocky or gravel bottoms, lots of places to hide, and an abundance of crayfish. Queensnakes will often hibernate in groups with other snakes, amphibians and even crayfish. Suitable hibernation sites (hibernacula) include abutments of old bridges and crevices in bedrock.	No	No	Suitable habitat is not present within the subject property.
Mammals											
Myotis lucifugus	Little Brown Myotis	S5	END	E	Schedule 1	Dobbyn 1994	No	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges	**Yes**	**Yes**	Two cavity trees within the hedgerow may provide suitable habitatfor SAR bat species.
Insects											
Asterocampa clyton	Tawny Emporer	S2S3				Macnaughton et al. 2020	No	Forests and hedgerows with abundant Common Hackberry (*Celtis occidentalis*).	No	No	Suitable habitat is not present within the subject property.
Asterocampa celtis	Hackberry Emporer	S2				Macnaughton et al. 2020	No	Forests and hedgerows with abundant Common Hackberry (*Celtis occidentalis*).	No	No	Suitable habitat is not present within the subject property.
Danaus plexippus	Monarch	S4	SC	SC		Macnaughton et al. 2020	Yes	Open areas with milkweed species (*Asclepias* spp.).	No	No	Monarch was observed within the subject property however suitable habitat is not present.
Erynnis brizo	Sleepy Duskywing	S1				Macnaughton et al. 2020	No	Forests and hedgerows with abundant Oak (*Quercus* spp.).	No	No	Suitable habitat is not present within the subject property.
Odonates (Dragon/Damsel Flies)											
Enallagma aspersum	Azure Bluet	S3				MNRF 2020	No	Boggy margins of ponds and swamps.	No	No	Suitable habitat is not present within the subject property.
Enallagma basidens	Double-striped Bluet	S3				MNRF 2020	No	Ponds and sheltered coves of lakes and streams.	No	No	Suitable habitat is not present within the subject property.
Lestes eurinus	Amber-winged Spreadwing	S3				MNRF 2020	No	Ponds and small lakes.	No	No	Suitable habitat is not present within the subject property.

[1]MNRF 2020a; [2]MNRF 2020b; [3]COSEWIC 2020; [4]Government of Canada 2020; [5]OMNR 2000; [6]Paulson 2011

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA[4]	Background Source	Observed by NRSI	Habitat Preference[5,6]	Suitable Habitat Present	Carried Forward to EIS?	Rationale

LEGEND
SRANK
S1 Critically Imperiled
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
SH Possibly Extirpated (Historical)
S#? Rank Uncertain
B Breeding
N Non-breeding
COSSARO/COSEWIC
NAR Not at Risk
SC Special Concern
END/E Endangered
THR/T Threatened
SARA Schedule
Schedule 1 Officially Protected under SARA
Schedule 3 Special concern; may be reassessed for

APPENDIX II

Significant Wildlife Habitat Screening

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)					
Rationale: 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] Information Sources • Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence. • Reports and other information available from Conservation Authorities (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[i] 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.	Suitable habitat not present within subject property. SWH type not present.

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)					
Rationale: 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	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	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water). Information Sources • Environment Canada • Naturalist clubs often are aware of staging/stopover areas • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (eg. EHJV implementation plan) • Ducks Unlimited projects • Element occurrence specification by Nature Serve: http://www.natureserve.org • Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area	Studies carried out and verified presence of: • Aggregations of 100[i] or more of listed species for 7 days[i], 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.	Suitable habitat not present within subject property. SWH type not present.

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					
Rationale: High quality shorebird stopover habitat is extremely rare and typically has a long history of use	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	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH. Information Sources • 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	Studies confirming: • Presence of 3 or more of listed species and > 1000[i] 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[i] Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area[cxlviii] • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #8 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

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					
Rationale: Sites used by multiple species, a high number of individuals and used annually are most significant	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl Special Concern: Short-eared Owl Bald Eagle	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class. Forest: FOD, FOM, FOC Upland: CUM, CUT, CUS, CUW Bald Eagle: Forest Community Series: FOD, FOM, FOC, SWD, SWM, or SWC, on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. Raptor wintering (hawk/owl) sites need to be > 20ha[cxlviii, cxlix] with a combination of forest and upland[xvi, xvii, xviii, xix, xx, xxi]. Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands[cxlix] Field area of the habitat is to be wind swept with limited snow depth or accumulation. Eagle sites have open water and large trees and snags aviable for roosting[cxlix] Information Sources • 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	Studies confirm the use of these habitats by: • 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[i]. • 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.	Suitable habitat not present within subject property. SWH type not present.

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					
Rationale: Bat hibernacula, are rare habitats in all Ontario landscapes.	Big Brown Bat Eastern Pipistrelle/Tri-colored Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. Active mine sites should not be considered The locations of bat hibernacula are relatively poorly known. Information Sources • OMNRF for possible locations and contact for local experts • Natural Heritage Information Centre (NHIC) Bat Hibernaculum • Ministry of Northern Development and Mines for location of mine shafts • Clubs that explore caves (eg. Sierra Club) • University Biology Departments with bat experts	• All sites with confirmed hibernating bats are SWH[í]. • The area includes 200m radius around the entrance of the hibernaculum[cxlviii, ccvii, í]. 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.	Suitable habitat not present within subject property. SWH type not present.

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					
Rationale: Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.	Big Brown Bat Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	Maternity colonies can be found in tree cavities, vegetation and often in building [sxxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario[xxii]. • Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx] with >10/ha large diameter (>25cm dbh) wildlife trees[ccvii]. • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3[ccxiv] or class 1 or 2[ccxii]. • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred[ccx]. Information Sources • OMNRF for possible locations and contact for local experts • University Biology Departments with bat experts	Maternity Colonies with confirmed use by: • >10 Big Brown Bats[í] • >5 Adult Female Silver-haired Bats[í] • The area of the habitat includes the entire woodland or the forest stand ELC Ecosite containing the maternity colonies[í]. • 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.	Suitable habitat not present within subject property. Hedgerows do not constitute SWH for bats but there are considerations for SAR bats. SWH type not present.

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					
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle	Snapping and Midland Painted Turtles: ELC Community Classes: SW, MA, OA and SA ELC Community Series: FEO and BOO Northern Map Turtle: Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	• For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen[cix, cx, cxi, cxviii]. • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH Information Sources • EIS studies carried out by Conservation Authorities • Field naturalists clubs • OMNRF Ecologist or Biologist • Natural Heritage Information Centre (NHIC)	• Presence of 5 over-wintering Midland Painted Turtles is significant[j]. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant[j]. • 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)[cvii]. Congregation of turtles is more common where wintering areas are limited and therefore significant[cix, cx, cxi, cxii]. • SWHMIST[cxlix] Index #28 provides development effects and mitigation measures for turtle wintering habitat.	Suitable habitat not present within 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: Reptile Hibernaculum					
Rationale: Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant	Snakes: Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake Special Concern: Milksnake Eastern Ribbonsnake	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. 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.	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[xliv, l, li, lii, 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. Information Sources • 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)	Studies confirming: • 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 SWH[i]. • SWHMIST[cxlix] Index #13 provides development effects and mitigation measures for snake hibernacula.	A foundation from an old residence is present at the northern edge of the conifer plantation. This plantation is somewhat isolated from other natural features and is a relatively small natural area to support large numbers of snakes. No snakes were observed on any surveys in 2018. SWH type not present.

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)					
Rationale: 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.	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation. Information Sources • 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	Studies confirming: • 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.	Suitable habitat not present within subject property. SWH type not present.

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)					
Rationale: Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• 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. Information Sources • 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	Studies confirming: • 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[cxlix] Index #5 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

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 (Ground)					
Rationale: Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1 – 6 MAS1 – 3 CUM CUT CUS	• 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. Information Sources • 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	Studies confirming: • Presence of >25 active nests for Herring Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern[i]. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant[i]. • Presence of 5 or more pairs for Brewer's Blackbird[i]. • 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[cxlix] Index #6 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

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					
Rationale: Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter	Painted Lady Red Admiral Special Concern: Monarch	Combination of ELC Community Series; need to have present one Community Series from each landclass: Field: CUM CUT CUS Forest: FOC FOD FOM CUP Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.	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]. • 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]. Information Sources • 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	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)[xliii]. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day[xxxvii], significant variation can occur between years and multiple years of sampling should occur[xl, xlii]. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD • MUD of >5000 or >3000 with the presence of Painted Ladies or White Admiral's is to be considered significant[i]. • SWHMIST[cxlix] Index #16 provides development effects and mitigation measures.	Suitable habitat not present within subject property. Property is greater than 5km from Lake Erie. SWH type not present.

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					
Rationale: Sites with a high diversity of species as well as high numbers are most significant	All migratory songbirds Canadian Wildlife Service Ontario website: http://www.on.ec.gc.ca/wildlife_e.html All migrant raptors species Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	Woodlots need to be >5 ha[i] 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 • 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]. Information Sources • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • Ontario Important Bird Areas (IBA) Program	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[i]. 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[cxlix] Index #9 provides development effects and mitigation measures.	Suitable habitat not present within subject property. Property is greater than 5km from Lake Erie. SWH type not present.

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					
Rationale: 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]	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer plantations (CUP) smaller than 50 ha may also be used.	• Woodlots >100 ha in size or if large woodlots are rare in a planning area woodlots>50ha[í]. • 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[í]. Information Sources • MNRF District Offices • LIO/NRVIS	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF[cxlviii]. • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF[í]. • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques[ccxxiv], ground or road surveys, or a pellet count deer density survey[ccxxv]. • SWHMIST[cxlix] Index #2 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

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					
Rationale: Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.	Most cliff and talus slopes occur along the Niagara Escarpment. Information Sources • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website • Field naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes[lxxviii] • SWHMIST[cxlix] Index #21 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

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					
Rationale: Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry.	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always ≤ 60%.	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%.	A sand barren area >0.5ha in size Information Sources • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location information available on their website • Field naturalist clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens[lxxviii] • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotics sp)[i]. • SWHMIST[cxlix] Index #20 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

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					
Rationale: Alvars are extremely rare habitats in Ecoregion 7E	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 **Five Alvar Indicator Species:** 1) Carex crawei 2) Panicum philadelphicum 3) Eleocharis compressa 4) Scutellaria parvula 5) Trichostema brachiatum These indicator species are very specific to Alvars within Ecoregion 7E[cxlix]	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover[lxxviii].	An Alvar site > 0.5ha in size[lxxv]. Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie[cxcix]. Information Sources • Alvars of Ontario (2000), Federation of Ontario Naturalists[lxxvi]. • 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	Field studies identify four of the five **Alvar indicator species**[lxxv] at a candidate Alvar site is Significant • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses[lxxv]. • SWHMIST[cxlix] Index #17 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

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					
Rationale: Due to historic logging practices and land clearance for agriculture, old growth forest is rare in Ecoregion 7E.	Forest Community Series: FOD FOC FOM SWD SWC SWM	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.	Woodland area is >0.5ha Information Sources • OMNRF Forest Resource Inventory mapping • OMNRF Districts • Field naturalist clubs • Conservation Authorities • Sustainable Forestry Licence (SFL) companies will possibly know locations through field operations. • Municipal forestry departments	Field Studies will determine: • If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat[cxlviii]. • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities [cxlviii] (cut stumps will not be present) • Determine ELC Vegetation Type for forest area containing the old growth characteristics[lxxviii]. • SWHMIST[cxlix] Index #23 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

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					
Rationale: Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. 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].	No minimum size to site[i] Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • OMNRF Districts • Natural Heritage Information Centre (NHIC) has location data available on their website • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Savannah indicator species listed in[bxxv] Appendix N should be present[i]. Note: Savannah plant spp. list from Ecoregion 7E should be used. • Area of the ELC Vegetation type is the SWH[bxxviii]. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMIST[cxlix] Index #18 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

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					
Rationale: Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. 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].	No minimum size to site[i]. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • Natural Heritage Information Centre (NHIC has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities	Field studies confirm one or more of the Prairie indicator species listed in[lxxv] Appendix N should be present[i]. Note: Prairie plant spp. list from Ecoregion 7E should be used. • Area of the ELC Vegetation Type is the SWH[lxxviii]. • Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics). • SWHMIST[cxlix] Index #19 provides development effects and mitigation measures.	Vegetation commuinity is not present within the subject property. SWH type not present.

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					
Rationale: Plant communities that often contain rare species which depend on the habitat for survival.	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG[cxlviii]. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M[cxlviii]. The OMNRF/NHIC will have up to date listing for rare vegetation communities. Information Sources • Natural Heritage Information Centre (NHIC) has location information available on their website • OMNRF Districts • Field naturalists clubs • Conservation Authorities	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG[cxlviii]. • Area of the ELC Vegetation Type polygon is the SWH. • SWHMIST[cxlix] Index #37 provides development effects and mitigation measures.	No other rare vegetation communities present within the subject property. SWH type not present.

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. Information Sources • 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[i], or, • Presence of 10 or more nesting pairs for listed species including Mallards[i]. • 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[cxlviii] from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWHMIST[cxlix] Index #25 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type 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					
Rationale: 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.	Osprey Special Concern: Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). Information Sources • 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	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area[cxlviii]. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 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[cvi, 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[cvi]. • 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.	Suitable habitat not present within subject property. SWH type 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: Woodland Raptor Nesting Habitat					
Rationale: Nests sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD and CUP3	All natural or conifer plantation woodland/forest stands combined >30ha or with >4ha of interior habitat[lxxxviii, lxxxix, xc, xci, xciii, xciv, xcv,xcvi, cxxxiii]. Interior habitat determined with a 200m buffer[cxlviii]. • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. Information Sources • 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	Studies confirm: • Presence of 1 or more active nests from species list is considered significant[cxlviii]. • Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha of 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.	Suitable habitat not present within subject property. SWH type 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: Turtle Nesting Area					
Rationale: These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	Midland Painted Turtle Special Concern: Northern Map Turtle Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100m)[cxlviii] or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used. Information Sources • 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	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles[i] • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH[i] • 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.	Suitable habitat not present within subject property. SWH type 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: 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[cxlx, cxx, cxxi, cxxii, cxiii, 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[í] 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.	Suitable habitat not present within subject property. SWH type 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)					
Rationale: These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	• Presence of a wetland, pond or woodland pool (including vernal pools) >500m^2 (about 25m diameter) [ccvii] within or adjacent (within 120m) to a woodland (no minimum size)[clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx]. Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat[cxlviii]. Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF Districts and wetland evaluations • Field naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/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[lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi]. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • SWHMIST[cxlix] Index #14 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type 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 (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.	• Wetlands >500m^2 (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. Information Sources • 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	Studies confirm: • Presence of breeding population of 1or 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)[lxxi, lxxiii] 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.	Suitable habitat not present within subject property. SWH type 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: Woodland Area-Sensitive Bird Breeding Habitat					
Rationale: Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds.	Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren Pileated Woodpecker Special Concern: Cerulean Warbler Canada Warbler	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs. old) forest stands or woodlots >30ha[cv, cxxi, cxxii, cxxiii, cxxiv, cxxxv, cxxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvi, clvii, clviii, clix]. • Interior forest habitat is at least 200m from forest edge habitat[clxiv]. Information Sources • Local birder clubs • Canadian Wildlife Service (CWS) for the location of forest bird monitoring • Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species. • Reports and other information available from CAs	Studies confirm: • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species[i]. • Note: any site with breeding Cerulean Warblers or Canada Warbler is to be considered SWH[i]. • Conduct field investigations in early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi] • SWHMIST[cxlix] Index #34 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type not present.

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					
Rationale: Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	American Bittern Virginia Rail Sora Common Gallinule American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Green Heron Trumpeter Swan Special Concern: Black Tern Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites	• Nesting occurs in wetlands • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present[cxxiv]. • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. Information Sources • 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]	Studies confirm: • 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[j]. • Note: any wetland with breeding of 1 or more Trumpeter Swans, Black Terns, Green Heron or Yellow Rail is SWH[j]. • 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	Suitable habitat not present within subject property. SWH type 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: Open Country Bird Breeding Habitat					
Rationale: This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow Special Concern: Short-eared Owl	CUM1 CUM2	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)[i]. Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. Information Sources • Agricultural land classification maps Ministry of Agriculture • Local birder clubs • Ontario Breeding Bird Atlas[ccv] • EIS Reports and other information available from CAs	Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species[i]. • A field with 1 or more breeding Short-eared Owls is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWHMIST[cxlix] Index #32 provides development effects and mitigation measures	Suitable habitat not present within subject property. SWH type 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: Shrub/Early Successional Bird Breeding Habitat					
Rationale: This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records.	Indicator Spp: Brown Thrasher Clay-coloured Sparrow Common Spp. Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher Special Concern: Yellow-breasted Chat Golden-winged Warbler	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat such as woodland area for some bird species.	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)[i]. Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species[clxxiii]. Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Information Sources • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs • Ontario Breeding Bird Atlas[ccv] • Reports and other information available from CAs	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species[i]. • A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat[i]. • 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.	Suitable habitat not present within subject property. SWH type 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: Terrestrial Crayfish					
Rationale: Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare. [Ccii]	Chimney or Digger Crayfish (*Fallicambarus fodiens*) Devil Crawfish or Meadow Crayfish (*Cambarus Diogenes*)	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. Information Sources • 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[cxlix] Index #36 provides development effects and mitigation measures.	Suitable habitat not present within subject property. SWH type 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					
Rationale: These species are quite rare or have experienced significant population declines in Ontario	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre (NHIC).	All plant and animal element occurrences (EO) within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites[lxxviii]. Information Sources • Natural Heritage Information Centre (NHIC) will have 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.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat neess 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.	Monarch (*Danaus plexippus*) was observed but suitable meadow or marsh habitat with abundant nectar sources is not present. Western Chorus Frog (*Pseudacris triseriata*) was documented calling from the wetland on the property to the east. **SWH type confirmed.**

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					
Rationale: 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[clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, 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[í]. Information Sources • 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 waterwaycxlix or be up to 200m widecxlix 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.	Suitable habitat not present within subject property. SWH type not present.

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					
Rationale: 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[clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, 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[i]. Information Sources • 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 waterwaycxlix or be up to 200m widecxlix 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.	Suitable habitat not present within subject property. SWH type not present.

APPENDIX III
Scoping Checklist

Appendix A

Environmental Impact Study
ISSUES SUMMARY CHECKLIST REPORT

Application Title:

Date Submitted:

Proponent:

Qualifications

Primary Consultant:

Key contact person:

Other consultant / field personnel:

- Hydrogeology / Hydrology:
- Biological – Flora:
- Biological – Fauna:
- Other:

Context for Background Information

Subwatershed:

Tributary Fact Sheet Number:

Planning / Policy Area:

Technical Advisory Review Team

- Ecologist Planner:
- Planner for File:
- EEPAC:
- Conservation Authority:
- 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.).

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

Soils (surface and subsurface)

Glacial geomorphology - landform type

Subwatershed

Topographic features

Ground water discharge

Shallow ground water/baseflow

Ground water discharge/aquifer

Aggregate resources

1.2.2 Hydrology

Hydrological catchment boundary and of wetlands + determine the catchment areas of all wetlands

Surface drainage pattern

Watercourses (Permanent, Intermittent)

Stream order (Headwater, 1st, 2nd, 3rd or higher)

Agricultural Drains

Downstream receiving watercourse

Hazard Line (Map 6)

1.2.3 Natural Hazards

100 year Erosion Line

Floodline mapping

Max line mapping – UTRCA mapping + text based regulated areas

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 Sites

Rare Vegetation Communities

1.2.5 Flora

Flora (Inventory dates, Source)

Rare Flora (National, Provincial, Regional)

1.2.6 Fauna

Fauna (Inventory dates; sources)

Breeding Birds

Migratory Birds

Amphibians

Reptiles

Mammals

Butterflies

Odonata

Other

Partners In Flight (PIF)

Rare Fauna

1.2.7 Wildlife Habitat + as per MNRF 2015 Criteria, as amended from time to time, and all applicable Official Plan policies and In-force London Plan policies

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 Resource 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 'S'. They also address the protection of environmental quality and ecological function with respect to water quality, fish habitat, groundwater recharge, headwaters and aquifers.

A component of a Subject Lands Status Report that is required to be included in the EIS is the evaluation of significance of all potential natural heritage features and areas recognized by In-force London Plan policies and/ or Official Plan policies.

A component of a Subject Lands Status Report that is required to be included in the EIS is the confirmation and mapping of boundaries of all natural heritage features and areas.

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 / Special Concern

2.5 Woodlands and Vegetation Patches

Significant Woodlands

Unevaluated Vegetation Patches and/ or other 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

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

4.0 ADDITIONAL COMPONENTS AND NOTES

- EIS to show and demonstrate conformity with the Provincial Policy Statement (2020), in-force London Plan (as of Nov. 2019) policies, and current Official Plan policies (1989), Environmental Management Guidelines (2006).

APPENDIX IV

Vascular Flora Reported from the Study Area

Vascular Plant Species Reported From the Study Area

Scientific Name	Common Name	CC	CW	Weed	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Middlesex County[5]	NHIC Data[1]	NRSI Observed
Pteridophytes	**Ferns & Allies**										
Equisetaceae	**Horsetail Family**										
Equisetum arvense	Field Horsetail	0	0		S5				C		X
Gymnosperms	**Conifers**										
Pinaceae	**Pine Family**										
Picea glauca	White Spruce	6	3		S5				I		X
Picea pungens	Colorado Spruce			NA	SE1				I		X
Dicotyledons	**Dicots**										
Aceraceae	**Maple Family**										
Acer negundo	Manitoba Maple	0	-2		S5				C		X
Acer platanoides	Norway Maple		5	-3	SE5				IU		X
Acer saccharum ssp. *nigrum*	Black Maple	7	3		S4?				C		X
Anacardiaceae	**Sumac or Cashew Family**										
Toxicodendron radicans ssp. *negundo*	Poison-ivy	5	-1		S5				X		X
Toxicodendron rydbergii	Poison-ivy	0	0		S5				X		X
Apiaceae	**Carrot or Parsley Family**										
Daucus carota	Wild Carrot		5	-2	SE5				IC		X
Apocynaceae	**Dogbane Family**										
Apocynum cannabinum var. *cannabinum*	Indian Hemp		1		S5				C		X
Asclepiadaceae	**Milkweed Family**										
Asclepias syriaca	Common Milkweed	0	5		S5				C		X
Asteraceae	**Composite or Aster Family**										
Achillea millefolium ssp. *millefolium*	Common Yarrow		3	-1	SE?						X
Cirsium arvense	Canada Thistle		3	-1	SE5				IC		X
Cirsium vulgare	Bull Thistle		4	-1	SE5				I		X
Erigeron annuus	Daisy Fleabane	0	1		S5						X
Euthamia graminifolia	Flat-topped Bushy Goldenrod	2	-2		S5				C		X
Leucanthemum vulgare	Ox-eye Daisy		5	-1	SE5						X
Solidago canadensis	Canada Goldenrod	1	3		S5				X		X
Symphyotrichum novae-angliae	New England Aster	2	-3		S5				C		X
Balsaminaceae	**Touch-me-not Family**										
Impatiens capensis	Spotted Touch-me-not	4	-3		S5				C		X
Berberidaceae	**Barberry Family**										
Podophyllum peltatum	May-apple	5	3		S5				X		X

Scientific Name	Common Name	CC	CW	Weed	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Middlesex County[5]	NHIC Data[1]	NRSI Observed
Betulaceae	**Birch Family**										
Carpinus caroliniana ssp. *virginiana*	Blue Beech	6	0		S5				C		X
Corylus americana	American Hazel	5	4		S5				C		X
Ostrya virginiana	Hop Hornbeam	4	4		S5				C		X
Brassicaceae	**Mustard Family**										
Alliaria petiolata	Garlic Mustard		0	-3	SE5				IC		X
Hesperis matronalis	Dame's Rocket		5	-3	SE5				I		X
Caprifoliaceae	**Honeysuckle Family**										
Lonicera X *bella*	Bell's Honeysuckle		5	-3	SE2						X
Cornaceae	**Dogwood Family**										
Cornus foemina ssp. *racemosa*	Red Panicled Dogwood	2	-2		S5				X		X
Dipsacaceae	**Teasel Family**										
Dipsacus fullonum ssp. *sylvestris*	Wild Teasel		5	-1	SE5				IC		X
Fabaceae	**Pea Family**										
Medicago sativa ssp. *sativa*	Alfalfa		5	-1	SE5				IC		X
Robinia pseudo-acacia	Black Locust		4	-3	SE5				IC		X
Trifolium pratense	Red Clover		2	-2	SE5				I		X
Vicia cracca	Tufted Vetch		5	-1	SE5				I		X
Fagaceae	**Beech Family**										
Quercus macrocarpa	Bur Oak	5	1		S5				C		X
Castanea dentata	American Chestnut	8	5		S1S2	END	END	Schedule 1	R	X	
Juglandaceae	**Walnut Family**										
Carya cordiformis	Bitternut Hickory	6	0		S5				X		X
Juglans nigra	Black Walnut	5	3		S4				X		X
Lamiaceae	**Mint Family**										
Nepeta cataria	Catnip		1	-2	SE5				IC		X
Oleaceae	**Olive Family**										
Fraxinus americana	White Ash	4	3		S5				C		X
Ligustrum vulgare	Common Privet		1	-2	SE5				I		X
Ranunculaceae	**Buttercup Family**										
Ranunculus acris	Tall Buttercup		-2	-2	SE5				IC		X

Scientific Name	Common Name	CC	CW	Weed	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Middlesex County[5]	NHIC Data[1]	NRSI Observed
Rhamnaceae	**Buckthorn Family**										
Rhamnus cathartica	European Buckthorn		3	-3	SE5				IC		X
Frangula alnus	Glossy Buckthorn		-1	-3	SE5				IU		X
Rosaceae	**Rose Family**										
Crataegus species	Hawthorn species										X
Geum canadense	White Avens	3	0		S5				X		X
Malus domestica	Apple										X
Prunus avium	Cherry Plum		5	-2	SE4				IR		X
Rosa rubiginosa	Sweetbrier Rose		5	-1	SE4				I		X
Rubus allegheniensis	Alleghany Blackberry	2	2		S5				C		X
Rubus idaeus ssp. *idaeus*	Red Raspberry				SE1						X
Rubiaceae	**Madder Family**										
Galium mollugo	White Bedstraw		5	-2	SE5				I		X
Rutaceae	**Rue Family**										
Zanthoxylum americanum	American Prickly-ash	3	5		S5				C		X
Salicaceae	**Willow Family**										
Populus deltoides ssp. *deltoides*	Eastern Cottonwood	4	-1		S5				X		X
Populus tremuloides	Trembling Aspen	2	0		S5				X		X
Salix alba var. *vitellina*	Weeping Willow				SU						X
Salix matsudana	Corkscrew Willow										X
Salix petiolaris	Slender Willow	3	-4		S5				X		X
Scrophulariaceae	**Figwort Family**										
Verbascum thapsus	Common Mullein		5	-2	SE5				IC		X
Tiliaceae	**Linden Family**										
Tilia americana	American Basswood	4	3		S5				C		X
Ulmaceae	**Elm Family**										
Ulmus americana	White Elm	3	-2		S5				X		X
Vitaceae	**Grape Family**										
Parthenocissus vitacea	Woodbine	3	3		S5				X		X
Vitis riparia	Riverbank Grape	0	-2		S5				C		X
Monocotyledons	**Monocots**										
Alismataceae	**Water-plantain Family**										
Alisma plantago-aquatica	Common Water-plantain	3	-5		S5				C		X

Scientific Name	Common Name	CC	CW	Weed	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Middlesex County[5]	NHIC Data[1]	NRSI Observed
Araceae	**Arum Family**										
Arisaema triphyllum	Jack-in-the-pulpit	5	-2		S5				C		X
Cyperaceae	**Sedge Family**										
Carex gracillima	Graceful Sedge	4	3		S5				C		X
Carex spicata	Spiked Sedge		5	-1	SE5				IC		X
Carex vulpinoidea	Fox Sedge	3	-5		S5				C		X
Schoenoplectus tabernaemontani	American Great Bulrush	5	-5		S5				C		X
Scirpus pendulus	Lined Bulrush	3	-5		S5				C		X
Juncaceae	**Rush Family**										
Juncus effusus var. *solutus*	Soft Rush	4	-5		S5				X		X
Juncus tenuis	Path Rush	0	0		S5				X		X
Liliaceae	**Lily Family**										
Convallaria majalis	Lily-of-the-valley		5	-2	SE5				IR		X
Hemerocallis fulva	Orange Day-lily		5	-3	SE5				I		X
Poaceae	**Grass Family**										
Bromus inermis ssp. *inermis*	Awnless Brome		5	-3	SE5				IC		X
Dactylis glomerata	Orchard Grass		3	-1	SE5				IC		X
Festuca arundinacea	Tall Fescue		2	-1	SE5				IC		X
Festuca rubra ssp. *rubra*	Red Fescue		1	-1	S5				I		X
Phalaris arundinacea	Reed Canary Grass	0	-4		S5				X		X
Phleum pratense	Timothy		3	-1	SE5				IC		X
Phragmites australis	Common Reed	0	-4		S5				X		X
Poa pratensis ssp. *pratensis*	Kentucky Bluegrass	0	1		S5				C		X
Typhaceae	**Cattail Family**										
Typha latifolia	Broad-leaved Cattail	3	-5		S5				X		X
									Total	**0**	**81**

[1]MNRF 2018a; [2]MNRF 2018b; [3]COSEWIC 2018; [4]Government of Canada 2018; [5]Oldham 1993

APPENDIX V

Bird Species Reported from the Study Area

Bird Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	OBBA[5] 17MH75	NHIC Data[1]	NRSI Observed
Anatidae	**Ducks, Geese & Swans**							
Branta canadensis	Canada Goose	S5				CO		X
Aix sponsa	Wood Duck	S5				CO		
Anas platyrhynchos	Mallard	S5				CO		X
Lophodytes cucullatus	Hooded Merganser	S5B, S5N				CO		
Phasianidae	**Partridges, Grouse & Turkeys**							
Bonasa umbellus	Ruffed Grouse	S4				PO		
Meleagris gallopavo	Wild Turkey	S5				CO		PR
Columbidae	**Pigeons & Doves**							
Columba livia	Rock Pigeon	SNA				CO		
Zenaida macroura	Mourning Dove	S5				CO		PO
Cuculiformes	**Cuckoos & Anis**							
Coccyzus americanus	Yellow-billed Cuckoo	S4B				PO		
Coccyzus erythropthalmus	Black-billed Cuckoo	S5B				PO		
Caprimulgidae	**Goatsuckers**							
Chordeiles minor	Common Nighthawk	S4B	SC	SC	Schedule 1	PR		
Apodidae	**Swifts**							
Chaetura pelagica	Chimney Swift	S4B, S4N	THR	T	Schedule 1	CO		
Trochilidae	**Hummingbirds**							
Archilochus colubris	Ruby-throated Hummingbird	S5B				PR		
Rallidae	**Railes, Gallinules & Coots**							
Rallus limicola	Virginia Rail	S5B				PR		
Porzana carolina	Sora	S4B				PR		
Charadriidae	**Plovers**							
Charadrius vociferus	Killdeer	S5B, S5N				CO		PO
Scolopacidae	**Waders**							
Scolopax minor	American Woodcock	S4B				PO		
Actitis macularia	Spotted Sandpiper	S5				PR		

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	OBBA[5] 17MH75	NHIC Data[1]	NRSI Observed
Ardeidae	**Herons & Bitterns**							
Ardea herodias	Great Blue Heron	S4B				PO		
Butorides virescens	Green Heron	S4B				CO		
Cathartidae	**Vultures**							
Cathartes aura	Turkey Vulture	S5B				CO		X
Accipitridae	**Hawks, Kites, Eagles & Allies**							
Accipiter striatus	Sharp-shinned Hawk	S5	NAR			CO		
Accipiter cooperii	Cooper's Hawk	S4	NAR	NAR		CO		X
Buteo jamaicensis	Red-tailed Hawk	S5	NAR	NAR		CO		
Strigidae	**Typical Owls**							
Megascops asio	Eastern Screech-Owl	S4	NAR	NAR		CO		
Bubo virgianus	Great Horned Owl	S4				CO		X
Alcedinidae	**Kingfishers**							
Megaceryle alcyon	Belted Kingfisher	S4B				PR		
Picidae	**Woodpeckers**							
Melanerpes carolinus	Red-bellied Woodpecker	S4				CO		
Sphyrapicus varius	Yellow-bellied Sapsucker	S5B				PR		
Picoides pubescens	Downy Woodpecker	S5				CO		
Picoides villosus	Hairy Woodpecker	S5				CO		
Colaptes auratus	Northern Flicker	S4B				CO		
Falconidae	**Caracaras & Falcons**							
Falco sparverius	American Kestrel	S4				PR		
Tyrannidae	**Tyrant Flycatchers**							
Contopus virens	Eastern Wood-Pewee	S4B	SC	SC		PO		
Empidonax traillii	Willow Flycatcher	S5B				PO		PO
Empidonax minimus	Least Flycatcher	S4B				PO		
Sayornis phoebe	Eastern Phoebe	S5B				CO		
Myiarchus crinitus	Great Crested Flycatcher	S4B				CO		
Tyrannus tyrannus	Eastern Kingbird	S4B				CO		
Vireonidae	**Vireos**							
Vireo gilvis	Warbling Vireo	S5B				CO		X
Vireo olivaceus	Red-eyed Vireo	S5B				CO		

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	OBBA[5] 17MH75	NHIC Data[1]	NRSI Observed
Corvidae	**Crows & Jays**							
Cyanocitta cristata	Blue Jay	S5				CO		PR
Corvus brachyrhynchos	American Crow	S5B				CO		PO
Alaudidae	**Larks**							
Eremophila alpestris	Horned Lark	S5B				PR		PO
Hirundinidae	**Swallows**							
Progne subis	Purple Martin	S4B				PO		
Tachycineta bicolor	Tree Swallow	S4B				CO		
Stelgidopteryx serripennis	Northern Rough-winged Swallow	S4B				CO		
Riparia riparia	Bank Swallow	S4B	THR	T		CO		
Petrochelidon pyrrhonota	Cliff Swallow	S4B				CO		
Hirundo rustica	Barn Swallow	S4B	THR	T		CO		
Paridae	**Chickadees & Titmice**							
Poecile atricapillus	Black-capped Chickadee	S5				CO		
Sittidae	**Nuthatches**							
Sitta canadensis	Red-breasted Nuthatch	S5				CO		
Sitta carolinensis	White-breasted Nuthatch	S5				CO		
Troglodytidae	**Wrens**							
Troglodytes aedon	House Wren	S5B				CO		PO
Thryothorus ludovicianus	Carolina Wren	S4				CO		
Polioptilidae	**Gnatcatchers**							
Polioptila caerulea	Blue-gray Gnatcatcher	S4B				CO		
Turdidae	**Thrushes**							
Sialia sialis	Eastern Bluebird	S5B	NAR	NAR		CO		
Catharus fuscescens	Veery	S4B				PO		
Hylocichla mustelina	Wood Thrush	S4B	SC	T		PR		
Turdus migratorius	American Robin	S5B				CO		PO
Mimidae	**Mockingbirds, Thrashers & Allies**							
Dumetella carolinensis	Gray Catbird	S4B				CO		X
Toxostoma rufum	Brown Thrasher	S4B				CO		
Sturnidae	**Starlings**							
Sturnus vulgaris	European Starling	SNA				CO		X

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	OBBA[5] 17MH75	NHIC Data[1]	NRSI Observed
Bombycillidae	**Waxwings**							
Bombycilla cedrorum	Cedar Waxwing	S5B				CO		PO
Passeridae	**Old World Sparrows**							
Passer domesticus	House Sparrow	SNA				CO		X
Fringillidae	**Finches & Allies**							
Carpodacus mexicanus	House Finch	SNA				CO		
Spinus tristis	American Goldfinch	S5B				CO		PR
Parulidae	**Wood Warblers**							
Vermivora cyanoptera	Blue-winged Warbler	S4B				PR		
Geothylpis trichas	Common Yellowthroat	S5B				CO		
Setophaga ruticilla	American Redstart	S5B				PO		
Setophaga petechia	Yellow Warbler	S5B				CO		PO
Setophaga pensylvanica	Chestnut-sided Warbler	S5B				PO		
Setophaga pinus	Pine Warbler	S5B				PR		
Emberizidae	**New World Sparrows & Allies**							
Pipilo erythrophthalmus	Eastern Towhee	S4B				PR		
Spizella passerina	Chipping Sparrow	S5B				CO		
fringillidae	Field Sparrow	S4B				PR		PO
Pooecetes gramineus	Vesper Sparrow	S4B				PR		
Passerculus sandwichensis	Savannah Sparrow	S4B				CO		PO
Melospiza melodia	Song Sparrow	S5B				CO		PR
Melospiza georgiana	Swamp Sparrow	S5B				PO		
Cardinalidae	**Cardinals, Grosbeaks & Allies**							
Piranga olivacea	Scarlet Tanager	S4B				PO		
Cardinalis cardinalis	Northern Cardinal	S5				CO		PO
Pheucticus ludovicianus	Rose-breasted Grosbeak	S4B				CO		
Passerina cyanea	Indigo Bunting	S4B				CO		
Icteridae	**Blackbirds**							
Dolichonyx oryzivorus	Bobolink	S4B	THR	T	No Schedule	PR		PR
Agelaius phoeniceus	Red-winged Blackbird	S4				CO		PR
Sturnella magna	Eastern Meadowlark	S4B	THR	T	No Schedule	CO		
Quiscalus quiscula	Common Grackle	S5B				CO		PO
Molothrus ater	Brown-headed Cowbird	S4B				CO		PO
Icterus spurius	Orchard Oriole	S4B				CO		
Icterus galbula	Baltimore Oriole	S4B				CO		X
					Total	**91**	**0**	**30**

[1]MNRF 2018a; [2]MNRF 2018b; [3]COSEWIC 2018; [4]Government of Canada 2018; [5]BSC et al. 2006

APPENDIX VI

Herpetofauna Species Reported from the Study Area

Reptile and Amphibian Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	ORAA[5]	NHIC Data[1]	NRSI Observed
Turtles								
Chelydra serpentina serpentina	Snapping Turtle	S3	SC	SC	Schedule 1	X		
Chrysemys picta marginata	Midland Painted Turtle	S5		SC		X		
Emydoidea blandingii	Blanding's Turtle (GLSL Pop.)	S3	THR	T	Schedule 1	X		
Graptemys geographica	Northern Map Turtle	S3	SC	SC	Schedule 1	X		
Trachemys scripta elegans	Red-eared Slider	SNA				X		
Snakes								
Heterodon platirhinos	Eastern Hog-nosed Snake	S3	THR	T	Schedule 1	X		
Lampropeltis triangulum	Eastern Milksnake	S4	NAR	SC	Schedule 1	X		
Opheodrys vernalis	Smooth Greensnake	S4				X		
Nerodia sipedon sipedon	Northern Watersnake	S5	NAR	NAR		X		
Regina septemvittata	Queensnake	S2	END	E	Schedule 1	X		
Storeria dekayi dekayi	Northern Brownsnake (Dekay's Brownsnake)	S5	NAR	NAR		X		
Thamnophis sirtalis sirtalis	Eastern Gartersnake	S5				X		
Pantherophis gloydi (pop. 1)	Eastern Foxsnake (Georgian Bay Population)	S3	THR	E	Schedule 1	X		
Salamanders								
Ambystoma maculatum	Spotted Salamander	S4				X		
Hemidactylium scutatum	Four-toed Salamander	S4	NAR	NAR		X		
Notophthalmus viridescens viridescens	Red-spotted Newt					X		
Plethodon cinereus	Eastern Red-backed Salamander	S5				X		
Toads and Frogs								
Anaxyrus americanus	American Toad	S5				X		
Hyla versicolor	Tetraploid Gray Treefrog	S5				X		
Pseudacris triseriata pop. 2	W. Chorus Frog *(GLSL Pop.)*	S3	NAR	T	Schedule 1	X		X
Pseudacris crucifer	Spring Peeper	S5				X		
Lithobates catesbeiana	American Bullfrog	S4				X		
Lithobates clamitans melanota	Northern Green Frog	S5				X		
Lithobates palustris	Pickerel Frog	S4	NAR	NAR		X		
Lithobates pipiens	Northern Leopard Frog	S5	NAR	NAR		X		
Lithobates sylvaticus	Wood Frog	S5				X		
					Total	**26**	**0**	**1**

[1]MNRF 2018a; [2]MNRF 2018b; [3]COSEWIC 2018; [4]Government of Canada 2018; [5]Ontario Nature 2018

Legend
SRANK
S1 Critically Imperiled
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
S5 Secure
SNA Unranked
S#? Rank Uncertain
SARO/COSEWIC
END/E Endangered
THR/T Threatened
SC/SC Special Concern
NAR Not at Risk
SARA Schedule
Schedule 1 Officially Protected under SARA

APPENDIX VII

Mammal Species Reported from the Study Area

Mammal Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Ontario Mammal Atlas[5]	NHIC Data[1]	NRSI Observed
Didelphimorphia	**Opossums**							
Didelphis virginiana	Virginia Opossum	S4				X		
Insectivora	**Shrews and Moles**							
Blarina brevicauda	Northern Short-tailed Shrew	S5				X		
Condylura cristata	Star-nosed Mole	S5				X		
Parascalops breweri	Hairy-tailed Mole	S4				X		
Sorex cinereus	Masked Shrew	S5				X		
Sorex fumeus	Smoky Shrew	S5				X		
Chiroptera	**Bats**							
Eptesicus fuscus	Big Brown Bat	S4				X		
Lasionycteris noctivagans	Silver-haired Bat	S4				X		
Lasiurus borealis	Eastern Red Bat	S4				X		
Lasiurus cinereus	Hoary Bat	S4				X		
Myotis lucifugus	Little Brown Myotis	S4	END	E	Schedule 1	X		
Lagomorpha	**Rabbits and Hares**							
Lepus europaeus	European Hare	SNA				X		
Sylvilagus floridanus	Eastern Cottontail	S5				X		X
Rodentia	**Rodents**							
Castor canadensis	Beaver	S5				X		
Marmota monax	Woodchuck	S5				X		
Microtus pennsylvanicus	Meadow Vole	S5				X		
Mus musculus	House Mouse	SNA				X		
Ondatra zibethicus	Muskrat	S5				X		
Peromyscus leucopus	White-footed Mouse	S5				X		
Peromyscus maniculatus	Deer Mouse	S5				X		
Rattus norvegicus	Norway Rat	SNA				X		
Sciurus carolinensis	Eastern Gray Squirrel	S5				X		X
Tamiasciurus hudsonicus	Red Squirrel	S5				X		
Tamias striatus	Eastern Chipmunk	S5				X		
Zapus hudsonius	Meadow Jumping Mouse	S5				X		
Carnivora	**Carnivores**							
Canis latrans	Coyote	S5				X		X
Mephitis mephitis	Striped Skunk	S5				X		
Mustela frenata	Long-tailed Weasel	S4				X		
Mustela vison	American Mink	S4				X		
Procyon lotor	Northern Raccoon	S5				X		X
Vulpes vulpes	Red Fox	S5				X		

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Ontario Mammal Atlas[5]	NHIC Data[1]	NRSI Observed
Artiodactyla	**Deer and Bison**							
Odocoileus virginianus	White-tailed Deer	S5				X		X
					Total	**32**	**0**	**5**

[1]MNRF 2018a; [2]MNRF 2018b; [3]COSEWIC 2018; [4]Government of Canada 2018; [5]Dobbyn 1994

Legend
SRANK
S1 Critically Imperiled
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
S5 Secure
SNA
SARO/COSEWIC
END/E Endangered
SARA Schedule
Schedule 1 Officially Protected under SARA

APPENDIX VIII

Butterfly Species Reported from the Study Area

Butterfly Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	TEA Atlas[5] (17MH75)	NRSI Observed
Hesperiidae	**Skippers**						
Anatrytone logan	Delaware Skipper	S4				X	
Ancyloxypha numitor	Least Skipper	S5				X	
Erynnis brizo	Sleepy Duskywing	S1				X	
Erynnis juvenalis	Juvenal's Duskywing	S5				X	
Erynnis species	Duskywing species						X
Erynnis baptisiae	Wild Indigo Duskywing	S4				X	
Erynnis icelus	Dreamy Duskywing	S5				X	
Euphyes vestris	Dun Skipper	S5				X	
Polites mystic	Long Dash Skipper	S5				X	
Polites peckius	Peck's Skipper	S5				X	
Polites themistocles	Tawny-edged Skipper	S5				X	
Thymelicus lineola	European Skipper	SNA				X	
Wallengrenia egeremet	Northern Broken Dash	S5				X	
Pompeius verna	Little Glassywing	S4				X	
Poanes hobomok	Hobomok Skipper	S5				X	
Epargyreus clarus	Silver-spotted Skipper	S4				X	
Papilionidae	**Swallowtails**						
Papilio cresphontes	Giant Swallowtail (Eastern Giant Swallowtail)	S4				X	
Papilio glaucus	Eastern Tiger Swallowtail	S5				X	
Papilio troilus	Spicebush Swallowtail	S4				X	
Papilio polyxenes	Black Swallowtail	S5				X	
Pieridae	**Whites and Sulphurs**						
Colias philodice	Clouded Sulphur	S5				X	X
Pieris oleracea	Mustard White	S4				X	
Pieris rapae	Cabbage White	SNA				X	X
Colias eurytheme	Orange Sulphur	S5				X	
Lycaenidae	**Harvesters, Coppers, Hairstreaks, Blues**						
Callophrys augustinus	Brown Elfin	S5				X	
Cupido comyntas	Eastern Tailed Blue	S5				X	
Lycaena epixanthe	Bog Copper	S4S5				X	
Lycaena phlaeas	American Copper	S5				X	
Satyrium calanus	Banded Hairstreak	S4				X	
Strymon melinus	Gray Hairstreak	S4				X	
Celastrina sp.	Azure Species	SNA				X	
Celastrina neglecta	Summer Azure	S5				X	

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	TEA Atlas[5] (17MH75)	NRSI Observed
Nymphalidae	**Brush-footed Butterflies**						
Aglais milberti	Milbert's Tortoiseshell	S5				X	
Asterocampa celtis	Hackberry Emperor	S2				X	
Asterocampa clyton	Tawny Emperor	S2S3				X	
Boloria bellona	Meadow Fritillary	S5				X	
Boloria selene	Silver-bordered Fritillary	S5				X	
Cercyonis pegala	Common Wood-Nymph	S5				X	
Chlosyne nycteis	Silvery Checkerspot	S5				X	
Coenonympha tullia	Common Ringlet	S5				X	
Danaus plexippus	Monarch	S2N, S4B	SC	END	Schedule 1	X	X
Euphydryas phaeton	Baltimore Checkerspot	S4				X	
Junonia coenia	Common Buckeye	SNA				X	
Lethe anthedon	Northern Pearly-Eye	S5				X	
Lethe eurydice	Eyed Brown / Northern Eyed Brown	S5				X	
Libytheana carinenta	American Snout	SNA				X	
Limenitis archippus	Viceroy	S5				X	
Limenitis arthemis astyanax	Red-spotted Purple	S5				X	
Megisto cymela	Little Wood-Satyr	S5				X	
Nymphalis antiopa	Mourning Cloak	S5				X	
Phyciodes cocyta	Northern Crescent	S5				X	X
Phyciodes tharos	Pearl Crescent	S4				X	
Polygonia comma	Eastern Comma	S5				X	
Polygonia comma	Eastern Comma/Hop Merchant	S5				X	
Polygonia interrogationis	Question Mark	S5				X	
Speyeria cybele	Great Spangled Fritillary	S5				X	
Vanessa atalanta	Red Admiral	S5				X	
Vanessa cardui	Painted Lady	S5				X	
Vanessa virginiensis	American Lady	S5				X	
Lethe appalachia	Appalachian Brown	S4				X	
Polygonia progne	Gray Comma	S5				X	
					Total	**60**	**5**

[1]MNRF 2018a; [2]MNRF2018b; [3]COSEWIC 2018; [4]Government of Canada 2018; [5]Macnaughton et al. 2018

LEGEND
SRANK
S1 Critically Imperiled
S2 Imperiled
S3 Vulnerable
S4 Apparently Secure
S5 Secure
SNA Unranked
COSSARO/COSEWIC
SC Special Concern

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	TEA Atlas[5] (17MH75)	NRSI Observed
SARA Schedule							
Schedule 1 Officially protected under SARA							

APPENDIX IX

Odonata Species Reported from the Study Area

Dragonfly and Damselfly Species Reported From the Study Area

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Odonata Atlas[5]	NRSI Observed
Calopterygidae	**Broadwinged Damselflies**						
Calopteryx maculata	Ebony Jewelwing	S5				X	
Hetaerina americana	American Rubyspot	S4				X	
Lestidae	**Spreadwings**						
Lestes congener	Spotted Spreadwing	S5				X	
Lestes dryas	Emerald Spreadwing	S5				X	
Lestes eurinus	Amber-winged Spreadwing	S3				X	
Lestes rectangularis	Slender Spreadwing	S5				X	
Lestes unguiculatus	Lyre-tipped Spreadwing	S5				X	
Coenagrionidae	**Narrow-winged Damselflies**						
Argia apicalis	Blue-fronted Dancer	S4				X	
Argia tibialis	Blue-tipped Dancer	S3				X	
Enallagma antennatum	Rainbow Bluet	S4				X	
Enallagma aspersum	Azure Bluet	S3				X	
Enallagma basidens	Double-striped Bluet	S3				X	
Enallagma boreale	Boreal Bluet	S5				X	
Enallagma ebrium	Marsh Bluet	S5				X	
Enallagma exsulans	Stream Bluet	S5				X	
Enallagma hageni	Hagen's Bluet	S5				X	
Ischnura posita	Fragile Forktail	S4				X	
Ischnura verticalis	Eastern Forktail	S5				X	
Nehalennia irene	Sedge Sprite	S5				X	
Aeshnidae	**Darners**						
Aeshna constricta	Lance-tipped Darner	S5				X	
Aeshna umbrosa	Shadow Darner	S5				X	
Anax junius	Common Green Darner	S5				X	X
Cordulegasteridae	**Spiketails**						
Cordulegaster diastatops	Delta-spotted Spiketail	S4				X	
Corduliidae	**Emeralds**						
Epitheca cynosura	Common Baskettail	S5				X	

Scientific Name	Common Name	SRank[1]	SARO[2]	COSEWIC[3]	SARA Schedule[4]	Odonata Atlas[5]	NRSI Observed
Libellulidae	**Skimmers**						
Celithemis elisa	Calico Pennant	S5				X	
Erythemis simplicicollis	Eastern Pondhawk	S5				X	
Leucorrhinia intacta	Dot-tailed Whiteface	S5				X	
Libellula pulchella	Twelve-spotted Skimmer	S5				X	
Libellula semifasciata	Painted Skimmer	S2				X	
Pachydiplax longipennis	Blue Dasher	S5				X	
Plathemis lydia	Common Whitetail	S5				X	
Sympetrum obtrusum	White-faced Meadowhawk	S5				X	
Sympetrum rubicundulum	Ruby Meadowhawk	S5				X	
Sympetrum vicinum	Auttumn Meadowlark	S5				X	
					Total	**33**	**1**

[1]MNRF 2020a; 2MNRF2020b; [3]COSEWIC 2020; [4]Government of Canada 2020; [5]MNRF 2020c

LEGEND	
SRANK	
S2	Imperiled
S3	Vulnerable
S4	Apparently Secure
S5	Secure

APPENDIX X
Subject Lands Photographs

Photograph1: Soybean field with cultural plantation at right, property to east at left. View to south. (October 13, 2018)

Photograph 2: Northeast corner of subject lands with adjacent parcel and wetland designation at right. View to north. (October 13, 2018)

Photograph 3: Intermittent channel along east side of property. View to north. (October 13, 2018)

Photograph 4: East side of property. View to north. (October 13, 2018)

Photograph 5: Cultural thicket community in Exeter Road parcel (southern portion of subject lands). (October 13, 2018)

Photograph 6: Meadow marsh community in south portion of subject lands. (October 13, 2018)

Photograph 7: Cultural meadow in southern portion of subject lands, hedgerow (H1) in background. View to north. (October 13, 2018)

Photograph 8: Marsh and plantation in northwest of subject lands. (January 31, 2020)

Photograph 9. Drainage Channel at south end of wetland and plantation. View to south. (January 31, 2020)

Photograph 10. Drainage channel on east side of subject lands. View south. (January 31, 2020)

APPENDIX XI

Correspondence with regards to Goldfield HDF

Subject: Re: Goldfield Development - Feature Description (proj2525, proj2524) - Lismer Lane
From: "Stefanie Pratt" <pratts@thamesriver.on.ca>
Date: 2021-01-07, 9:11 a.m.
To: "Katharina Richter" <krichter@nrsi.on.ca>
CC: "Brent Verscheure" <VerscheureB@thamesriver.on.ca>, "Joseph Lance" <jlance@nrsi.on.ca>, "Michael Pease" <mpease@london.ca>, "Mohamed Abuhajar" <mohamed@incon.ca>, bworrad@menearlaw.com, mvivian@london.ca, sallen@mhbcplan.com

Katharina,

The letter you have provided is sufficient to meet our requirements relating to the HDF on the Goldfield Lands. Block 2 may proceed through the DA process with the City. The Section 28 permit application, referenced in my email on November 30, 2020, can be completed for the apartment block to the south and include this information.

Additional discussion was included relating to a recommended corridor width for Goldfield 1 - as you have noted, the final corridor width will be determined through the Draft Plan process as additional information and technical studies are required to determine the final width. At this time, the UTRCA is not approving the recommended 15 m corridor width on the Goldfield 1 lands.

Given the number of reviews needed to complete this process, an additional review fee will be charged in the amount of $250 (50% of original).

Melanie/Michael, if you need any additional information from me, please advise.

Regards,

Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 2020-12-23 12:30 PM >>>
Stefanie,
Please see the response letter attached.
Regards,
Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-12-22 4:26 p.m., Stefanie Pratt wrote:

> Katharina,
>
> This calculation of the HDF differs from that previously provided (was noted at 120 metres on various occasions). We've been trying to confirm this information since December 2019 and I'm not sure why it has changed now as we're nearing final approvals. It is my understanding that the feature has been removed from the landscape since we were out site in November 2019, and aerial image has been used to determine this length so it should be consistent? Typically the process is to ensure this information is obtained prior to removal, but since that is not the case we are trying to work with you.
>
> This isn't the only calculation that has changed since your initial assessment; the previous buffer recommendation was for a 15 metre wide corridor which has been reduced to 10 metres through this months correspondence. It is our understanding that you have used a 10 metre corridor in other jurisdictions for HDF's, however the justification you have provided isn't related to this site. This may be acceptable but please provide further explanation for this change.
>
> Given these changes and the spread of information across various emails, multiple letters, and drawings, it is most appropriate at this point in time to provide a revised letter to tie all of this information together (as mentioned in my November 30th email). This letter will ensure the most accurate and up to date information is available for future approvals. Please include the following information in the revised letter:
>
> - Purpose of letter - determine removal and compensation requirements of HDF
> - Summary of site visit discoveries - previous info on watercourse depth, width, vegetation, habitat, species observed, etc.
> - Description of length and buffers of HDF with appropriate justification (site specific)
> - Description of compensation - amount, generic characteristics to be created, and location (typically net environmental benefit)
> - Inclusion of Dingman EA generic info and how compensation will add to this
> - Appendix - figure provided last week
>
> Once these revisions have occurred, this should be the final piece for approvals to move forward.
>
> **Stefanie Pratt**
> Land Use Planner
> 1424 Clarke Road
> London, ON N5V 5B9
> t: 519-451-2800 ext. 430
> e: pratts@thamesriver.on.ca
>
> UPPER THAMES RIVER
> CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 12/17/2020 12:02 PM >>>
Stefanie,
Please see the attached map.
The HDF is 114.4m in length.
The area of its corridor is 0.114ha.

Regards,
Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-12-14 12:47 p.m., Stefanie Pratt wrote:

> Good afternoon Katharina,
>
> Thank you for the providing the below description. As noted in my previous email, we will need a revised figure identifying the feature (noted at 120m in length) and its buffer. Once this is received, we can ensure appropriate comments are provided through the process to allow this file to move forward.
>
> Kind Regards,
>
> **Stefanie Pratt**
> Land Use Planner
> 1424 Clarke Road
> London, ON N5V 5B9
> t: 519-451-2800 ext. 430
> e: pratts@thamesriver.on.ca
>
> UPPER THAMES RIVER
> CONSERVATION AUTHORITY
>
> >>> Katharina Richter <krichter@nrsi.on.ca> 12/11/2020 8:53 AM >>>
> Stefanie,
> Thank you for your email from November 30, as well as for our discussion yesterday morning. As identified in my email to you from July 30, 2020 (below), the drainage feature on the Goldfield property (north of the future Bradley Avenue extension), was 120m in length prior to its removal. As mentioned, this feature was not observed by NRSI prior to its removal, but is estimated to have been a fairly insignificant headwater drainage feature (HDF) that collected runoff from the adjacent field. Prior to its removal, the area was dominated by grasses and old field species (i.e. cultural meadow). Trees in that area were inventoried by NRSI biologists on October 4, 2018. The drainage feature was not noted at that time, likely as it was dry, very narrow, and hidden by vegetation.
>
> A formal headwater drainage feature assessment had not been required of this feature. The 'Evaluation,

Classification and Management of Headwater Drainage Features Guidelines' (CVC & TRCA 2014) does not identify a corridor width for protected headwater features. Through other project experience NRSI has had, predominantly in the GTA, a 10m corridor width for HDFs has been deemed acceptable and approved. As such, if the same approach is taken for the HDF on the Goldfield property, at a length of 120m, this is an area of 1,200m2 (0.12ha/0.3ac). This area will be compensated for through habitat restoration on the Goldfield 1 lands, south of the Bradley Avenue extension.

Compensation details will be worked through during the Draft Plan approval process of the Goldfield 1 lands. However, at a high level, compensation will consist of trees, shrubs, and a herbaceous seed mix, all comprised of native species only. The compensation for the HDF will be natural and will contribute to the ecological value and function of the drainage feature corridor on the Goldfield 1 lands.

Regards,
Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-11-30 10:51 a.m., Stefanie Pratt wrote:

> Good morning Katharina,
>
> I am following up from the email below to see if you have obtained any information from the City in regards to the Dingman EA and the Lismer Lane project. We have waited to provide a response to your previous information in an attempt to reduce duplication of efforts and ensure any revised letters included all available information.
>
> **Scott and Brian**, in response to your inquiries we have been reviewing information prepared by NRSI to address the watercourse feature that was located on Block 2 lands. This watercourse initiates on these lands before connecting into the southern system, acting as a headwater. This was confirmed through a site visit with City of London, UTRCA and NRSI staff in November 2019. Continual reference refers to it as a "Headwater Drainage Feature", however a full headwater drainage feature analysis (according to TRCA/CVC guidelines) was not requested. An analysis has been requested to determine the extent of the area that was removed and determine how this can be recreated/result in a net environmental benefit. UTRCA staff have agreed to allow this area to be compensated for and to tie into works proposed on the future Goldfield 1 Lands to the south.
>
> The added complication is the ongoing Dingman Subwatershed EA. This tributary has been identified as an area of interest for the City to undertake a complete corridor approach. The complete corridor approach will include future studies to determine how to appropriately accommodate a complete corridor on these lands (consideration for natural hazard and natural heritage), with consideration for future development plans as well. The calculations and works described below/through NRSI correspondence will need to form a part of any future corridor work.
>
> In the absence of the EA information, we recommend moving forward in the following manner:
>
> 1. The UTRCA will need a revised letter from NRSI connecting the information discussed via email with the existing data provided. Please include:
> a) A Figure identifying the extent of the headwater drainage feature prior to removal. Measurements should be

included to identify the length of the feature on the subject lands and the area (including buffers).
b) Text describing the feature prior to removal. This should include description of an appropriate buffer and why a total buffer width of 15 m was identified.
c) Recommendations for appropriate compensation. Total area and suggestions for what that compensation can include.

2. The applicant will need to obtain site plan approval/development agreement from the City for the proposed townhouse development. I have cc'ed Melanie Vivian (City planner and file handler).

3. A Section 28 permit application will be required.
a) Include complete engineer drawing set submitted to City and the revised letter
b) The fee for the permit will be $750 (minor alteration to watercourse)
c) Approval of this permit will allow development to proceed for both Block 2 and the apartment block

If you would like to discuss any of these details, please advise.

Kind Regards,

Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 7/30/2020 12:50 PM >>>
Stefanie,
In the absence of a response from the City on the Dingman EA, I am forwarding you an updated Map 1 (attached) in response to your point #1, below.
The following text provides a response to your point #2:

On May 25, 2020, Reach 2 on the Goldfield site was surveyed. This reach is shown on Map 1, and is very consistent with City of London and UTRCA mapping, as shown on Figures 1 and 2 in NRSI's correspondence to you from December 18, 2019. This HDF portion is 45.1m in length, for a combined total length of 157.1m for Reach 2. It is acknowledged, that Reach 2 may have extended further north in the past, prior to site manipulation. It is not known where the HDF may have originated, but its furthest extent was likely as shown by the blue line in the figure below. The length of this HDF to the property line is 120m, for a potential total Reach 2 length of 232m.

April 29, 2011 (Google Earth)

Once I hear back from the City on the Dingman EA, I will respond with regards to your point #3.

-Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-07-03 3:30 p.m., Katharina Richter wrote:

> Stefanie,
> Thank you for your email and comments. I will provide a response once I have the necessary information. Most importantly, we are awaiting responses on the Dingman EA from the City, which will affect the drainage feature corridor across the Goldfield lands.
> Regards,
> Katharina.
>
> Katharina Richter B.E.S.
> Senior Biologist
> **Natural Resource Solutions Inc.**
> 415 Phillip Street, Unit C
> Waterloo, ON N2L 3X2
> (p) 519-725-2227 Ext. 258 (f) 519-725-2575
> (m) 519-635-6051
> (w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
> @nrsinews

On 2020-06-25 10:09 a.m., Stefanie Pratt wrote:

Hi Katharina,

We have undertaken a review of your drainage feature analysis prepared for the Goldfield lands, dated May 20, 2020. We have the following comments:

1. It was noted during previous email correspondence that the figure attached to this letter did not include the full extent of the drainage feature that this analysis was requested for. An updated drawing prepared by SBM (received May 26, 2020) included an "HDF Location Map" detail. Please revise your figure to include this segment of Reach 2 that was originally omitted.

2. As noted in your letter, earth-moving works began on the Goldfield Lands and have altered the character of Reach 2. Prior to these earth works, the HDF location would have extended further north as identified at the November 2019 site visit.

Later in this paragraph, a measurement for the length of Reach 2 is provided. Please revise this measurement to reflect the entirety of Reach 2, including the area shown on the SBM "HDF Location Map". Typically this measurement would also include the length of the feature that was altered due to earth-moving works.

3. In previous email correspondence you provided reference to the Dingman EA. The EA document for Stage 1 identifies that these reaches are located within the "Tributaries of Interest" associated with the White Oaks Drain. Reach 1 has been included within the EA analysis and recommendations for corridor width shall match with this document and may be refined based on site specific investigations prior to future development.

Your letter recommends that an appropriate corridor width for Reach 2 totals 15 metre wide (7.5 m on either side of feature). As we are seeking an net environmental benefit for the removal of Reach 2, all future corridor widths for Reach 1 shall include the recommendation from the EA (or site specific investigations for this reach) plus the width for Reach 2 for enhancement. The length of this additional corridor width for Reach 1 will directly relate to the revised calculation for the length of Reach 2.

Please provide a revised letter addressing these comments.

Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

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>>> Katharina Richter <krichter@nrsi.on.ca> 5/20/2020 12:12 PM >>>
Stefanie, Brent:
I was just forwarded email correspondence between Brent and Kyle Kane (SMB Ltd) (attached), implying that a full headwater drainage feature assessment (HDFA) is required on the Goldfield property. That had not been my understanding, and in fact I recollect it being stated that this was NOT required, when we met in November. Rather, a more detailed description of the drainage feature was requested, but not a full 3-visit assessment. This was stated in my letter from December 18, 2019, and I have received no requests for a

HDFA in any correspondence since that time (emails from Stefanie Pratt January 9, March 3, and April 14, 2020). The letter from Stefanie to Ms. Melanie Vivian (City of London), May 15, 2020, speaks of more information having been requested on the headwater drainage feature. I'd like to confirm that this is not a full assessment in accordance with the TRCA/CVC 2014 Guidelines. If such was required, the timing window for the first visit has been missed, since this should have been undertaken in April.

I did sent Stefanie a letter providing more information on the HDF and compensation/enhancement earlier today. Please review this and advise if anything else remains outstanding. The submission of the letter was delayed as we were awaiting responses on our questions to the City on the Dingman EA. These have not yet been received, but Stefanie's May 15 letter prompted today's submission.

Regards,
Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-05-20 9:33 a.m., Katharina Richter wrote:

> Stefanie,
> The attached letter provides greater detail on the drainage features found within the Goldfield and Goldfield 1 properties, as well as additional detail on the proposed enhancement.
> Regards,
> Katharina.
>
> Katharina Richter B.E.S.
> Senior Biologist
> **Natural Resource Solutions Inc.**
> 415 Phillip Street, Unit C
> Waterloo, ON N2L 3X2
> (p) 519-725-2227 Ext. 258 (f) 519-725-2575
> (m) 519-635-6051
> (w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
> @nrsinews
>
> On 2020-03-03 10:39 a.m., Stefanie Pratt wrote:
>
> > Hi Katharina,
> >
> > Further to our call, a meeting will likely not be required. *Please* provide a revised letter with further information pertaining to the evaluation of the existing feature and recommended compensation that will result in a net environmental benefit. A conceptual plan which identifies that this compensation can be achieved on adjacent lands would be beneficial.
> >
> > Thanks,

Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 02/03/2020 10:03 AM >>>
Stefanie,
Please provide some dates for a meeting. Thank you!
-Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-02-06 2:56 p.m., Katharina Richter wrote:

> Stefanie,
> Thanks for taking my call just now. As discussed, I'd like to set up a meeting with you to discuss the enhancement options of the watercourse south of the Bradley Avenue extension (Goldfield 1 development site). If you could, please suggest several dates so I can coordinate with Mohamed.
>
> I believe the Bradley Extension ROW is owned by the City, but I will ask Mohamed to confirm that.
>
> Regards,
> Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-01-09 3:17 p.m., Stefanie Pratt wrote:

> Hi Katharina,
>
> Thank you for providing this information pertaining to the drainage feature identified on our site visit. After completing a preliminary review, we offer the following comments:

1. The UTRCA will require more detailed information pertaining to the enhancement occurring on the other Goldfield property to compensate for the removal of this feature. This should include information such as size of existing feature vs proposed enhancements/landscaping, details regarding planting/grading design, etc. The UTRCA generally requires a net environmental benefit in terms of size and quality of the feature.
2. Can you please confirm who the current owner the Bradley Extension ROW is? The feature also encroaches into this area.

If you have any questions, please reach out to Brent or myself.

Kind Regards,

UPPER THAMES RIVER
CONSERVATION AUTHORITY
Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

>>> Katharina Richter <krichter@nrsi.on.ca> 18/12/2019 10:39 AM >>>
> Stephanie,
Attached is a letter describing the drainage feature on the Goldfield development property, that was reviewed with you in the field on November 28, 2019.
Regards,
Katharina.
--

CELEBRATING 20 YEARS 1998 - 2018
Katharina Richter B.E.S.
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Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

December 23, 2020 Project 2525

Stefanie Pratt
Upper Thames River Conservation Authority
1424 Clarke Road
London, ON N5V 5B9

Dear Ms. Pratt,

RE: Goldfield Development – Removal and Compensation Requirements for the Headwater Drainage Feature

Natural Resource Solutions Inc. (NRSI) is working as the natural heritage consultant for Incon on their Goldfield and Goldfield 1 developments in London, Ontario. The subject properties are located south of Wharncliffe Road South, west of White Oak Road, and north of Exeter Road, surrounded by fields and other development sites. This letter is in response to your most recent email, dated yesterday, December 22, 2020, and aims to summarize all previous correspondence on the Goldfield headwater drainage feature (HDF), providing recommendations for its compensation as it has been removed. Previous correspondence is appended.

NRSI was originally retained by the previous landowner to undertake a tree inventory on the Goldfield property. The tree inventory was undertaken on October 4, 2018, which was the only field work undertaken at the time. The HDF was not noted during the tree inventory. It is likely that it was not observed as it was dry, very narrow, and hidden by vegetation.

A meeting was held on the Goldfield property with yourself and others on November 28, 2019, at which time the HDF was originally observed. At this time, tree removal had occurred and the land was altered, so the original condition and extent of the HDF could not be identified. A letter was submitted to you on December 18, 2019 to describe the drainage feature. An additional letter was submitted to you on May 20, 2020, that provided a more detailed description of the HDF to the south, located on the Goldfield 1 Lands, as well as compensation measures for the removal of the drainage feature on the Goldfield property.

The Goldfield HDF (also referred to as the upstream portion of Reach 2 in other correspondence) was first observed on November 28, 2019 with limited flow, due to recent rains. The feature was a maximum of 30cm wide and 5cm deep, flowing in a very shallow depression without defined bed or banks. Due to the tree cutting and felled trees remaining on site, some of the HDF was hidden beneath the debris. The HDF was situated within a disturbed meadow community dominated by a variety of grasses, before it pooled in vehicle tracks within the proposed Bradley Avenue right-of-way. On February 1, 2020, an aquatic habitat assessment was undertaken that described the Goldfield 1 HDF. The Goldfield HDF (upstream portion of Reach 2) was noted as having undefined flow on the Goldfield Lands and becoming channelized at the border with the Goldfield 1 Lands. Historically, the Goldfield HDF was dominated by grasses and old field species (i.e. cultural meadow) surrounding an old farmstead (now removed). Downstream, the Goldfield HDF/Reach 2 would have been ploughed and

cropped as active agricultural lands. The Goldfield HDF drained lands to the north and does not provide fish habitat.

The extent of the current HDF was surveyed May 25, 2020 (see map contained in correspondence from July 30, 2020), with a length of 45.1m on the Goldfield property. It is acknowledged that the Goldfield HDF likely extended further north in the past, prior to site manipulation. It is not known where the HDF may have originated, but its furthest extent was likely as shown in the attached Map 1. The alignment of the HDF on this map was determined in part by the survey of the existing HDF (May 25, 2020), as well as through air photo interpretation (see attached correspondence from December 18, 2019; July 30, 2020; and December 17, 2020). The HDF shown on Map 1 has a length of 114.4m on the Goldfield property. An earlier estimate of 120m (July 30, 2020) was based on less detailed mapping.

The 'Evaluation, Classification and Management of Headwater Drainage Features Guidelines' (CVC & TRCA 2014) does not identify a corridor width for protected HDFs. Through other project experience NRSI has had, predominantly in the Greater Toronto Area, a 10m corridor width for HDFs has been deemed acceptable and approved. Given the minor feature and function of the Goldfield HDF, the 10m corridor is sufficient. There is no wetland associated with the HDF and its riparian vegetation was comprised of a cultural meadow community. The Goldfield 1 HDF was noted to be dry with small, isolated pools of water present during field assessments in 2018 (see December 18, 2019 letter). The same can be anticipated for the Goldfield HDF, if not drier, given the smaller catchment and smaller nature of the feature. As such, at a length of 114.4m, within a 10m wide corridor, an area of 1,144m^2 (0.114ha/0.282ac) will be compensated for through habitat restoration on the Goldfield 1 lands, south of the Bradley Avenue extension.

Compensation details will be worked out during the Draft Plan approval process of the Goldfield 1 lands. However, at a high level, compensation will consist of trees, shrubs, and a herbaceous seed mix, all comprised of native species only. The compensation for the HDF will be natural and will contribute to the ecological value and function of the drainage feature corridor on the Goldfield 1 lands. As the compensation lands will be combined with the Goldfield 1 natural corridor approach, details of that provided below also apply to the compensation area.

Previous reporting and correspondence had noted that the Goldfield 1 HDF/Reach 1 is likely to be realigned east-west across the Goldfield 1 property and then along the eastern edge of the property. Tile drainage will be removed and a meandering channel will be created with a series of pools, riffles, and runs. The created watercourse is to be situated in a 15m wide naturalized corridor, with compensation lands for the removal of the Goldfield HDF added to this corridor. This corridor will be planted with native species, including trees, shrubs, and herbaceous species. A detailed watercourse restoration plan and planting plan will be provided to the Upper Thames River Conservation Authority (UTRCA) for review at the detailed design stage. The newly created channel and corridor will be monitored for several years to ensure the watercourse is functioning as designed and to ensure the plantings are establishing well. A detailed monitoring plan will also be provided at the detailed design stage. Additional proposed enhancement of the watercourse corridor to provide compensation for the Goldfield HDF had originally included the following:

- Topsoil depth of 0.40m
- Scarification of subsoils to 0.45m
- No trails to be included within the minimum 15m naturalized corridor
- Fencing along the corridor edge will be considered to reduce impact to the watercourse and corridor from adjacent land uses.

The 'Dingman Creek Subwatershed: Stormwater Servicing Study Master Plan and Schedule B Municipal Class Environmental Assessment' (Aquafor Beech Ltd. 2020) identified the Goldfield 1 HDF as the 'White Oaks – East tributary' (WCT-3) and placed it within a "complete corridor", which is to convey water, people, and wildlife. Section 8.6 of the Dingman EA describes the complete corridor approach envisioned for the City of London, with details on the White Oaks Drain corridor provided in Section 3.4.6.3. Including buffers and trail, the complete corridor is stated to range in width between 50 and 100m in the Dingman EA, although it states that exact corridor width should be established based on site conditions and site-specific goals and targets. The Goldfield 1 corridor width will be determined through the Draft Plan process of that site, in consultation with the City of London and the UTRCA.

Even a 15m wide corridor, as previously proposed for the Goldfield 1 property, would be a large improvement over current site conditions. Whereas much of the drainage feature is currently tile drained and is/was ploughed through during agricultural practices, the feature will be daylighted and protected through a natural corridor planted with native species. There is currently no riparian vegetation along the drainage features (both Reach 1 and Reach 2) within the Goldfield 1 property, other than where they flow through the plantation and marsh. Although the UTRCA generally protects watercourses within a 30m wide corridor, the drainage features within the Goldfield and Goldfield 1 lands are HDFs and not watercourses. The Goldfield 1 HDF will be naturalized through natural channel design, providing a variety of habitats, where now there is none.

Should you have any questions or comments regarding this letter, please do not hesitate to contact me.

Sincerely,
Natural Resource Solutions Inc.

Katharina Richter
Senior Biologist

MAP

478600 478700 478800

4753400 4753300 4753200 4753100

PAULPEEL AVE

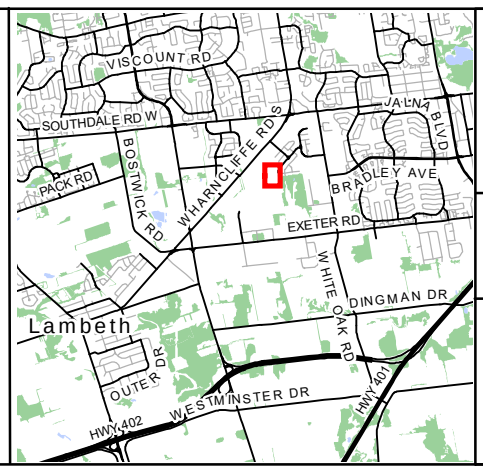
Goldfield Lands

Reach 2

478600 478700 478800

Legend

- Subject Property
- Headwater Drainage Feature (HDF) (presumed original)
- HDF Corridor (10m)
- Reach Break
- Intermittent Watercourse/Drainage Feature



Map 1

Goldfield Lands

Headwater Drainage Feature

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 20 40 60 80 Meters

N

Project: 2525
Date: December 17, 2020
NAD83 - UTM Zone 17
Scale 1:1,000 (11x17")

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. Source: Data provided by MNRF © Copyright: Queen's Printer Ontario Imagery: First Base Solutions Inc. (2019)

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APPENDIX I

Correspondence

December 18, 2019

Letter from NRSI to UTRCA

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

December 18, 2019 Project 2182

Stefanie Pratt
Upper Thames River Conservation Authority
1424 Clarke Road
London, ON N5V 5B9

Dear Ms. Pratt,

RE: Goldfield Development – Drainage Feature Description
North of the Bradley Avenue Extension

Natural Resource Solutions Inc. (NRSI) was retained by INCON Industrial (the Client) to undertake a Tree Protection Plan (TPP) for a proposed residential development in the City of London, Ontario, referred to as the "Goldfield" development. The TPP was submitted September 9, 2019, based on a tree inventory that was conducted October 4, 2018. The subject property is located north of the City's planned Bradley Avenue extension, west of White Oak Road. It is approximately 3.9 hectares in size and is legally described as Part of Lot 33, Concession 2. Most of the subject property is presently in agricultural production (soy in 2018). Some trees are located around the subject property's perimeter, and a small treed area was located in the southwest where a homestead once stood.

A site meeting took place on November 28, 2019 to review any natural heritage features on site. It was noted at this time that tree removal had taken place approximately two weeks prior. There are no wetlands within the subject property. A small drainage feature was noted, as heavy rains were experienced in the two days prior to the site meeting. Development has started on the property immediately to the north (Emily Carr development), which included tree removal along the northern subject property boundary. This letter characterizes the drainage feature and makes recommendations with regards to natural heritage enhancements on the lands south of the Bradley Avenue extension, which are also owned by the Client, and are referred to as the "Goldfield 1" development.

The drainage feature appears to be a headwater drainage feature (HDF). It was not observed on the October 2018 site visit. The HDF is not included in regulated area screening mapping from the Upper Thames River Conservation Authority (UTRCA).

The HDF was highlighted by UTRCA staff in the field, as a 'blue line' appears on City of London interactive mapping (Figure 1). A drainage feature does not appear in this area on City of London Official Plan Schedules.

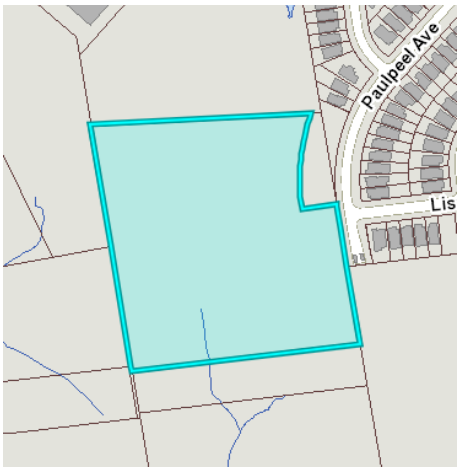

Figure 1. City of London Interactive Mapping

Mapping from the UTRCA also shows a potential watercourse in this area (Figure 2), but it is not included in their regulated area screening map.

Figure 2. UTRCA Regulated Area Screening Map (regulated areas shown in red hatching)

A drainage feature in this area is not discernable using air photos from Google Earth. The figures below show a variety of years available online, dating back to 2006.

Figure 3. May 2, 2006 (Google Earth)

Figure 4. April 29, 2011 (Google Earth)

Figure 5. September 27, 2013 (Google Earth)

Figure 6. October 22, 2015 (Google Earth)

Figure 7. July 2, 2018 (Google Earth)

As can be seen from Figures 3 to 7, there appears to be some minor field drainage moving south, partially to the southwest portion of the subject property that contained the trees. The agricultural field is ploughed and contains no defined features of any kind. Drainage can be identified through soils darkened by moisture (Figures 3, 4, 7), as well as by greener crops from moister ground (Figure 5).

On November 28, 2019, the HDF had limited flow. The feature was a maximum of 30cm wide and 5cm deep, flowing in a very shallow depression without defined bed or banks. Due to the tree cutting and felled trees remaining on site, some of the HDF was hidden beneath the debris. The HDF is situated within a disturbed meadow community dominated by a variety of grasses, before it pools within vehicle tracks within the proposed Bradley Avenue right-of-way. South of the future road, within the "Goldfield 1" property, is a cultural meadow and conifer planation comprised of Colorado Spruce (*Picea pungens*) and Norway Spruce (*P. glauca*). The plantation surrounds a small meadow marsh (MAM2) dominated by Reed-canary Grass (*Phalaris arundinacea*) along with Broad-leaved Cattail (*Typha latifolia*), Fox Sedge (*Carex vulpinoidea*), American Great Bulrush (*Schoenoplectus tabernaemontani*), and Lined Bulrush (*Scirpus pendulus*). Photos 1 to 6 show the HDF on November 28, 2019.

An intermittent channel was identified by NRSI biologists within the Goldfield 1 property in 2018. This headwater feature originates to the west of the Goldfield subject property (northwest of the Goldfield 1 property), closer to Wharncliffe Road South, passes through the conifer plantation, receiving surface water from the meadow marsh and continues southeast across the agricultural field. Within the plantation and marsh, the drainage channel appears to be dug, with vertical edges. This channel was described in the Draft Environmental Impact Study (EIS) (NRSI, January 2019) for the Goldfield 1 development as a headwater feature, ultimately connecting to Dingman Creek approximately 2.3km south of the Goldfield subject property. The channel was dry with small, isolated pools of water present throughout the period of 2018 field surveys, end of April to mid October 2018. Evidence of spring freshet conditions was evident in the spring (2018) as indicated by pooling and saturated substrates. In the vicinity of Exeter Road, the channel feature appears to contain a greater depth of water for much of the year and functions as a permanent watercourse.

The intermittent channel on the Goldfield 1 property will be retained by the proposed development of that property, although a reach may be realigned. Although the channel is regularly ploughed through south of the marsh, and contains no riparian vegetation, it will be buffered from development and its buffer naturalized with native species. This restoration plan will be addressed through the Goldfield 1 EIS and potential additional studies.

A formal HDF assessment is not required for the Goldfield subject property. The HDF has minimal function, likely only conveying water during more significant rainfall events and snowmelt. As such, the removal of the HDF can be mitigated through additional enhancements to the intermittent channel on the Goldfield 1 property.

Photo 1. North edge of the former treed area, where there is no feature. Felled trees remain.

Photo 2. Start of HDF at eastern edge of former treed area. View towards north.

Photo 3. View southeast. Narrow channel.

Photo 4. View south. Very little water.

Photo 5. Pooled water within future Bradley Avenue road allowance. View towards southwest.

Photo 6. View to the south with conifer plantation.

Should you have any questions or comments regarding this letter, please do not hesitate to contact me.

Sincerely,
Natural Resource Solutions Inc.

Katharina Richter

Katharina Richter
Senior Biologist

January 9, 2020

Email from UTRCA to NRSI

Subject: Re: Goldfield Development - Feature Description (proj2182) - Lismer Lane
From: "Stefanie Pratt" <pratts@thamesriver.on.ca>
Date: 2020-01-09, 3:17 p.m.
To: "Katharina Richter" <krichter@nrsi.on.ca>
CC: "Brent Verscheure" <VerscheureB@thamesriver.on.ca>, "Joseph Lance" <jlance@nrsi.on.ca>, "Mohamed Abuhajar" <mohamed@incon.ca>, dfitzger@london.ca

Hi Katharina,

Thank you for providing this information pertaining to the drainage feature identified on our site visit. After completing a preliminary review, we offer the following comments:

1. The UTRCA will require more detailed information pertaining to the enhancement occurring on the other Goldfield property to compensate for the removal of this feature. This should include information such as size of existing feature vs proposed enhancements/landscaping, details regarding planting/grading design, etc. The UTRCA generally requires a net environmental benefit in terms of size and quality of the feature.
2. Can you please confirm who the current owner the Bradley Extension ROW is? The feature also encroaches into this area.

If you have any questions, please reach out to Brent or myself.

Kind Regards,

UPPER THAMES RIVER
CONSERVATION AUTHORITY
Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

>>> Katharina Richter <krichter@nrsi.on.ca> 18/12/2019 10:39 AM >>>
> Stephanie,
Attached is a letter describing the drainage feature on the Goldfield development property, that was reviewed with you in the field on November 28, 2019.
Regards,
Katharina.
--

CELEBRATING 20 YEARS 1998 - 2018
Katharina Richter B.E.S.
Senior Biologist
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415 Phillip Street, Unit C
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(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

May 20, 2020

Letter from NRSI to UTRCA

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

May 20, 2020 Project 2182

Stefanie Pratt
Upper Thames River Conservation Authority
1424 Clarke Road
London, ON N5V 5B9

Dear Ms. Pratt,

RE: Goldfield Development and Goldfield 1 Development – Drainage Features

Natural Resource Solutions Inc. (NRSI) is working as the natural heritage consultant for INCON Industrial on their Goldfield and Goldfield 1 developments in London, Ontario. The subject properties are located south of Wharncliffe Road South, west of White Oak Road, and north of Exeter Road, surrounded by fields and other development sites. Following a meeting on the Goldfield property with yourself and others on November 28, 2019, a letter was submitted to you on December 18, 2019 to describe a drainage feature that was observed on the property. Today's additional letter provides a more detailed description of the drainage feature to the south, located on the Goldfield 1 Lands, as well as compensation measures for the removal of the drainage feature on the Goldfield site. This follows a telephone conversation between you and me on March 3, 2020, as well as a follow-up email sent by you on the same date. The drainage feature originating in the west and flowing through the Goldfield 1 site (south of the future Bradley Avenue extension) is referred to as Reach 1; the drainage feature originating on the Goldfield site (north of the future Bradley Avenue extension) is referred to as Reach 2 (see Map 1). Both reaches are headwater drainage features. As was stated on the site visit November 28, 2019, a formal headwater drainage feature assessment was not required.

An aquatic habitat assessment of Reach 1 and Reach 2 was undertaken by an aquatic biologist from NRSI on February 1, 2020. Reach 1 originates northwest of the Goldfield 1 Lands. At the time of assessment water was flowing southeast through the conifer plantation, entering along the west edge, through the marsh, and exiting the plantation along the south edge, where it merges with Reach 2. Several large pools are present within the plantation, which are 1.0-1.5m deep and approximately 2.0m across. These pools appear to be caused by broken farm tiles, which are approximately 0.30m in diameter. The water from the tiles is eroding the soil as it flows to the surface, creating the pools/sink holes. Reach 1 exits the marsh at its southeast corner, where it is eroding soil and flows south for a short distance. Although the Reach 1 channel is visible through the field, the feature was dry on February 1, 2020, as the main flow was noted to go underground just south of the plantation. Approximately 20m south of the plantation, the water re-emerges to the surface for a short distance (30m) before going underground and flowing through tile drains once again. The dry channel turns to the south and flows along the eastern property boundary. Here, Reach 1 flows through a channel with established terrestrial grasses that connects a series of pools. Within 5m of the southern Goldfield 1 property boundary, Reach 1 turns and flows east onto neighbouring lands. Fish habitat is not present within Reach 1, due to its poor connectivity, terrestrial grasses within the channel, and extensive tile drainage.

At the time of assessment, earth-moving works had begun on the Goldfield Lands and have altered the character of Reach 2. Reach 2 was described February 1, 2020 as having undefined flow from the Goldfield Lands and becoming channelized at the border with the Goldfield 1 Lands. Here, the channel is well defined, but intermittent in nature, based on the lack of vegetation, lack of iron staining or visible groundwater inputs, and infilling of fine sediments. Historically, Reach 2 would have been ploughed and cropped as active agricultural lands; it drains the lands to the north. Reach 2 ranges in width from 0.15-0.70m and in depth from 0-0.30m. It meanders with a 2-3m amplitude, for approximately 57m in a series of pools and flats before the channelization breaks down and it becomes overland flow for approximately 55m. It channelizes again upon entering the marsh, at approximately the mid-way point within the plantation. Within the marsh, Reach 2 merges with the Reach 1. Reach 2 does not provide fish habitat.

The removal of Reach 2 will be compensated for through the restoration and enhancement of Reach 1 during the development of the Goldfield 1 Lands. It is likely to be realigned east-west across the property and then along the eastern edge of the property. Tile drainage will be removed and a meandering channel will be created with a series of pools, riffles, and runs. The created watercourse is to be situated in a 15m wide naturalized corridor. This corridor will be planted with native species, including trees, shrubs, and herbaceous species. A detailed watercourse restoration plan and planting plan will be provided to the Upper Thames River Conservation Authority (UTRCA) for review at the detailed design stage. The newly created channel and corridor will be monitored for several years to ensure the watercourse is functioning as designed and to ensure the plantings are establishing well. A detailed monitoring plan will also be provided at the detailed design stage. Development of the Goldfield 1 Lands is in the early planning stages, and a Draft Plan of Subdivision has not yet been created. Additional proposed enhancement of the watercourse corridor includes:

- Topsoil depth of 0.40m
- Scarification of subsoils to 0.45m
- No trails to be included within the 15m naturalized corridor
- Fencing along the corridor edge will be considered to reduce impact to the watercourse and corridor from adjacent land uses.

The 15m wide, proposed corridor is seen as sufficient for the watercourse, as it will be a large improvement over current conditions. Whereas much of the drainage feature is currently tile drained and is/was ploughed through during agricultural practices, the feature will now be daylighted and protected through a natural corridor planted with native species. There is currently no riparian vegetation along the drainage features, other than where they flow through the plantation and marsh. Although the UTRCA generally protects watercourses within a 30m wide corridor, the drainage features within the Goldfield and Goldfield 1 lands are headwater drainage features and not watercourses. The drainage feature will be naturalized through natural channel design, providing a variety of habitats, where now there is none.

A tree inventory was conducted within the conifer plantation on January 17, 21, and 31, 2020. The following wildlife observations were made within the plantation:

- Great Horned Owl (*Bubo virginianus*) use of plantation (evidence in the form of an owl pellet),
- Stick nest present within plantation, indicating owl or raptor nesting,
- Several other common songbird species,
- Active Coyote (*Canis latrans*) den in plantation,

- White-tailed Deer (*Odocoileus virginianus*) trail through plantation, and
- Tracks of Eastern Cottontail (*Sylvilagus floridanus*) and Raccoon (*Procyon lotor*).

Should you have any questions or comments regarding this letter, please do not hesitate to contact me.

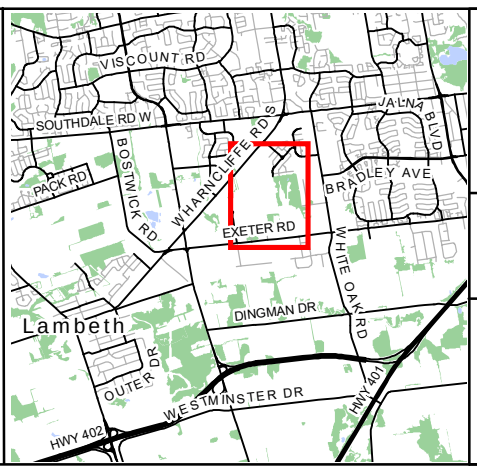
Sincerely,
Natural Resource Solutions Inc.

Katharina Richter
Senior Biologist

Enclosure
Map 1: Goldfield and Goldfield 1 Lands—Drainage Features

Legend

- Subject Property
- Permanent Watercourse/Drainage Feature
- Intermittent Watercourse/Drainage Feature
- Reach Break
- Wooded Area



Map 1

Goldfield and Goldfield 1 Lands

Drainage Features

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 50 100 150 200 250 300 Meters

N

Project: 2182
Date: May 19, 2020
NAD83 - UTM Zone 17
Scale 1:5,000 (11x17")

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Path: X:\2182_TreeInventory_BradleyAveN\NRSI_2182_Map1_DrainageFeatures_5K_2020_05_19_LEH.mxd

June 25, 2020

Email from UTRCA to NRSI

Subject: Re: Goldfield Development - Feature Description (proj2182) - Lismer Lane
From: "Stefanie Pratt" <PrattS@thamesriver.on.ca>
Date: 2020-06-25, 10:09 a.m.
To: "Brent Verscheure" <VerscheureB@thamesriver.on.ca>, "Katharina Richter" <krichter@nrsi.on.ca>
CC: "Joseph Lance" <jlance@nrsi.on.ca>, "Mohamed Abuhajar" <mohamed@incon.ca>

Hi Katharina,

We have undertaken a review of your drainage feature analysis prepared for the Goldfield lands, dated May 20, 2020. We have the following comments:

1. It was noted during previous email correspondence that the figure attached to this letter did not include the full extent of the drainage feature that this analysis was requested for. An updated drawing prepared by SBM (received May 26, 2020) included an "HDF Location Map" detail. Please revise your figure to include this segment of Reach 2 that was originally omitted.

2. As noted in your letter, earth-moving works began on the Goldfield Lands and have altered the character of Reach 2. Prior to these earth works, the HDF location would have extended further north as identified at the November 2019 site visit.

Later in this paragraph, a measurement for the length of Reach 2 is provided. Please revise this measurement to reflect the entirety of Reach 2, including the area shown on the SBM "HDF Location Map". Typically this measurement would also include the length of the feature that was altered due to earth-moving works.

3. In previous email correspondence you provided reference to the Dingman EA. The EA document for Stage 1 identifies that these reaches are located within the "Tributaries of Interest" associated with the White Oaks Drain. Reach 1 has been included within the EA analysis and recommendations for corridor width shall match with this document and may be refined based on site specific investigations prior to future development.

Your letter recommends that an appropriate corridor width for Reach 2 totals 15 metre wide (7.5 m on either side of feature). As we are seeking an net environmental benefit for the removal of Reach 2, all future corridor widths for Reach 1 shall include the recommendation from the EA (or site specific investigations for this reach) plus the width for Reach 2 for enhancement. The length of this additional corridor width for Reach 1 will directly relate to the revised calculation for the length of Reach 2.

Please provide a revised letter addressing these comments.

Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 5/20/2020 12:12 PM >>>
Stefanie, Brent:
I was just forwarded email correspondence between Brent and Kyle Kane (SMB Ltd) (attached), implying that a full

July 30, 2020

Email from NRSI to UTRCA

Subject: Re: Goldfield Development - Feature Description (proj2182) - Lismer Lane
From: Katharina Richter <krichter@nrsi.on.ca>
Date: 2020-07-30, 12:50 p.m.
To: Stefanie Pratt <PrattS@thamesriver.on.ca>
CC: Brent Verscheure <VerscheureB@thamesriver.on.ca>, Joseph Lance <jlance@nrsi.on.ca>, Mohamed Abuhajar <mohamed@incon.ca>

Stefanie,
In the absence of a response from the City on the Dingman EA, I am forwarding you an updated Map 1 (attached) in response to your point #1, below.
The following text provides a response to your point #2:

On May 25, 2020, Reach 2 on the Goldfield site was surveyed. This reach is shown on Map 1, and is very consistent with City of London and UTRCA mapping, as shown on Figures 1 and 2 in NRSI's correspondence to you from December 18, 2019. This HDF portion is 45.1m in length, for a combined total length of 157.1m for Reach 2. It is acknowledged, that Reach 2 may have extended further north in the past, prior to site manipulation. It is not known where the HDF may have originated, but its furthest extent was likely as shown by the blue line in the figure below. The length of this HDF to the property line is 120m, for a potential total Reach 2 length of 232m.

April 29, 2011 (Google Earth)

Once I hear back from the City on the Dingman EA, I will respond with regards to your point #3.

-Katharina.

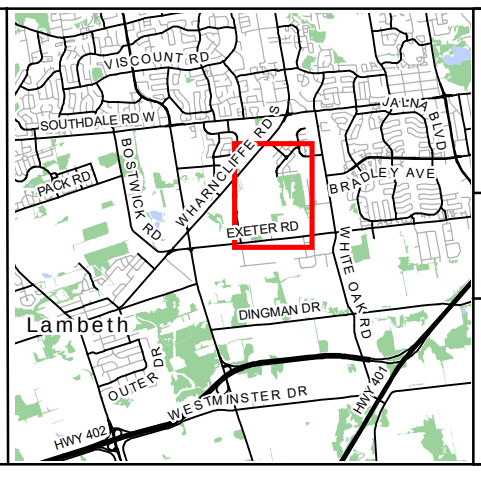
Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-07-03 3:30 p.m., Katharina Richter wrote:

> Stefanie,
> Thank you for your email and comments. I will provide a response once I have the necessary

Legend

- Subject Property
- Surveyed Headwater Drainage Feature
- Permanent Watercourse/Drainage Feature
- Intermittent Watercourse/Drainage Feature
- Reach Break
- Wooded Area



Map 1

Goldfield and Goldfield 1 Lands

Drainage Features

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 50 100 150 200 250 300 Meters

N

Project: 2182
Date: July 6, 2020
NAD83 - UTM Zone 17
Scale 1:5,000 (11x17")

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. Source: Data provided by MNRF © Copyright: Queen's Printer Ontario Imagery: First Base Solutions Inc. (2019)

Path: X:\2182_TreeInventory_BradleyAveN\NRSI_2182_Map1_DrainageFeatures_5K_2020_07_06_GCS.mxd

information. Most importantly, we are awaiting responses on the Dingman EA from the City, which will affect the drainage feature corridor across the Goldfield lands.
Regards,
Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-06-25 10:09 a.m., Stefanie Pratt wrote:

> Hi Katharina,
>
> We have undertaken a review of your drainage feature analysis prepared for the Goldfield lands, dated May 20, 2020. We have the following comments:
>
> 1. It was noted during previous email correspondence that the figure attached to this letter did not include the full extent of the drainage feature that this analysis was requested for. An updated drawing prepared by SBM (received May 26, 2020) included an "HDF Location Map" detail. Please revise your figure to include this segment of Reach 2 that was originally omitted.
>
> 2. As noted in your letter, earth-moving works began on the Goldfield Lands and have altered the character of Reach 2. Prior to these earth works, the HDF location would have extended further north as identified at the November 2019 site visit.
>
> Later in this paragraph, a measurement for the length of Reach 2 is provided. Please revise this measurement to reflect the entirety of Reach 2, including the area shown on the SBM "HDF Location Map". Typically this measurement would also include the length of the feature that was altered due to earth-moving works.
>
> 3. In previous email correspondence you provided reference to the Dingman EA. The EA document for Stage 1 identifies that these reaches are located within the "Tributaries of Interest" associated with the White Oaks Drain. Reach 1 has been included within the EA analysis and recommendations for corridor width shall match with this document and may be refined based on site specific investigations prior to future development.
>
> Your letter recommends that an appropriate corridor width for Reach 2 totals 15 metre wide (7.5 m on either side of feature). As we are seeking an net environmental benefit for the removal of Reach 2, all future corridor widths for Reach 1 shall include the recommendation from the EA (or site specific investigations for this reach) plus the width for Reach 2 for enhancement. The length of this additional corridor width for Reach 1 will directly relate to the revised calculation for the

Email from NRSI to UTRCA – December 17, 2020 (Mapped HDF)

Email from UTRCA to NRSI – December 14, 2020 (Request for map)

Email from NRSI to UTRCA – December 11, 2020 (Info on compensation)

Email from UTRCA to NRSI – November 30, 220 (Follow-up from June/July)

Subject: Re: Goldfield Development - Feature Description (proj2525, proj2524) - Lismer Lane
From: Katharina Richter <krichter@nrsi.on.ca>
Date: 2020-12-17, 12:02 p.m.
To: Stefanie Pratt <pratts@thamesriver.on.ca>, bworrad@menearlaw.com, sallen@mhbcplan.com
CC: Brent Verscheure <VerscheureB@thamesriver.on.ca>, Joseph Lance <jlance@nrsi.on.ca>, Michael Pease <mpease@london.ca>, Mohamed Abuhajar <mohamed@incon.ca>, mvivian@london.ca

Stefanie,
Please see the attached map.
The HDF is 114.4m in length.
The area of its corridor is 0.114ha.

Regards,
Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 258 (f) 519-725-2575
(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-12-14 12:47 p.m., Stefanie Pratt wrote:

> Good afternoon Katharina,
>
> Thank you for the providing the below description. As noted in my previous email, we will need a revised figure identifying the feature (noted at 120m in length) and its buffer. Once this is received, we can ensure appropriate comments are provided through the process to allow this file to move forward.
>
> Kind Regards,
>
> **Stefanie Pratt**
> Land Use Planner
> 1424 Clarke Road
> London, ON N5V 5B9
> t: 519-451-2800 ext. 430
> e: pratts@thamesriver.on.ca
>
> UPPER THAMES RIVER
> CONSERVATION AUTHORITY
>
> >>> Katharina Richter <krichter@nrsi.on.ca> 12/11/2020 8:53 AM >>>

478600 478700 478800

4753400 4753300 4753200 4753100

PAULPEEL AVE

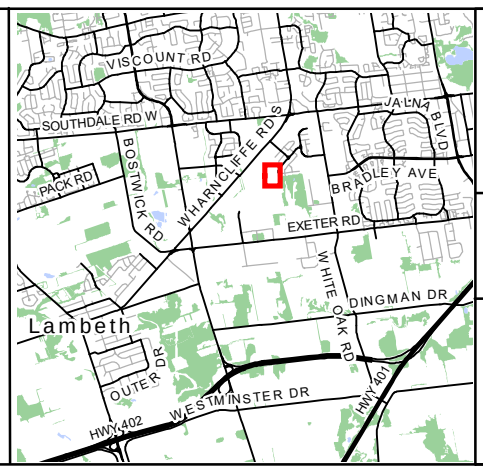
Goldfield Lands

Reach 2

478600 478700 478800

Legend

- Subject Property
- Headwater Drainage Feature (HDF) (presumed original)
- HDF Corridor (10m)
- Reach Break
- Intermittent Watercourse/Drainage Feature



Map 1

Goldfield Lands

Headwater Drainage Feature

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 20 40 60 80 Meters

N

Project: 2525
Date: December 17, 2020
NAD83 - UTM Zone 17
Scale 1:1,000 (11x17")

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. Source: Data provided by MNRF © Copyright: Queen's Printer Ontario Imagery: First Base Solutions Inc. (2019)

Path: X:\2182_TreeInventory_BradleyAveN\NRSI_2525_Map1_DrainageFeatures_5K_2020_12_17_MV.mxd

Stefanie,
Thank you for your email from November 30, as well as for our discussion yesterday morning. As identified in my email to you from July 30, 2020 (below), the drainage feature on the Goldfield property (north of the future Bradley Avenue extension), was 120m in length prior to its removal. As mentioned, this feature was not observed by NRSI prior to its removal, but is estimated to have been a fairly insignificant headwater drainage feature (HDF) that collected runoff from the adjacent field. Prior to its removal, the area was dominated by grasses and old field species (i.e. cultural meadow). Trees in that area were inventoried by NRSI biologists on October 4, 2018. The drainage feature was not noted at that time, likely as it was dry, very narrow, and hidden by vegetation.

A formal headwater drainage feature assessment had not been required of this feature. The 'Evaluation, Classification and Management of Headwater Drainage Features Guidelines' (CVC & TRCA 2014) does not identify a corridor width for protected headwater features. Through other project experience NRSI has had, predominantly in the GTA, a 10m corridor width for HDFs has been deemed acceptable and approved. As such, if the same approach is taken for the HDF on the Goldfield property, at a length of 120m, this is an area of 1,200m2 (0.12ha/0.3ac). This area will be compensated for through habitat restoration on the Goldfield 1 lands, south of the Bradley Avenue extension.

Compensation details will be worked through during the Draft Plan approval process of the Goldfield 1 lands. However, at a high level, compensation will consist of trees, shrubs, and a herbaceous seed mix, all comprised of native species only. The compensation for the HDF will be natural and will contribute to the ecological value and function of the drainage feature corridor on the Goldfield 1 lands.

Regards,
Katharina.

Katharina Richter B.E.S.
Senior Biologist
Natural Resource Solutions Inc.
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Waterloo, ON N2L 3X2
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(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-11-30 10:51 a.m., Stefanie Pratt wrote:

> Good morning Katharina,
>
> I am following up from the email below to see if you have obtained any information from the City in regards to the Dingman EA and the Lismer Lane project. We have waited to provide a response to your previous information in an attempt to reduce duplication of efforts and ensure any revised letters included all available information.
>
> **Scott and Brian**, in response to your inquiries we have been reviewing information prepared by

NRSI to address the watercourse feature that was located on Block 2 lands. This watercourse initiates on these lands before connecting into the southern system, acting as a headwater. This was confirmed through a site visit with City of London, UTRCA and NRSI staff in November 2019. Continual reference refers to it as a "Headwater Drainage Feature", however a full headwater drainage feature analysis (according to TRCA/CVC guidelines) was not requested. An analysis has been requested to determine the extent of the area that was removed and determine how this can be recreated/result in a net environmental benefit. UTRCA staff have agreed to allow this area to be compensated for and to tie into works proposed on the future Goldfield 1 Lands to the south.

The added complication is the ongoing Dingman Subwatershed EA. This tributary has been identified as an area of interest for the City to undertake a complete corridor approach. The complete corridor approach will include future studies to determine how to appropriately accommodate a complete corridor on these lands (consideration for natural hazard and natural heritage), with consideration for future development plans as well. The calculations and works described below/through NRSI correspondence will need to form a part of any future corridor work.

In the absence of the EA information, we recommend moving forward in the following manner:

1. The UTRCA will need a revised letter from NRSI connecting the information discussed via email with the existing data provided. Please include:
a) A Figure identifying the extent of the headwater drainage feature prior to removal. Measurements should be included to identify the length of the feature on the subject lands and the area (including buffers).
b) Text describing the feature prior to removal. This should include description of an appropriate buffer and why a total buffer width of 15 m was identified.
c) Recommendations for appropriate compensation. Total area and suggestions for what that compensation can include.

2. The applicant will need to obtain site plan approval/development agreement from the City for the proposed townhouse development. I have cc'ed Melanie Vivian (City planner and file handler).

3. A Section 28 permit application will be required.
a) Include complete engineer drawing set submitted to City and the revised letter
b) The fee for the permit will be $750 (minor alteration to watercourse)
c) Approval of this permit will allow development to proceed for both Block 2 and the apartment block

If you would like to discuss any of these details, please advise.

Kind Regards,

Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

UPPER THAMES RIVER
CONSERVATION AUTHORITY

>>> Katharina Richter <krichter@nrsi.on.ca> 7/30/2020 12:50 PM >>>
Stefanie,
In the absence of a response from the City on the Dingman EA, I am forwarding you an updated Map 1 (attached) in response to your point #1, below.
The following text provides a response to your point #2:

On May 25, 2020, Reach 2 on the Goldfield site was surveyed. This reach is shown on Map 1, and is very consistent with City of London and UTRCA mapping, as shown on Figures 1 and 2 in NRSI's correspondence to you from December 18, 2019. This HDF portion is 45.1m in length, for a combined total length of 157.1m for Reach 2. It is acknowledged, that Reach 2 may have extended further north in the past, prior to site manipulation. It is not known where the HDF may have originated, but its furthest extent was likely as shown by the blue line in the figure below. The length of this HDF to the property line is 120m, for a potential total Reach 2 length of 232m.

April 29, 2011 (Google Earth)

Once I hear back from the City on the Dingman EA, I will respond with regards to your point #3.

-Katharina.

CELEBRATING 20 YEARS 1998 - 2018

Katharina Richter B.E.S.
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415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
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(m) 519-635-6051
(w) www.nrsi.on.ca (e) krichter@nrsi.on.ca
@nrsinews

On 2020-07-03 3:30 p.m., Katharina Richter wrote:

December 22, 2020

Email from UTRCA to NRSI

Subject: Re: Goldfield Development - Feature Description (proj2525, proj2524) - Lismer Lane
From: "Stefanie Pratt" <pratts@thamesriver.on.ca>
Date: 2020-12-22, 4:26 p.m.
To: "Katharina Richter" <krichter@nrsi.on.ca>, bworrad@menearlaw.com, sallen@mhbcplan.com
CC: "Brent Verscheure" <VerscheureB@thamesriver.on.ca>, "Joseph Lance" <jlance@nrsi.on.ca>, "Michael Pease" <mpease@london.ca>, "Mohamed Abuhajar" <mohamed@incon.ca>, mvivian@london.ca

Katharina,

This calculation of the HDF differs from that previously provided (was noted at 120 metres on various occasions). We've been trying to confirm this information since December 2019 and I'm not sure why it has changed now as we're nearing final approvals. It is my understanding that the feature has been removed from the landscape since we were out site in November 2019, and aerial image has been used to determine this length so it should be consistent? Typically the process is to ensure this information is obtained prior to removal, but since that is not the case we are trying to work with you.

This isn't the only calculation that has changed since your initial assessment; the previous buffer recommendation was for a 15 metre wide corridor which has been reduced to 10 metres through this months correspondence. It is our understanding that you have used a 10 metre corridor in other jurisdictions for HDF's, however the justification you have provided isn't related to this site. This may be acceptable but please provide further explanation for this change.

Given these changes and the spread of information across various emails, multiple letters, and drawings, it is most appropriate at this point in time to provide a revised letter to tie all of this information together (as mentioned in my November 30th email). This letter will ensure the most accurate and up to date information is available for future approvals. Please include the following information in the revised letter:

- Purpose of letter - determine removal and compensation requirements of HDF
- Summary of site visit discoveries - previous info on watercourse depth, width, vegetation, habitat, species observed, etc.
- Description of length and buffers of HDF with appropriate justification (site specific)
- Description of compensation - amount, generic characteristics to be created, and location (typically net environmental benefit)
- Inclusion of Dingman EA generic info and how compensation will add to this
- Appendix - figure provided last week

Once these revisions have occurred, this should be the final piece for approvals to move forward.

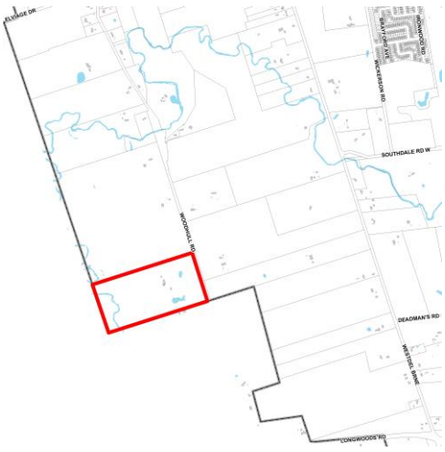
Stefanie Pratt
Land Use Planner
1424 Clarke Road
London, ON N5V 5B9
t: 519-451-2800 ext. 430
e: pratts@thamesriver.on.ca

UPPER THAMES RIVER
CONSERVATION AUTHORITY

PUBLIC MEETING NOTICE

Official Plan and Zoning By-law Amendments

3207 Woodhull Road



File: O-9429/Z-9430
Applicant: Karen and Eric Auzins

What is Proposed?

Official Plan and Zoning amendments to facilitate:

- The severance of the woodlot from the farm holdings for conservation purposes

YOU ARE INVITED!

Further to the Notice of Application you received on November 10, 2021, you are invited to a public meeting of the Planning and Environment Committee to be held:

Meeting Date and Time: Monday, January 31, 2022, no earlier than 4:00 p.m.

Meeting Location: During the COVID-19 emergency, the Planning and Environment Committee meetings are virtual meetings, hosted in City Hall, Council Chambers (see insert)

For more information contact:

Barb Debbert
bdebbert@london.ca
519-661-CITY (2489) ext. 5345
Planning & Development, City of London
300 Dufferin Avenue, 6th Floor,
London ON PO Box 5035 N6A 4L9
File: O-9429/Z-9430

london.ca/planapps

To speak to your Ward Councillor:

Anna Hopkins
ahopkins@london.ca
519-661-CITY (2489) ext. 4009

Date of Notice: January 12, 2022

Application Details

Requested Amendment to The London Plan (New Official Plan)

To align the boundary of the Green Space Place Type on Map 1 – Place Types with proposed lands to be severed, and to change the Potential Environmentally Significant Area on Map 5 – Natural Heritage to Environmentally Significant Area and align it with the proposed lands to be severed to recognize areas to be protected as part of the natural heritage system.

Requested Zoning By-law Amendment

To change the zoning of the lands proposed to be severed from a Holding Open Space (h-2*OS4) Zone and an Agricultural (AG2) Zone to an Open Space Special Provision (OS5(_)) Zone. To change the zoning of the lands proposed to be retained from an Agricultural (AG2) Zone and an Environmental Review (ER) Zone to an Agricultural Special Provision (AG2(_)) Zone and an Environmental Review (ER) Zone. Changes to the currently permitted land uses and development regulations are summarized below.

Both Official Plans and the Zoning By-law are available at london.ca.

Current Zoning

Zone: Holding Open Space (h-2*OS4), Agricultural (AG2), and Environmental Review (ER) Zones
Permitted Uses: Open Space (OS4) – conservation lands, conservation works, golf courses without structures, private parks without structures, public parks without structures, recreational golf courses without structures, cultivation or use of land for agricultural purposes, sports fields without structures. Agricultural (AG2) – a range of agricultural uses, livestock facilities, farm dwellings, forestry uses, kennels, conservation lands, wayside pits, nursery, passive recreation use, farm market, small wind energy conservation system, compost facility, aquaculture, agricultural research station, manure storage facility, mushroom farm. Environmental Review (ER) – conservation lands, conservation works, passive recreational uses, managed woodlot, agricultural uses.
Special Provision(s): n/a
Residential Density: 1 farm dwelling per lot in the Agricultural (AG2) Zone
Height: 12 - 15 metres in the Agricultural (AG2) Zone

Requested Zoning – Severed Lands

Zone: Open Space Special Provision (OS5(_)) Zone
Permitted Uses: conservation lands, conservation works, passive recreation uses which include hiking trails and multi-use pathways, managed woodlots.
Special Provision(s): lot frontage of Zero (0.0m) in place of 15.0 metres, and a reduced Minimum Distance of Separation between livestock barns, manure storage or anaerobic digesters and surrounding land uses from of 60.0 metres in place of 164.8 metres.
Height: 12.0 metres

Within the parcel to be severed, the City may also consider an additional special provision to the requested Open Space Special Provision (OS5(_)) Zone to remove passive recreation uses which include hiking trails and multi-use pathways from the list of permitted uses.

Requested Zoning – Retained Lands

Zone: Agricultural Special Provision (AG2(_)) Zone and Environmental Review (ER) Zone
Permitted Uses: Agricultural Special Provision (AG2(_)) – a range of agricultural uses, livestock facilities, farm dwellings, forestry uses, kennels, conservation lands, wayside pits, nursery, passive recreation use, farm market, small wind energy conservation system, compost facility, aquaculture, agricultural research station, manure storage facility, mushroom farm. Environmental Review (ER) – conservation lands, conservation works, passive recreational uses, managed woodlot, agricultural uses.
Special Provision(s): In the AG2 Zone, to permit a minimum lot area of 10.0 hectares in place of the required minimum of 40.0 hectares.
Residential Density: 1 farm dwelling per lot in the Agricultural Special Provision (AG2(_)) Zone
Height: 12 – 15 metres

Within the parcel to be retained, the City may also consider; a Holding provision for a portion of the AG2(_) Zone to require a Subject Lands Status Report and/or an Environmental Impact Assessment, Hydrogeological Report /Water Balance, and Geotechnical Report prior to any non-farm development on the retained farm parcel; an additional special provision to the AG2(_) Zone to prohibit buildings and structures within 20 metres of the conservation lands; and to rezone a small area from a Holding Open Space (h-2*OS4) Zone to an Open Space Special Provision (OS5(_)) Zone with permission for a zero (0.0m) lot frontage and a reduced minimum lot area, or other modifications to achieve the same effect.

This property is also the subject of an application for consent to sever (City File B.036/21).

Planning Policies

Any change to the Zoning By-law must conform to the policies of the Official Plan, London's long-range planning document. These lands are currently designated as Agriculture, Open Space, and Environmental Review in the 1989 Official Plan. The Agriculture designation permits the cultivation of land and the raising of livestock as the main uses. The Open Space designation permits parks, private open space, flood plain lands and lands that are subject to natural hazards, components of the Natural Heritage System, and lands that contribute to important ecological functions as the main uses. The Environmental Review designation permits existing uses, agriculture, woodlot management, horticulture, conservation, and recreational uses, and essential public utilities and municipal services as the main uses.

The subject lands are in the Farmland, Green Space, and Environmental Review Place Types in The London Plan. The Farmland Place Type permits agricultural uses, residential uses on existing lots of record, home occupations, secondary farm occupation and on-farm diversified uses, agricultural-related commercial and industrial uses that are directly related to farm operations in the area, ancillary retail for on-farm grown and/or produced goods, limited non-agricultural uses, natural resource extraction, small wind energy conservation system, green energy projects and existing uses. The permitted uses in the Green Space Place Type vary considerably dependent on natural heritage features, hazards and natural resources and may include parks, private green space uses such as cemeteries and private golf courses, agriculture, woodlot management, horticulture and urban gardens, conservation, essential public utilities and municipal services, storm water management, and recreational and community services. The Environmental Review Place Type permits existing uses, agriculture, woodlot management, horticulture, conservation, and recreational uses.

How Can You Participate in the Planning Process?

You have received this Notice because someone has applied to change the Official Plan designation and the zoning of land located within 120 metres of a property you own, or your landlord has posted the public meeting notice in your building. The City reviews and makes decisions on such planning applications in accordance with the requirements of the Planning Act. If you previously provided written or verbal comments about this application, we have considered your comments as part of our review of the application and in the preparation of the planning report and recommendation to the Planning and Environment Committee. The additional ways you can participate in the City's planning review and decision making process are summarized below.

See More Information

You can review additional information and material about this application by:

- Contacting the City's Planner listed on the first page of this Notice; or
- Viewing the application-specific page at london.ca/planapps
- Opportunities to view any file materials in-person by appointment can be arranged through the file Planner.

Attend This Public Participation Meeting

The Planning and Environment Committee will consider the requested Official Plan and zoning changes at this meeting, which is required by the Planning Act. You will be invited to provide your comments at this public participation meeting. A neighbourhood or community association may exist in your area. If it reflects your views on this application, you may wish to select a representative of the association to speak on your behalf at the public participation meeting. Neighbourhood Associations are listed on the Neighbourgood website. The Planning and Environment Committee will make a recommendation to Council, which will make its decision at a future Council meeting.

Attendance is available through telephone or virtual web streaming (computer) application. Pre-registration is required to access these options and can be found in the Public Participation insert.

Please refer to the enclosed Public Participation Meeting Process insert.

What Are Your Legal Rights?

Notification of Council Decision

If you wish to be notified of the decision of the City of London on the proposed official plan amendment and zoning by-law amendment, you must make a written request to the City Clerk, 300 Dufferin Ave., P.O. Box 5035, London, ON, N6A 4L9, or at docservices@london.ca. You

will also be notified if you speak to the Planning and Environment Committee at the public meeting about this application and leave your name and address with the Secretary of the Committee.

Right to Appeal to the Ontario Land Tribunal

If a person or public body would otherwise have an ability to appeal the decision of the Council of the Corporation of the City of London to the Ontario Land Tribunal but the person or public body does not make oral submissions at a public meeting or make written submissions to the City of London before the proposed official plan amendment is adopted, the person or public body is not entitled to appeal the decision.

If a person or public body does not make oral submissions at a public meeting or make written submissions to the City of London before the proposed official plan amendment is adopted, the person or public body may not be added as a party to the hearing of an appeal before the Ontario Land Tribunal unless, in the opinion of the Tribunal, there are reasonable grounds to add the person or public body as a party.

For more information go to https://olt.gov.on.ca/appeals-process/forms/.

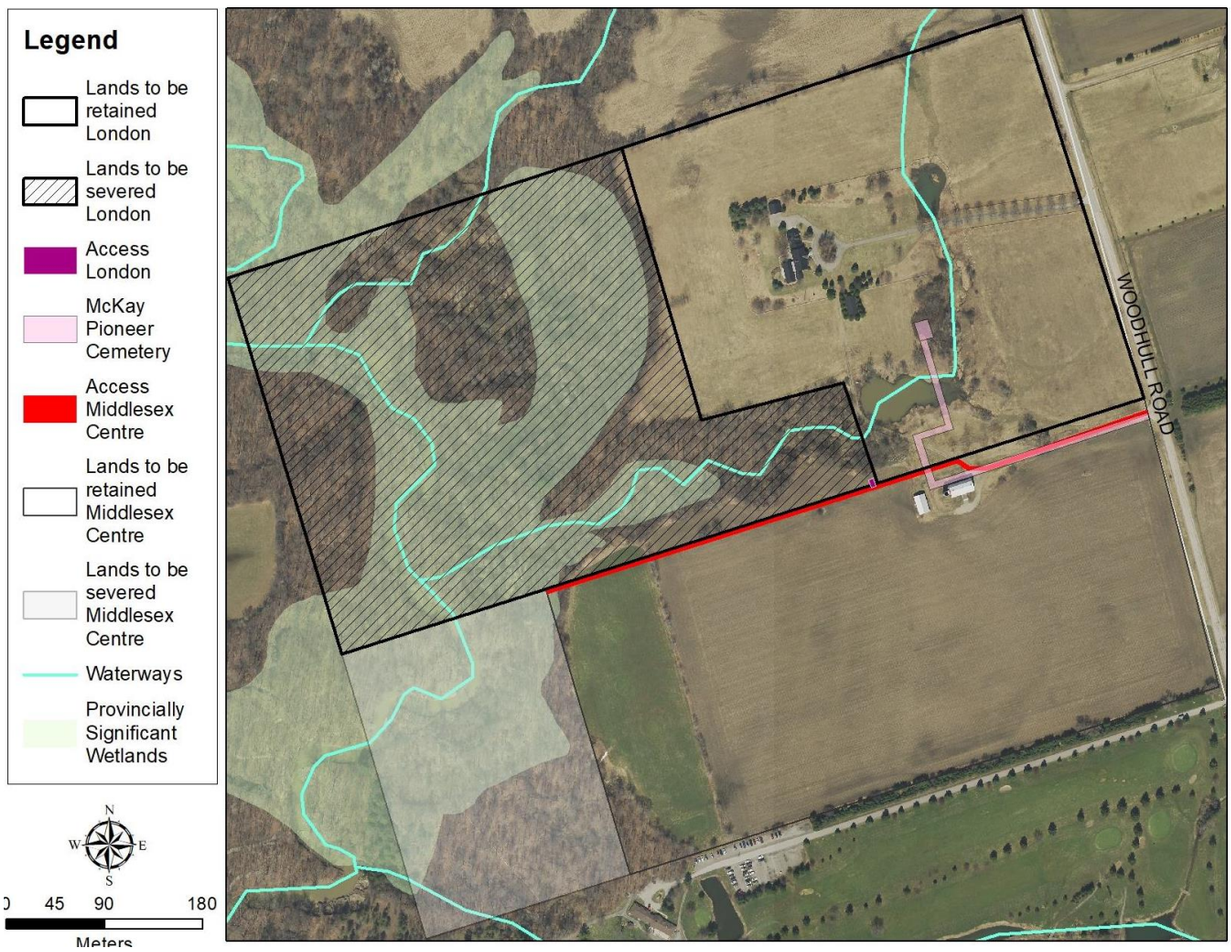
Notice of Collection of Personal Information

Personal information collected and recorded at the Public Participation Meeting, or through written submissions on this subject, is collected under the authority of the Municipal Act, 2001, as amended, and the Planning Act, 1990 R.S.O. 1990, c.P.13 and will be used by Members of Council and City of London staff in their consideration of this matter. The written submissions, including names and contact information and the associated reports arising from the public participation process, will be made available to the public, including publishing on the City's website. Video recordings of the Public Participation Meeting may also be posted to the City of London's website. Questions about this collection should be referred to Cathy Saunders, City Clerk, 519-661-CITY(2489) ext. 4937.

Accessibility

Alternative accessible formats or communication supports are available upon request. Please contact developmentservices@london.ca for more information.

Site Concept



The above image represents the applicant's proposal as submitted and may change.

Public Participation Meeting Process

As part of the City's ongoing efforts to slow the spread of COVID-19, and in keeping with the regulations and guidelines provided by the Province of Ontario, the Public Participation Meeting process has been modified. The capacity for individuals in City Hall meeting rooms and the Council Chambers Public Gallery will reflect the requirement for 2m physical distancing, with designated seating and standing areas being provided.

Please refer to the public meeting notice for all options available for you to participate in the planning process.

Public Participation Meeting (PPM) Process

- Members of the public are asked to "pre-register" to speak in person at a PPM. Pre-registered speakers will be given priority access to entering City Hall. Speakers will be limited to five minutes of verbal presentation.
    - **Pre-register by calling 519-661-2489 ex. 7100; or by emailing PPMClerks@london.ca** Please indicate the PPM subject matter when contacting the Clerk's Office. Registrations will be confirmed.[1]
    - When pre-registering, members of the public will have a brief COVID-19 health screening and will be asked to self-screen prior to entering City Hall.
- Presentations will be strictly verbal; any other submission of photos, slides or written information must be made outside of the PPM. These can be forwarded to the Planner associated with this application and/or to the registration email, noted above. In order to be considered, all submissions should be made prior to the Council meeting when the Planning and Environment Committee recommendation regarding the subject matter is considered.

Public Participation Meeting (PPM) Process – At the meeting

- Members of the public should self-screen before entering City Hall. You likely will be greeted by security upon entering the building. A mask/face covering is required at all times in City Hall.
- Each committee room in use for the PPM will broadcast the meeting taking place in the Council Chambers.
- City Staff will be in each assigned room to assist members of the public.
- When appropriate, individual members of the public will have an opportunity to speak to the committee remotely, using the camera/microphone in the committee room. Floor markings will indicate where to stand.

Council Chambers

- Committee members and staff will be present in the Chambers (physically, or by remote attendance).
- There will be no public access to the Council floor.

[1] Notice of Collection of Personal Information – information is collected under the authority of the *Municipal Act, 2001*, as amended, and the *Planning Act,* 1990 RSO 1990, c.P. 13, and will be used by Members of Council and City of London staff in their consideration of this matter. Please see additional information on the enclosed Public Meeting Notice pages.

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Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

ENVIRONMENTAL IMPACT STUDY
ADELAIDE WASTEWATER TREATMENT PLANT
LONDON, ONTARIO

Prepared for:
THE CITY OF LONDON

Prepared by:
MATRIX SOLUTIONS INC.

Version 0.2
November 2021
Guelph, Ontario

650 Woodlawn Rd W, Unit 7B
Guelph, ON N1K 1B8
T 519.772.3777 F 226.314.1908
www.matrix-solutions.com

ENVIRONMENTAL IMPACT STUDY

ADELAIDE WASTEWATER TREATMENT PLANT

CITY OF LONDON

Prepared for City of London, November 2021

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

reviewed by
Robyn Leppington, B.Sc.
Senior Aquatic Biologist

Karen Reis, B.E.S. (Hons)
Ecologist

DISCLAIMER

Matrix Solutions Inc. certifies that this report is accurate and complete and accords with the information available during the project. Information obtained during the project or provided by third parties is believed to be accurate but is not guaranteed. Matrix Solutions Inc. has exercised reasonable skill, care, and diligence in assessing the information obtained during the preparation of this report.

This report was prepared for City of London. The report may not be relied upon by any other person or entity without the written consent of Matrix Solutions Inc. and of City of London. Any uses of this report by a third party, or any reliance on decisions made based on it, are the responsibility of that party. Matrix Solutions Inc. is not responsible for damages or injuries incurred by any third party, as a result of decisions made or actions taken based on this report.

VERSION CONTROL

Version	Date	Issue Type	Filename	Description
V0.1	19-Oct-2021	Draft	32667-531 Greenway and Adelaide EIS R 2021-10-20 draft V0.1.docx	Issued to client for review
V0.2	26-Nov-2021	Draft revised	32667-531 Adelaide EIS R 2021-11-26 draft V0.2.docx	Report split into two; revisions issued to client

EXECUTIVE SUMMARY

The City of London retained Matrix Solutions Inc. to complete two Municipal Class Environmental Assessments (EA) to address climate change resiliency measures at the Greenway Wastewater Treatment Centre (WWTC) and Adelaide Wastewater Treatment Plant (WWTP). The two facilities have been identified as vulnerable to severe flooding and the EA will seek to identify a preferred flood protection approach to improve asset resilience, enhance treatment capabilities, and improve plant safety.

This report will focus on the natural heritage features and functions of the Adelaide WWTP, with the Greenway WWTP discussed in a separate report. The purpose of the Environmental Impact Study (EIS) was to define and record the natural heritage features, discuss implications and constraints to the proposed short list of alternatives, and recommend mitigation measures to offset any potential negative impacts to protected features. The short list of alternatives for Adelaide WWTP recommended developing a berm with varying entrance protection.

Matrix combined information from the ecological field studies with relevant information from background reviews to identify significant features within the Adelaide WWTP study area. The results indicated several natural heritage features, which included:

- significant woodlands
- wetlands (unevaluated)
- candidate significant wildlife habitat
- candidate and confirmed species at risk (SAR)
- fish and fish habitat

The most significant ecological functions identified within the Adelaide WWTP study area include the significant woodland located to the south of the WWTP. A confirmed avian SAR (Chimney swift) was observed flying over the study area but does not have confirmed nesting sites within the study area; therefore, it is not anticipated to be directly impacted during construction activities.

The major undertakings of the flood mitigation alternatives at the Adelaide WWTP include the creation of a berm that would encapsulate the northern, western, and southern boundaries of the WWTP and would also include varying degrees of flood protection (raise entrance, temporary measures, and berm) for the east side of the property, which largely includes a parking lot. The north and east portions of the study area, where the berm and raised entrance are to be erected, are already disturbed (parking lot and manicured lawn) and will include minimal vegetation removal. The majority of the natural heritage features within the site are located along the west and south side of the property. It has been recommended within the mitigation measures that the construction of the berm should not impede with the significant woodland located directly south of the proposed berm. Tree protection fencing for this area should be located outside of the dripline to keep the significant woodland intact and to minimize impact. Along the western side of the proposed berm there will be some vegetation removal, which is

located within 25 m of a stormwater outfall that outlets into the Thames River. Mitigation measures have been recommended to protect this outfall and the Thames River from erosion, sedimentation, and spills. Any trees removed should be replaced at a 3:1 ratio, which will result in a long-term, net benefit for the area once the trees and vegetation reach maturity.

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1 INTRODUCTION

The City of London (the City) retained Matrix Solutions Inc. to complete two Municipal Class Environmental Assessments (EAs) to address climate change resiliency measures at the Greenway Wastewater Treatment Centre (WWTC) and Adelaide Wastewater Treatment Plants (WWTP) in London, Ontario. The two facilities have been identified as vulnerable to severe flooding, and the EA will seek to identify a preferred flood protection approach to improve asset resilience, enhance treatment capabilities, and improve plant safety.

One component of the EA process is the completion of an Environmental Impact Study (EIS) to define and record the natural heritage features, discuss implications and constraints to the proposed short list of alternative designs and recommend mitigation measures to offset any potential negative impacts to protected features.

This report will focus on the natural heritage features and functions of the Adelaide WWTP, with the Greenway WWTP discussed in a separate report.

1.1 Study Area

The study area includes the fenced in area of the WWTP and the 50 m surrounding the facility.

The Adelaide WWTP is located at 1153 Adelaide Street North #0B1 (Figure 2). Adelaide is approximately 300 m from the Thames River. It is bounded to the north by the North London Athletic Fields, to the south and east by residential and commercial lands, and to the southwest by an undeveloped natural area.

1.2 Study Objectives

The objective of the EIS is to define and record the natural heritage features within each facilities study area, discuss implications and constraints to the proposed short list of alternative designs and recommend mitigation measures to offset any potential negative impacts to protected features. The short list of alternatives recommends developing a berm with varying entrance protections for the Adelaide WWTP.

This EIS document was completed to meet the objectives and criteria as defined within the approved Terms of Reference (Appendix A) as well as applicable federal, provincial, and municipal policies and guidelines as defined in Section 2.

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Easting (m)

479400 479550 479700 479850 480000 480150

Northing (m)

4762800 4762650 4762500 4762350 4762200

- Adelaide Wastewater Treatment Plant Study Area
- Adelaide Wastewater Treatment Plant Study Area (50m Buffer)
- Highway
- Road

1:3,000 metres

30 0 30 60

NAD 1983 UTM Zone 17N

Reference: Contains information licensed under the Open Government Licence – Ontario. Imagery (2020) Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

City of London
Greenway and Adelaide Wastewater Treatment Plants

Adelaide Study Area

Date:	Project:	Submitter:	Reviewer:
November 2021	32667	K. Reis	R. Leppington

Disclaimer: The information contained herein may be compiled from numerous third party materials that are subject to periodic change without prior notification. While every effort has been made by Matrix Solutions Inc. to ensure the accuracy of the information presented at the time of publication, Matrix Solutions Inc. assumes no liability for any errors, omissions, or inaccuracies in the third party material.

Figure 1

I:\City of London\32667\Figures And Tables\EA\2021\Report\EIS_Reporting\Adelaide\Figure 1-Adelaide _Study_Area.mxd - Tabbed_L - 25-Nov-21, 06:04 PM - mwright - TID005

2 REGULATORY FRAMEWORK

This section provides an overview of key federal, provincial, and local environmental legislation, policies, and regulations that are directly applicable/relevant to the Adelaide study area. This policy framework provides guidance on the protection of natural heritage features and the evaluation of significance. Features identified within the study area were evaluated against relevant federal, provincial, and municipal planning policies applicable to the local site context, to determine natural heritage constraints and recommend appropriate mitigation measures to minimize risks of negative impacts to the environment.

2.1 Federal Legislation

2.1.1 Species at Risk Act

Species classified as extirpated, endangered, and threatened in Schedule 1 of the *Species at Risk Act* (SARA) are protected under the provisions of SARA. This includes protection to the species and their critical habitat. Critical habitat is defined as those habitats necessary for the survival or recovery of a listed species, as identified in the recovery strategy or in an action plan for the species. While SARA applies to species on federal land, such as Canadian oceans and waterways, national parks, national wildlife areas, some migratory bird sanctuaries, and First Nations reserve lands, it also applies to species at risk (SAR) migratory birds protected under the *Migratory Birds Convention Act* (MBCA) and fish, anywhere they occur. Therefore, SARA only applies to SAR migratory birds, fish, and mussels for this project.

General prohibitions (does not apply to Special Concern species except for provisions related to EAs, in which case, all Schedule 1 species apply) that apply:

- kill, harm, harass, capture, or take an individual of a species listed in Schedule 1 of SARA as Endangered, Threatened, or Extirpated (Section 32[1] of SARA)
- possess, collect, buy, sell, or trade an individual, or any part or derivative of a species listed in Schedule 1 of SARA as Endangered, Threatened, or Extirpated (Section 32[2] of SARA)
- damage or destroy the residence (e.g., nest or den) of one or more individuals of a species listed in Schedule 1 of SARA as Endangered or Threatened, or that an activity is listed as Extirpated, if a recovery strategy has recommended the reintroduction of the Extirpated species (Section 33 of SARA)

Destruction of critical habitat of any listed Endangered species or of any listed Threatened species if the following apply:

- the critical habitat is on federal land, in the exclusive economic zone of Canada, or on the continental shelf of Canada

- the listed species is an aquatic species
- the listed species is a species of migratory birds protected by the MBCA (Section 58[1] of SARA)

General habitat (necessary for the species survival and recovery) (S.80) by Emergency Order only:

- applies to all species, including aquatic and migratory birds on federal land or Exclusion Economic Zone (relates to the sea)
- migratory birds on non-federal lands or Exclusion Economic Zone (relates to the sea)
- all species, except aquatic and migratory birds, on non-federal lands or Exclusion Economic Zone (relates to the sea)

2.1.2 Fisheries Act

The *Fisheries Act* outlines the framework for the management and regulation of fisheries and the conservation and protection of fish and fish habitat within the fishing zones of Canada, all waters in the territorial sea of Canada, and all internal waters of Canada. The most recent revision to the *Fisheries Act* restricts activities that cause "death of fish, other than by fishing" as well as the "harmful alteration, disruption, or destruction of fish habitat (HADD; Government of Canada 2019)" and the release of substances that are known or suspected to be deleterious to fish or fish habitat.

Proposed works that are anticipated to directly or indirectly result in negative impacts to fish and fish habitat as described in the *Fisheries Act* will require a review by Fisheries and Oceans Canada (DFO) to determine whether the proposed activities may be permitted under the *Fisheries Act*. If so, the project may require an authorization or ministry approval under the *Fisheries Act* (DFO 2021a).

2.1.3 Migratory Birds Convention Act

The MBCA and associated regulations, including the Migratory Birds Regulations protect certain native species of migratory birds and their nests and eggs. Any migratory bird species that meets all three of the following criteria is protected under the MBCA:

- birds referred to in Article 1 of the Migratory Birds Convention, as amended under the 1995 Protocol, either directly by species name, directly by the listing of their family, or indirectly by interpretation of the original convention
- species that are native or naturally occurring in Canada:
    - A native migratory bird is one that is present entirely as a result of natural biological or ecological processes.

- Species known to have regularly occurred in Canada. Although species that occur frequently (i.e., “accidentals”) and that meet criteria 1 and 2 are not included on this list, they continue to be considered as having protection under the MBCA any time they occur in Canadian territory.

General prohibitions under the MBCA and associated regulations protect migratory birds, their nests, and eggs and prohibit the deposit of harmful substances in waters and areas frequented by them. It also prohibits deposition of harmful substances that have the potential to enter waters where they occur. The associated regulations also include an additional prohibition against the incidental take, which is defined as “the inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs.”

Environment and Climate Change Canada (ECCC) administers the MBCA and its associated regulations. Compliance with the MBCA and associated regulations is best achieved through a due diligence approach based on the consideration of avoidance guidelines on the ECCC website. Any vegetation removals would need to be completed outside of the breeding bird season for Zone C2 (April 10 to August 15) to avoid disturbing active nests of migratory birds protected under the MBCA (Government of Canada 2021).

2.2 Provincial Legislation, Policies, and Guidelines

2.2.1 Endangered Species Act

The *Endangered Species Act* (ESA) provides for the conservation and protection of fauna and flora species within the Province of Ontario that are at risk of extinction. Section 9(1) of the ESA prohibits the killing, harming, harassment, capture, taking, possession, transport, collection, buying, selling, leasing, trading, or offering to buy, sell, lease, or trade species listed as extirpated, endangered, or threatened on the Species at Risk in Ontario (SARO) list. Section 10(1) of the ESA prohibits damaging or destroying habitat of endangered or threatened species on the SARO list and may apply to extirpated species through special regulations. General habitat protection applies to all endangered and threatened species. Species-specific habitat protection is also given to those species with regulated habitat, as identified in Ontario Regulation 242/08. Species designated as special concern are not given species or habitat protection under the ESA; however, this designation aids in identification of significant wildlife habitat (SWH) at the municipal level.

Should an ESA protected species be encountered, impacts to the species or its habitat must be avoided or mitigated. Strategies to avoid contravention of the ESA include avoidance (e.g., through design modifications or timing of works), adherence to an applicable Notice of Activity, or by obtaining an Overall Benefit Permit.

2.2.2 Provincial Policy Statement

The Provincial Policy Statement, 2020 (PPS; MMAH 2020) provides policy direction related to land use planning and development in Ontario. The updated PPS, issued under Section 3 of the *Planning Act*, came into effect May 1, 2020, and applies to planning decisions made on or after that date. The PPS

addresses the need to protect natural heritage features to ensure Ontario's long-term prosperity, environmental health, and social well-being.

Section 2.1 of the PPS provides direction to regional and local municipalities regarding planning policies for the protection and management of natural heritage features and resources. The natural heritage policies that are relevant to this project state (MMAH 2020):

2.1.1 Natural features and areas shall be protected for the long term.

2.1.2 The diversity and connectivity of natural features in an area, and the long term ecological function and biodiversity of natural heritage systems, 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.

2.1.3 Natural heritage systems shall be identified in Ecoregions 6E & 7E1, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas.

2.1.4 Development and site alteration shall not be permitted in: a) significant wetlands in Ecoregions 5E, 6E and 7E; and b) significant coastal wetlands.

2.1.5 Development and site alteration shall not be permitted in:

a) significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;
b) significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
c) significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
d) significant wildlife habitat;
e) significant areas of natural and scientific interest; and
f) coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4(b) unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

2.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

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

2.1.8 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and, 2.1.6 unless the ecological function of the

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

2.1.9 Nothing in policy 2.1 is intended to limit the ability of agricultural uses to continue.

2.2.2.1 Natural Heritage Reference Manual

The *Natural Heritage Reference Manual for the Natural Heritage Policies of the Provincial Policy Statement, 2005* (NHRM; MNR 2010) was developed to provide technical guidance for implementing the natural heritage policies of the PPS. Although not yet updated to reflect changes adopted by the 2020 PPS update, it still functions as an important tool for those involved in development and review of policy documents, review and approval of development applications, and matters before provincial boards and tribunals. The NHRM is organized by specific natural heritage policies and provides basic guidance materials in the main sections, supported by more technical material in its appendices. The NHRM provides criteria in which to evaluate natural heritage features for their significance as well as recommendations for mitigation. Natural heritage features covered under the NHRM include:

- significant habitat of endangered and threatened species
- significant wetlands and significant coastal wetlands
- significant woodlands
- significant valleylands
- SWH
- significant areas of natural and scientific interest (ANSIs)
- fish habitat

Some of these features (i.e., Provincially Significant Wetlands [PSWs] and ANSIs) are identified, often with input from consultants, by the Ontario Ministry of Natural Resources and Forestry (MNRF). Others are to be identified by the local area municipalities or planning authorities (i.e., significant woodlands, significant valleylands, SWH). Threatened and endangered species are designated at the provincial level, but their habitat is typically not identified or verified until site-specific studies are completed and, if present, confirmed by MNRF. It is expected that even where features have been identified at the provincial, regional, or local levels that verification and some level of refinement will be required at the site-specific level.

2.2.2.2 Significant Wildlife Habitat Technical Guide

Pre-dating the NHRM, the *Significant Wildlife Habitat Technical Guide* (SWHTG; MNR 2000) was prepared to assist planning authorities and other participants in the land use planning systems. The SWHTG provides a technical manual that presents information on the identification, description, and prioritization of SWH. The document describes in detail some of the techniques, issues, and processes identified in the NHRM and provides a compilation of relevant technical support materials and references. Though it is

based on a former version of the NHRM, it provides additional information for evaluating SWH. In order to ensure a comprehensive approach identifying and evaluating SWH, the SWHTG divides wildlife habitat into four categories:

- seasonal concentration areas
- rare vegetation communities or specialized habitats for wildlife
- habitats of species of conservation concern
- animal movement corridors

More recently, due to Ontario's size and biodiversity, MNRF also created SWH ecoregion criteria schedules that support the SWHTG and provide criteria that are reflective of regional significance. Information provided in the schedules includes descriptions of wildlife habitat, wildlife species, and the criteria required to determine SWH. For this project, the assessment of SWH follows the guidelines in *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015).

2.2.3 Conservation Authorities Act

Section 28(1) of the *Conservation Authorities Act* empowers conservation authorities with the ability to make regulations governing development that can have an impact on watercourses, water bodies, and other hazard lands such as floodplains and wetlands.

Adelaide WWTP is within the Upper Thames Region Conservation Authority (UTRCA) regulation limits. As such, development on these lands must adhere to the policies and regulations of Ontario Regulation 157/06: *Upper Thames River Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*.

Proposed developments or associated works that may impact UTRCA-regulated areas may require permitting from UTRCA.

2.2.3.1 Upper Thames River Conservation Authority Environmental Planning Policy Manual

The *Environmental Planning Policy Manual for the Upper Thames River Conservation Authority* was approved on June 28, 2006, and was revised on October 24, 2017 (UTRCA 2017). The purpose of the manual is to provide local Upper Thames watershed policies that will guide development and site alteration while protecting, preserving, and enhancing the natural environment (UTRCA 2017).

The document identifies natural hazards (floodplains and slopes) and natural heritage resources (wetlands, woodlands, valleylands, wildlife habitat, threatened and endangered species, aquatic/fish habitat, and life science areas), and illustrates the UTRCA protection and preservation policies for these features. The goal of this planning document is to protect natural heritage features from negative impacts

and to maintain, restore, and enhance the biodiversity, ecological function, and connectivity of natural heritage features within the watershed (UTRCA 2017).

2.2.4 Accessibility for Ontarians with Disabilities Act

Ontario Regulation 413/12: *Integrated Accessibility Standards* provides for the development, implementation, and enforcement of accessibility standards in order to achieve accessibility for Ontarians with disabilities with respect to goods, services, facilities, accommodation, employment, buildings, structures, and premises on or before January 1, 2025.

2.3 Municipal Legislation, Policies, and Guidelines

2.3.1 The London Plan (City of London Official Plan)

The London Plan is the City's new official plan adopted by City council on June 23, 2016, and was approved by the Minister on December 28, 2016 (City of London 2016). The plan establishes a policy framework to guide the City's growth and development. The objectives and policies of this plan were drafted by City council to assist in making decisions for the physical development of the municipality, while having regard for relevant social, economic, and environmental matters.

The City has mapped the natural heritage system and identified areas as Green Space Place Type or Environmental Review Place Type. Natural heritage areas that are within the Green Space Place Type represent significant natural features and ecological functions. Natural heritage features and areas and other areas included in the Green Space Place Type include:

- fish habitat
- habitat of endangered species and threatened species
- PSWs
- significant woodlands and woodlands
- significant valleylands
- SWH
- ANSIs
- water resource systems
- Environmentally Significant Areas (ESAs)
- upland corridors
- potential naturalization areas
- adjacent lands

Natural heritage features and areas included in the Environmental Review Place Type include:

- unevaluated wetlands
- unevaluated vegetation patches
- other vegetation patches larger than 0.5 ha
- valleylands
- potential ESAs

The environmental policies section of *The London Plan* further describes the natural heritage features as well as the permitted and unpermitted development and alternation within these features.

2.3.2 City of London Environmental Management Guidelines

In 2007, the City completed and approved a set of six Environmental Management Guidelines (City of London 2007). These guidelines provide a consistent template, which has clear expectations and ensures that relevant issues are not overlooked and that unnecessary items are excluded.

The City's *Guidelines for the Preparation and Review of Environmental Impact Statements* was utilized most extensively during the planning process for this project to determine the scope of the EIS (City of London 2003). The project is subject to EIS requirements, as it is located within a significant river corridor (among other components discussed in Section 5 of this report). A review of the EIS Issues Summary Checklist was completed to scope the EIS and identify ecological data gaps within the Adelaide WWTP study area. The EIS final Terms of Reference was approved by the City on May 4, 2021 (Appendix A).

2.3.3 Thames Valley Corridor Plan

The *City of London Thames Valley Corridor Plan* (Dillon Consulting and D.R. Poulton 2011) recommends measures to protect and enhance the natural features within the Thames River Valley in support of *The London Plan* (City of London 2016). A key ecological goal of the *City of London Thames Valley Corridor Plan* is to preserve, enhance, and create ecological corridors and linkages between natural features in order to establish a continuous corridor along the Thames River and enhance linkages to tributary watersheds (Dillon Consulting and D.R. Poulton 2011).

2.3.4 Middlesex County Official Plan

The *Middlesex County Official Plan* was most recently consolidated in 2006 (Middlesex County 2006). Middlesex County surrounds the City, but the City itself is politically separate from Middlesex County.

The *Middlesex County Official Plan* endeavours to work with the City and provide seamless policy integration with *The London Plan*.

3 STUDY APPROACH AND METHODOLOGY

Information pertaining to natural heritage resources within or adjacent to the Adelaide WWTP study area was obtained through a review of available background studies, databases, and field investigations.

3.1 Background Review

The following information sources were reviewed for records related to natural heritage features that have the potential or are known to occur within the Adelaide study area.

Initial background requests regarding terrestrial sensitivities and SAR were submitted to the Ministry of the Environment, Conservation and Parks (MECP) and to the UTRCA. In addition to information provided by these regulatory agencies, other publicly available data sources were reviewed to determine potential species of conservation concern (SCC) and SAR whose occurrence ranges overlap with the study area. Background review material for the study area has also been obtained from available secondary source reports. The majority of background information was provided by the UTRCA. The sources reviewed are outlined in Table 1.

TABLE 1 Background Data Sources Reviewed

Source	Type	Description
Ministry of Environment, Conservation and Parks (MECP; Markham 2021, Pers. Comm.)	Agency Correspondence	A project screening request was sent to MECP on May 12, 2021, for information related to natural heritage features and species at risk (SAR) potential within the study area. The MECP responded on August 27, 2021, indicating additional SAR and species of conservation concern (SCC), which were incorporated into Appendix B
Upper Thames Region Conservation Authority (UTRCA; Ramsey 2021, Pers. Comm.)	Agency Correspondence	A background request for natural heritage information was submitted to UTRCA on May 12, 2021. This information was received on June 9, 2021, and was incorporated into Appendix B.
Ministry of Natural Resources and Forestry (MNRF; Webb 2021, Pers. Comm.)	Agency Correspondence	A background request for natural heritage information was submitted to MNRF on May 12, 2021. This information was received on June 9, 2021, and was incorporated into Appendix B.
Aquatic Species at Risk Maps (DFO 2021b)	Online Database	Aquatic SAR mapping is made available online by Fisheries and Oceans Canada for species listed endangered, threatened, or special concern under the *Species at Risk Act*. Results are included in Appendix C.
Natural Heritage Information Center (NHIC) Make-a-Map: Natural Heritage Areas (NHA MaM) (MNRF 2021a)	Online Database	A web application that provides information on provincial parks, conservation reserves, and natural heritage features (i.e., Areas of Natural and Scientific Interest (ANSI), wetlands, woodlands, and natural heritage systems related to provincial policy plan areas, such as the Niagara Escarpment, Oak Ridges Moraine, and Greenbelt Plans.) The NHA MaM also provides NHIC data, which is organized into 1 km^2 map squares and includes information on SCC and SAR records. Results are included in Appendix C.

Source	Type	Description
Lands Information Ontario (LIO) Geospatial Data (MNRF 2021b)	Online Database	LIO data is maintained by MNRF and provides key provincial geospatial data for Ontario. Shapefiles obtained from the LIO open datasets were used to show the natural features within the study area. Key datasets that were reviewed for the study area include policy plan areas, municipal land use designations, ANSIs, provincial parks and conservation areas, wetlands, woodlands, and watercourses.
Atlas of the Mammals of Ontario (Dobbyn 1994)	Online Atlas	The *Atlas of the Mammals of Ontario* shows the geographic distribution of mammals for three time periods: pre-1900, 1900 to 1969, and 1970 to 1993. A review of the 1970 to 1993 period was completed. Results are included in Appendix C.
Ontario Reptile and Amphibian Atlas (ORAA; Ontario Nature 2015)	Online Atlas	The ORAA provides known ranges of reptiles and amphibian species in Ontario based on historic and current species occurrences. Results are included in Appendix C.
Ontario Breeding Bird Atlas Guide for Participants (OBBA; OBBA 2001)	Online Atlas	The OBBA provides a list of bird species that have been observed during surveys completed between 1981 and 1985, and 2001 and 2005. Species that were documented between 2001 and 2005 were considered as part of this study. Results are included in Appendix C.
Ontario Butterfly Atlas (OBA; TEA 2019)	Online Atlas	The OBA collects observations of butterflies within Ontario. Sightings were reviewed from 2016 onward. Results are included in Appendix C.
Important Bird Areas of Canada (IBA; Bird Studies Canada 2021)	Online Atlas	The IBA was reviewed to determine if there are any important bird areas within the study area. Reviewed and study area are not located within an important bird area.
The London Plan (City of London 2016)	Online Mapping	*The London Plan* is the City of London's official plan, and schedules were reviewed to determine if there were any identified natural heritage features within the study area. Results are included in Appendix C
Thames Valley Parkway North Branch Connection, Class Environmental Assessment Environmental Impact Study, Richmond Street to Adelaide Street (Dillon Consulting 2016)	Report	Environmental impact study for lands adjacent to and partially within the Thames River Valley between Richmond Street and Adelaide Street in London. Significant findings were incorporated into this report.
One River Master Plan Environmental Assessment, River Characterization, City of London, Thames River (Matrix 2019)	Report	The One River Master Plan Municipal Class Environmental Assessment (EA) was initiated to integrate the outcomes of the dam, Ribbon of the Thames design, and other various improvement projects along the Thames River and adjacent valley corridor. The EA included lands adjacent to the Thames River from "the Forks" to Springbank Dam. Significant findings were incorporated into this report.
City of London Thames Valley Corridor Plan (Dillon Consulting and D.R. Poulton 2011)	Report	The *City of London Thames Valley Corridor Plan* recommends measures to protect and enhance the natural features within the Thames River Valley in support of *The London Plan*

3.2 Analysis of Significance and Sensitivity

The ecological features identified within the study area are evaluated to determine the significance of each feature. Significance is based on regional, provincial, and federal designations, which are described in the following subsections.

3.2.1 Natural Area Designations

Natural area designations are those that are recognized as significant on official plans or in other policy planning documents. This includes ANSIs (provincially, regionally, or other), significant wetlands (provincially, regionally, or locally), significant woodlands, and ESAs. ANSIs and ESA are evaluated by the province or municipality, while of these designations, only wetlands and woodlands can be assessed for significance by non-government organizations.

3.2.2 Significant Wildlife Habitat Screening

MNRF provides specific guidance on identifying and assessing wildlife habitat in the SWHTG (MNR 2000), the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015), and the NHRM (MNR 2010). The MNRF recognizes five main categories of wildlife habitat, each with several wildlife habitat types, each with criteria to evaluate significance. A description of each wildlife habitat category is provided below.

- **Seasonal concentration areas of animals:** defined as “areas where animals occur in relatively high densities for the species at specific periods in their life cycles and/or in particular seasons” and areas that are “localized and relatively small in relation to the area of habitat used at other times of the year” (MNR 2010).

- **Rare vegetation communities:** defined as “areas that contain a provincially rare vegetation community and areas that contain a vegetation community that is rare within the planning area” (MNR 2010).

- **Specialized habitat for wildlife:** defined as “areas that support wildlife species that have highly specific habitat requirements, areas with high species and community diversity, and areas that provide habitat that greatly enhances species' survival” (MNR 2010).

- **Habitat for SCC:** defined as “habitats of species that are designated at the national level as Endangered or Threatened by COSEWIC [the Committee on the Status of Endangered Wildlife in Canada], which are not protected in regulation under Ontario's ESA [the *Endangered Species Act*]; habitats of species listed as Special Concern under the ESA on the SARO [Species at Risk in Ontario] List (formerly referred to as "Vulnerable" in the SWHTG); and habitats of species that are assigned a provincial (i.e., sub-national) conservation status rank of S1 to S3 and are not on the SARO List” (MNR 2010).

- **Animal movement corridors:** defined as “elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another” (MNR 2010).

3.2.3 Species at Risk Screening

The background review identified potential SAR that could occur within the Adelaide study area. All SAR identified were screened to determine the likelihood of occurrence and whether suitable habitat is present.

SAR are defined in this report to include the following provincial and federal designations:

- ESA (provincial): all provincially designated species that are listed as extirpated, endangered, or threatened on the SARO list and protected under the ESA; species listed as special concern are considered a SCC, as they are not protected under the ESA.

- SARA (federal): only applies to fish and migratory birds protected under the MBCA, anywhere they occur (e.g., includes non-federal land), that are designated as extirpated, endangered, and/or threatened under the SARA. All other species are only protected if special provisions or executive orders are made.

To determine if suitable habitat for SAR is available within the study area, the preferred habitat requirements for reported SAR were compared to vegetation communities, aquatic habitats, and niche habitats identified during field inventories and the background review. The results of the SAR habitat screening are provided in Section 6.7.

4 FIELD METHODOLOGY

Matrix staff completed field inventories within the Adelaide study area during the spring and summer of 2021 as part of the EIS. Field inventories completed by each staff member are provided in Table 2. Detailed methods are described in the following subsections.

TABLE 2 Field Survey Summary

Field Inventory	Date	Matrix Staff
Vegetation (Ecological Land Classification, Botanical Inventory, Invasive Species)	April 16, 2021 August 9, 2021 August 13, 2021	Peter De Carvalho
Bat Maternity Roosting Habitat Survey	April 16, 2021(Leaf-off) August 9, 2021(Leaf -on)	Peter De Carvalho
Breeding Birds	June 4, 2021 June 24, 2021	Matthew Ilse
Incidental Observations	Collected during all site visits	All Staff

4.1.1 Ecological Land Classification

Vegetation community delineation was completed within the study area using aerial photography and refined thorough investigations in the field. The standard Ecological Land Classification (ELC) system for southern Ontario (Lee 2008; Lee et al. 1998) was applied. Details of the vegetation communities were recorded, including species composition and dominance, community structure, uncommon species or features, and evidence of anthropogenic disturbance. Vegetation community status rarity was assessed through National Heritage Information Centre vegetation community rankings (MNRF 2021c).

4.1.2 Botanical Inventories

A botanical inventory was completed during the field inventories for each of the vegetation communities. The field investigations were completed during spring and summer. A list of species was compiled to determine the presence of SCC, SAR, and invasive species. Habitats of SCC, SAR, and invasive species identified during the field inventories were mapped for the ELC community in which they encompassed.

Plants were identified to family, genus, species, subspecies, and hybrid level according to the Newmaster (1998) *Ontario Plant List* and cross-referenced with the *Database of Vascular Plants of Canada* (Brouillet et al. 2020) for scientifically accepted nomenclature.

4.1.3 Breeding Birds

Breeding bird surveys were conducted following the protocol outlined in the *Ontario Breeding Bird Atlas Guide for Participants* (OBBA 2001). The protocol states that two rounds of surveys should be completed between May 24 and July 10, between 05:00 and 10:00, and under reasonable weather conditions. Surveys should not be completed if there is heavy rain, heavy fog, or if winds are greater than 3 on the Beaufort scale (i.e., >19 km/hour). A total of six stations were surveyed to reflect the different habitats within the study area. These stations were spaced approximately 300 m apart to reduce any overlap in observations between stations. Observations were made using direct (visual observation) and indirect (songs and alarm call) methods to identify the level of breeding evidence. Observations of breeding evidence for each species were recorded based on the definitions provided by the *Ontario Breeding Bird Atlas Guide of Participants* (OBBA 2001).

4.1.4 Bat Maternity Roosting Survey

The location of suitable bat maternity roosting habitat, including snags, was identified following the modified methodology of the Guelph District *Survey Protocol for Species at Risk Bats within Treed Habitats: Little Brown Myotis, Northern Myotis, and Tri-coloured Bat* (MNRF 2017). This scoped assessment will indicate the likelihood that appropriate habitat for SAR bats is present; however, it will not confirm the presence or absence of any bat species.

Phase 1 Bat Habitat Suitability Assessment consists of evaluating the study area and deciding whether any area would be designated as a coniferous, deciduous, or mixed wooded ELC ecosite. Preliminary analyses

indicated deciduous treed areas present adjacent to the Adelaide WWTP. These treed areas were surveyed for suitable maternity roost trees through a leaf-off habitat assessment.

Identifying suitable roost trees for Little Brown Myotis and Northern Myotis includes recording the location of all snags that exhibit appropriate attributes including cavities, loose bark, cracks, or knot holes. Identifying suitable roost trees for Tri-Coloured Bats includes recording the location of any Oak trees greater than 10 cm diameter at breast height (DBH), Maple trees greater than 10 cm DBH if the tree includes dead/dying leaf clusters, and any Maple tree greater than 25 cm DBH. A formal leaf-on habitat assessment was not completed, though the presence of appropriately sized Oak and Maple trees were noted during subsequent ELC field studies.

4.1.5 Incidental Wildlife

All wildlife observations were documented on all field visits. This included actual direct observations (including vocalizations) of individuals and signs of wildlife presence (i.e., tracks, scats, dens, nests, etc.).

4.1.6 Significant Wildlife Habitat and Species at Risk Assessment

An assessment of potential SWH and potential SAR habitat within the study area was conducted during the field surveys. The study area was assessed for habitat identified within the criteria outlined in the *Significant Wildlife Habitat Technical Guide* (MNR 2000) and the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015). Natural areas were also assessed for their potential to provide habitat for those SAR and SCC identified during background review or observed during field investigations.

5 DESCRIPTION OF THE NATURAL ENVIRONMENT

5.1 Terrain Setting

The Adelaide study area is located adjacent to the Thames River, one of the largest river systems in southern Ontario. The Thames River is set in southern Ontario in the Carolinian Zone (Ecoregion 7E), which extends from Windsor to Toronto. The Carolinian Zone is the most human-populated zone in Canada and hosts more species than any other region in Canada (Carolinian Canada 2021). However, development over the past few hundred years had reduced the biodiversity of the ecoregion by over 90%. Ongoing conservation measures and expanding urban populations and development makes this zone uniquely situated for governance and regulatory measures.

The study area are located within the Caradoc Sand Plains and London Annex physiographic regions of southern Ontario. This region generally consists of gravel alluvium, which is spread over the Thames River and includes fox fine sandy loam, berrien sandy loam, and burford gravely loam (Chapman and Putnam 1984).

5.2 Identified Natural Heritage Features

There are no ESAs, PSWs or locally significant wetlands, or ANSIs present within the study area.

The London Plan (City of London 2016) Map 5 (Natural Heritage) has identified a "Woodland" to the southeast, "Significant Valleyland" to the north of the Greenway study area, and a "Significant Woodland" to the south and southeast of the Adelaide study area (Appendix C). The "Significant Woodland" adjacent to the Adelaide study area is also known as the "Huron Street Woods (patch 00027)".

5.3 Terrestrial Habitat

5.3.1 Vegetation Communities

Vegetation communities within the Adelaide study area are mapped on Figure 2 and described in further detail in Table 3. The Adelaide study area contains 14 ELC community types (7 terrestrial, 6 wetlands, and 1 terrestrial/wetland).

TABLE 3 Ecological Land Classification Communities - Adelaide Wastewater Treatment Plant

Ecological Land Classification Community Type	Community Description
FOD7-4 Fresh-Moist Black Walnut Lowland Deciduous Forest	This community defines the largest wooded areas of the study area south of the Adelaide Wastewater Treatment Plant (WWTP). The canopy was found to be variable, but mostly dominated by Black Walnut (*Juglans nigra*), with Manitoba Maple (*Acer negundo*) approaching co-dominance in sections. Common canopy constituents include Basswood (*Tilia americana*), Crack Willow (*Salix fragilis*), and Hackberry (*Celtis occidentalis*). Though most of these woodlands were found to be fresh-moist, a ridge on the easternmost FOD margin slopes upwards. This west-facing slope features a higher proportion of Sugar Maple (*Acer saccharum*) and Black Cherry (*Prunus serotina*). Understory is relatively open, and dominated by Manitoba Maple, European Buckthorn (*Rhamnus cathartica*), River Grape (*Vitis riparia*), young Green Ash (*Fraxinus pennsylvanica*), and willow species (*Salix sp.*), though margins and clearings are often choked with a dense shrub-layer dominated by European Buckthorn, young Manitoba Maple, and Red-osier Dogwood (*Cornus sericea*). Ground cover was variable, with no single species dominating. Growth form varied from forb to forb/graminoid mixed, to graminoid-dominated. There was also evidence of significant growth of Garlic Mustard (*Alliaria petiolata*) persisting from earlier in the growing season. Additionally, the understory was found to be frequently sparse, resulting in a high proportion of bare mineral soil. FOD7 ecosites can represent a transition between upland forest and lowland swamps.
FOD7 Fresh-Moist Lowland Deciduous Forest	A linear wooded feature is present east of the Adelaide WWTP. The canopy of this forest is similar in composition to the FOD7-4 ecosites, but generally dominated by Eastern Cottonwood (*Populus deltoides*), with Black Walnut approaching co-dominance. Much of the woodland is surrounded by a pronounced margin dominated by shrubs (European Buckthorn, Salix sp.). FOD7 ecosites can represent a transition between upland forest and lowland swamps.

Ecological Land Classification Community Type	Community Description
MAM2/MAS2/SWT2 Mineral Meadow Marsh/ Mineral Shallow Marsh/ Mineral Thicket Swamp	An approximately linear wet slough bisects the FOD7-4 ecosite southwest of the Adelaide WWTP. The dominant vegetation form within this slough vacillates between meadow marsh, shallow marsh, and thicket swamp ecosites. Meadow marsh ecosites were dominated by Reed Canary Grass, with common presence of Common Reed, Common Cattail, Purple Loosestrife, Spotted Jewelweed (*Impatiens capensis*), and sedges. Shallow marsh areas featured similar assemblage as meadow marsh but were inundated with standing water and had a higher proportion of emergent macrophytes (Common Cattail, Narrow-leaf Cattail). The thicket areas were dominated by willow species (Black, Slender - *Salix c.f. petiolaris*) with Red-osier Dogwood and River Grape common. It was also noted that the wettest portions of this ecosite contained Dodder (*Cuscuta gronovii*).
SWT2-2 Willow Mineral Thicket Swamp	A depression to the west of the Adelaide WWTP features several wetland types. Several areas are dominated by willow species (*Salix c.f. nigra*). Other common species include Red-osier Dogwood, young Eastern Cottonwood, and young Green Ash (*Fraxinus pennsylvanica*) The ground-layer was more sparse than adjacent non-thicket areas, but composition was generally similar. Common ground species included Reed-canary Grass (*Phalaris arundinacea*), Black Bulrush (*Scirpus atrovirens*), Softstem Bulrush (*Schoenoplectus tabernaemontani*), Purple Loosestrife (*Lythrum salicaria*), and sedges (*Carex sp.*).
MAM2-1 Reed-canary Grass Mineral Meadow Marsh	The areas not wet enough to contain standing water and not dominated by shrubs typically resemble meadow marsh dominated by Reed-canary Grass. Other common ground species include Black Bulrush, Softstem Bulrush, Purple Loosestrife, and sedges.
MAS2-1 Cattail Mineral Meadow Marsh	A large area of persistent standing water was noted south of the FOD7 ecosite. This area was dominated by Common Cattail (*Typhus latifolia*), Narrow-leaf Cattail (*Typhus angustifolia*), and Common Reed (*Phragmites australis*). Actual depth was assumed to be >2 m and substrate was assumed to be mineral, though this was not confirmed in the field.
MAS2a Phragmites Mineral Meadow Marsh	A smaller depression southeast of the MAS2-1 ecosite was found to contain standing water. This depression was almost completely dominated by Common Reed, though Common Cattail, Narrow-leaved Cattail, and Purple Loosestrife were noted to persist at the margins.
MAS2b Mineral Shallow Marsh	A deep linear outlet channel runs generally east west to the west of the Adelaide WWTP. This channel was found to be full of water both in late spring (May) and in mid-summer (July). The channel is lined with large armour-stone, but significant vegetation growth was noted within the channel in sections. Species composition was variable but typically consisted of Jewelweed, Common Boneset (*Eupatorium perfoliatum*), Joe Pye Weed (*Eutrichium purpureum*), Common Cattail, Narrow-leaf Cattail, Phragmites, Black Bulrush, Softstem Bulrush, and willow species.
CUM1 Mineral Cultural Meadow	Large sections of open upland habitat are present within the Adelaide study area. Though species composition tends to be variable, they are typically graminoid-dominated. Reed-canary Grass is the most common species noted, though other grasses were found to be common (Orchard Grass - *Dactylis glomerata*; Kentucky Bluegrass - *Poa pratensis*; Timothy - *Phleum pratense*; Smooth Brome - *Bromus inermis*; Large Crab Grass - *Digitaria sanguinalis*). Common non-graminoid species include Common Dandelion (*Taraxacum officinale*), Bird's-foot Trefoil (*Lotus corniculatus*), Perforate St. John's Wort (*Hypericum perforatum*), and Canada Goldenrod (*Solidago canadensis*).

Ecological Land Classification Community Type	Community Description
CUM1/MAM2-10 Mineral Cultural Meadow/ Forb Mineral Meadow Marsh	A section of open area northeast of the MAS2-1 ecosite formed a complex of upland cultural meadow and narrow linear depressions that were filled with water. This resulted in a mix of upland (CUM1) and lowland (MAM2-10 ecosites). The upland species were similar in composition to surrounding CUM1 ecosite assemblages.
CUT1a Mineral Cultural Thicket	CUT1a ecosites feature a higher density of shrub species, but typically share the understory composition as adjacent CUM1 areas. Common shrub species include Common Ninebark (*Physocarpus opulifolius*), Gray Dogwood (*Cornus racemosa*), European Buckthorn, and River Grape.
CUT1b European Buckthorn Cultural Thicket	A large thicket comprised almost entirely of a continuous canopy of tall European Buckthorn was noted as present north of the FOD7-4 ecosites. This thicket featured very low species diversity and the understory was almost completely devoid of herbaceous species.
CUT1/CUM1 Mineral Cultural Meadow/ Mineral Cultural Thicket	Several portions of the study area were noted as having vegetation assemblages resembling CUM1 and CUT1a ecosites. These areas are denoted as CUT1/CUM1.
CUW1 Mineral Cultural Woodland	Small, wooded parcels are present throughout the study area. These are variable in composition, but typically either dominated by Trembling Aspen (*Populus tremuloides*), Manitoba Maple, or Black Walnut. These ecosites do not typically form a significant canopy and are often associated with robust shrub margins comprised of European Buckthorn, Gray Dogwood, River Grape, and Ninebark. Understory is typically similar to adjacent CUM1 areas.
D Open/Disturbed	Multiple areas were identified as having been heavily modified or disturbed within the Adelaide study area. This includes granular and paved pathways, informal trail systems, sports fields, and other manicured or landscaped areas. Manicured lawns are typically graminoid-dominated with sod-forming species interspersed with common weeds. Waste areas are similarly dominated by weedy or non-native species. Habitat potential in these areas is typically low, though lone mature trees do have potential to support nesting birds and mammals. A small drainage swale was noted at the northwest corner of the Adelaide WWTP. This small pocket contains meadow species including Purple Loosestrife, Red-osier Dogwood, and willow species. It is approximately 400 m^2 and isolated within a field of mowed grass. Habitat potential for this feature is low due to its small size and isolated nature.

DRAFT

Easting (m)

479400 479600 479800 480000 480200

Northing (m)

4763000 4762800 4762600 4762400 4762200

BBS-4 BBS-5 BBS-6 BBS-1 BBS-2 BBS-3

D MAM2 CUW1 FOD7 CUM1 CUM1/MAM2-10 SWT2-2 MAM2-1 MAS2b MAS2-1 CUM1/CUT1 CUT1b MAS2a CUT1a FOD7-4 MAM2/MAS2/SWT2

Kipps Lane Belfield Street Adelaide Street North Huron Street

N

- Adelaide Wastewater Treatment Plant Study Area
- Adelaide Wastewater Treatment Plant Study Area (50m Buffer)
- Highway
- Road
- Breeding Bird Survey Point

ELC Code | Description

- CUM1 | CUM1 - Mineral Cultural Meadow
- CUM1 | Mineral Cultural Meadow
- CUM1/CUT1 | Mineral Cultural Meadow/Mineral Cultural Thicket
- CUM1/MAM2-10 | Mineral Cultural Meadow/Forb Mineral Meadow Marsh
- CUT1a | Mineral Cultural Thicket
- CUT1b | European Buckthorn Cultural Thicket
- CUW1 | Mineral Cultural Woodland
- D | Open/Disturbed
- FOD7 | FOD7 - Fresh-Moist Cottonwood Lowland Deciduous Forest
- FOD7-4 | Fresh-Moist Black Walnut Lowland Deciduous Forest
- MAM2 | Infiltration Channel Meadow Marsh
- MAM2-1 | Reed-canary Grass Mineral Meadow Marsh
- MAM2/MAS2/SWT2 | Mineral Meadow Marsh/Mineral Shallow Marsh/Mineral Thicket Swamp
- MAS2-1 | Cattail Mineral Shallow Marsh
- MAS2a | Phragmites Mineral Thallow Marsh
- MAS2b | Forb Mineral Shallow Marsh
- SWT2-2 | SWT2-2 - Willow Mineral Thicket Swamp
- SWT2-2 | Willow Mineral Thicket Swamp

1:4,000 metres

40 0 40 80

NAD 1983 UTM Zone 17N

Reference: Contains information licensed under the Open Government Licence – Ontario. Imagery (2020). Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

City of London
Greenway and Adelaide Wastewater Treatment Plants

Adelaide Wastewater Treatment Plant Ecological Land Classification Communities

Date:	Project:	Submitter:	Reviewer:
November 2021	32667	K. Reis	R. Leppington

Disclaimer: The information contained herein may be compiled from numerous third party materials that are subject to periodic change without prior notification. While every effort has been made by Matrix Solutions Inc. to ensure the accuracy of the information presented at the time of publication, Matrix Solutions Inc. assumes no liability for any errors, omissions, or inaccuracies in the third party material.

Figure 2

I:\City of London\32667\Figures And Tables\EA\2021\Report\EIS_Reporting\Adelaide\Figure 2-Adelaide_Wastewater_Treatment_Plant_Ecological_Land_Classification_Communities.mxd - Tabbed_L - 25-Nov-21, 05:57 PM - imwright - TID05

5.3.2 Flora

Based on the background review, a total of one SAR and six SCC were identified as potentially occurring within the Adelaide study area. These SAR and SCC species and their potential to occur within the habitat found within the Adelaide study area are discussed further in Sections 6.6 and 6.3, respectively.

A total of 145 vascular plant species were observed within the Adelaide study area. A complete vascular plant list is provided in Appendix D. Of these species, 11 are considered S4, 56 are considered S5, and 78 are considered SNA/SNR. No SAR or SCC ranked species were observed within the Adelaide study area.

5.4 Wildlife and Wildlife Habitat

5.4.1 Birds

Based on the background review, there were a total of 128 avian species identified as having a potential to occur within the Adelaide study area. Of the 128 species identified, 9 SAR and 2 SCC were noted within the Adelaide study area. These SAR and SCC species and their potential to occur within the habitat found within the Adelaide study area are discussed further in Sections 6.6 and 6.3, respectively.

A total of 36 bird species were observed during surveys within the Adelaide study area (Appendix E). Only one SAR was observed within the Adelaide study area: Chimney Swift. The Chimney Swift was observed as a flyover near the river and not a breeder for the Adelaide study area. SAR birds are discussed further in Section 6.6. No bird SCC were observed within the Adelaide study area.

5.4.2 Herpetofauna

5.4.2.1 Adelaide Study Area

No site-specific field surveys were conducted for herptofauna within the Adelaide study area. However, the background review noted a total of 23 herpetofauna species that have a potential to occur within the Adelaide study area. Of the 23 species identified, there are 4 SAR and 3 SCC noted within the Adelaide study area. These SAR and SCC species and their potential to occur within the habitat found within the Greenway study area are discussed further in Sections 6.6 and 6.3, respectively.

5.4.3 Mammals

Based on the background review, there are a total of 40 mammal species that have a potential to occur within the study area. Of the 40 species identified, 4 SAR were noted within the study area and no SCC. The SAR were assessed to identify the habitat potential within the study area within Section 6.6.

5.4.3.1 Bat Maternity Roosting Survey

Species at Risk Habitat

The Tri-coloured Bat and the two Myotis species require different roosting habitat characteristics. Little Brown Myotis and Northern Myotis roost in tree cavities, crevices, and under loose exfoliating bark in wooded areas located near water. The Tri-coloured Bat most often roost in foliage (both dead and alive) within or below the canopy. Often, Oak (*Quercus sp.*) species are utilized for roosting because the leaves are retained longer in the fall season; however, Maple (*Acer sp.*) species are also used. Tri-Coloured Bats forage along riparian corridors and open water.

Identifying suitable roost trees for Little Brown Myotis and Northern Myotis included recording the location of all snags that exhibit appropriate attributes including cavities, loose bark, cracks, or knot holes.

A total of 30 snags greater than 10 cm DBH were located within the Adelaide study area, of which 7 are considered high-quality snags (Table 4). These high-quality snags should be considered potential SAR bat habitat for Myotis SAR, and removal of high-quality habitat trees as identified in Table 6 should be treated as though candidate SAR bat habitat is being removed.

No formal leaf-on survey was conducted, but the FOD7-4, FOD7, and CUW1 ecosites were noted to contain Oak and/or Maple trees greater than 10 cm DBH. These areas should be assumed to contain habitat that may support Tri-colored Bat. Removal of mature Oak or Maple trees, or other project works that may otherwise result in significant encroachment/impacts within these ecosites, should be treated as potential impact to candidate Tri-colored Bat habitat.

TABLE 4 Summary of Little Brown Myotis and Northern Myotis Suitable Roost Trees within Adelaide Study Area (Leaf-off Survey)

Tree Number	Tree Species	Diameter at Breast Height	Height Class	Description
1	Deciduous (dead)	58	3	Long dead, some remaining loose bark may provide bat maternity habitat potential
2	Manitoba Maple	43, 29	2	Declining tree, large cavity 2 m high, some sloughed bark
3	Manitoba Maple	38	3	Knothole at 5 m
4	Manitoba Maple	35	3	Cavity at 3 m
5	Ash sp. (dead)	23	4	Dead, main stem split at 3 m
6	Ash sp. (dead)(1)	38	1	Dead with fissured bark at 9 to 11 m
7	American Basswood	43	1	Cavity at 9 m
8	Common Hackberry	144	1	Knothole at 5 m, sloughed bark at 8 m on one stem
9	Crack Willow	130, 89, 187	1	At least one large cavity at 6 m
10	Manitoba Maple(1)	157	1	Large hollow off main stem 9 m high
11	Manitoba Maple	45	3	Fallen and hollowed at base
12	Common Hackberry	68	1	Knothole at 3 m, 7 m

Tree Number	Tree Species	Diameter at Breast Height	Height Class	Description
13	Crack willow(1)	220	1	Broken branch forming new cavity plus sloughing bark at point of break
14	Manitoba Maple(1)	97	2	Crown broken, dead stems w significant bark sloughing.
15	Common Hackberry	165	1	Knothole at 6 m
16	Manitoba Maple	38, 67	1	Cavity 1 m from base
17	Crack Willow	350+	1	Declining tree, cavity noted at 5 m, sloughed bark at 8 m
18	Eastern Cottonwood	93, 71, 102	1	Cavity approximately 8 m from base
19	Crack Willow	200+	4	Multiple injuries, fissured and cracked at multiple spots 2 to 5 m high
20	American Basswood	22	4	Bent with conspicuous knot hole at 3 m
21	Crack Willow(1)	157	1	Shagging bark with apparent cavities from 4 to 11 m
22	Crack Willow(1)	300+	1	Downed branches providing cavity shelter, cavity at 12 m
23	Crack Willow	300+	1	Two dead stems, one hollow from 3 to 6+ m
24	American Basswood(1)	41, 33	2	Dead, main stem appears to be rotted, partially hallow
25	Deciduous (dead)	40	4	Dead, some cavities near the top (6 m) and some sloughed bark at 5 m
26	Common Hackberry	123	1	Knotholes at 5, 6, and 8 m
27	American Basswood	18, 22	2	Knotholes (3) approximately 4 m high
28	Crack Willow	43	1	Fissured bark at 2 m
29	Manitoba Maple	34	2	Declining tree; twisted and cracked stem providing cavity 7 m high
30	Manitoba Maple	250+	1	Declining tree; sloughing bark on two dying stems

(1) high-quality snag trees

Significant Wildlife Habitat - Bat Maternity Colonies

As per the criteria from the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015) and the Bats and Bat Habitats: Guidelines for Wind Power Projects (MNR 2011), forested ELC communities that have a snag density greater than 10 snags per hectare for trees greater than 25 cm DBH that are in early decay (i.e., decay class 1 to 3) are considered to be candidate SWH for bat maternity roosting habitat.

The forested ELC polygons within the Adelaide study area have a total of 1.88 ha; therefore, a total of 19 or more snags are required for the study area to be considered candidate SWH for bat maternity roosting habitat. Of the 30 total snags within the Adelaide study area, only 7 trees are considered to be high-quality maternity roosting trees (i.e., decay class 1 to 3; Table 5 and Figure 3).

Therefore, the forested communities within the study area are not considered SWH for bat maternity roosting.

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TABLE 5 Summary of High-quality Snags per Ecological Land Classification Community Type, Adelaide Wastewater Treatment Plant

Ecological Land Classification Community	Surveyed Area (ha)	No. of High-quality Snags	Snag Density (snag/ha)
FOD7-4 West	0.16	1	6.25
FOD7-4 East	1.72	6	3.49
TOTAL AREA	**1.88**		

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Easting (m)

479400 479550 479700 479850 480000 480150

Northing (m)

4762800 4762650 4762500 4762350 4762200

- Adelaide Wastewater Treatment Plant Study Area
- Adelaide Wastewater Treatment Plant Study Area (50m Buffer)
- Highway
- Road
- High-Quality Bat Tree

1:3,000 metres

30 0 30 60

NAD 1983 UTM Zone 17N

Reference: Contains information licensed under the Open Government Licence – Ontario. Imagery (2020) Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

City of London
Greenway and Adelaide Wastewater Treatment Plants

Adelaide Wastewater Treatment Plant High-Quality Bat Trees

Date:	Project:	Submitter:	Reviewer:
November 2021	32667	K. Reis	R. Leppington

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Figure 3

I:\City of London\32667\Figures And Tables\EA\2021 Report\EIS_Reporting\Adelaide\Figure-3-Adelaide_Wastewater_Treatment_Plant_High_Quality_Bat_Trees.mxd - Tabloid_L - 25-Nov-21, 06:00 PM - imwright - TID005

5.4.4 Insects

Based on the background review, there are a total of 49 species within the Adelaide study area. Of these, two SCC species were noted within the Adelaide study area. No SAR were identified within either of the study area. The potential SCC noted in the background review were assessed to identify if their potential within the study area within Section 6.3.

5.5 Aquatic Resources

The North Thames River adjacent to the Adelaide WWTP originates near Mitchell and flows through St. Mary's before reaching Fanshawe Dam approximately 13 km upstream of the Forks. The North Thames River is regulated by Fanshawe Dam with one unregulated tributary, Medway Creek, contributing natural flows downstream of the reservoir (Matrix 2019).

5.5.1 Fish Community

Background fisheries data has largely been compiled from fish sampling records from DFO, Royal Ontario Museum, MNRF, and UTRCA (Table 6). The results of these records indicate the potential for 28 fish species within the Adelaide study area, which include 2 SAR and 1 SCC. The confirmed SAR species included Silver Shiner (*Notropis photogenis*), which is classified as threatened under the ESA and under SARA; and Black Redhorse (*Moxostoma duquesnei*), which is classified as threatened under the ESA and under SARA. The confirmed SCC includes the Northern Sunfish (*Lepomis peltastes*), which is classified as special concern under the ESA 2007 and SARA.

The study area for the Adelaide WWTP is located 300 m from the Thames River. Although there are confirmed and candidate SAR and SCC within the Thames River, the works associated with this project are unlikely to have any impact on the river, and therefore, will not impact these species. These species will therefore not be discussed further in the later sections.

TABLE 6 Historical Fisheries Data Within and Surrounding the Adelaide Study Area

Common Name	Scientific Name	SARA	ESA	UTRCA Data 2005-2020	DFO SAR Mapping
Black Redhorse	*Moxostoma duquesnei*	Threatened	Threatened	X	X
Bluegill	*Lepomis macrochirus*	-	-	X	-
Bluntnose Minnow	*Pimephales notatus*	-	-	X	-
Brassy Minnow	*Hybognathus hankinsoni*	-	-	X	-
Central Stoneroller	*Campostoma anomalum*	-	-	X	-
Common Carp	*Cyprinus carpio*	-	-	X	-
Common Shiner	*Luxilus cornutus*	-	-	X	-
Fantail Darter	*Etheostoma flabellare*	-	-	X	-
Greenside Darter	*Etheostoma blennioides*	-	-	X	-
Johnny Darter	*Etheostoma nigrum*	-	-	X	-
Largemouth Bass	*Micropterus salmoides*	-	-	X	-

Common Name	Scientific Name	SARA	ESA	UTRCA Data 2005-2020	DFO SAR Mapping
Longnose Dace	*Rhinichthys cataractae*			X	-
Northern Hog Sucker	*Hypentelium nigricans*	-	-	X	-
Northern Pike	*Esox lucius*	-	-	X	-
Northern Sunfish (Great Lakes - Upper St. Lawrence populations)	*Lepomis peltastes*	Special Concern	Special Concern	-	X
Mimic Shiner	*Notropis volucellus*	-	-	X	-
Pumpkinseed	*Lepomis gibbosus*	-	-	X	-
Rainbow Darter	*Etheostoma caeruleum*	-	-	X	-
River Chub	*Nocomis micropogon*	-	-	X	-
Rock Bass	*Ambloplites rupestris*	-	-	X	-
Roseyface Shiner	*Notropis rubellus*	-	-	X	-
Shorthead Redhorse	*Moxostoma macrolepidotum*	-	-	X	-
Silver Shiner	*Notropis photogenis*	Threatened	Threatened	-	X
Smallmouth Bass	*Micropterus dolomieu*	-	-	X	-
Spotfin Shiner	*Cyprinella spiloptera*	-	-	X	-
Stonecat	*Noturus flavus*	-	-	X	-
Stripped Shiner	*Luxilus chrysocephalus*	-	-	X	-
White Sucker	*Catostomus commersonii*	-	-	X	-

SARA - *Species at Risk Act*
ESA - *Endangered Species Act*
UTRCA - Upper Thames River Conservation Authority
DFO - Fisheries and Oceans Canada
MECP - Ontario Ministry of the Environment, Conservation and Parks

5.5.1.1 Mussel Community

Current mussel data was collected from federal and provincial databases. The UTRCA did not have any available mussel data for the Adelaide study area. Federal and provincial datasets indicated the potential for two species of mussels, which are also considered to be SAR (Table 7).

As discussed in Section 5.5.1 the Adelaide WWTP is located 300 m from the Thames River. Although there are confirmed and candidate SAR and SCC within the Thames River, the works associated with this project are unlikely to have any impact on the river, and therefore, will not impact these species. These species will therefore not be discussed further in the later sections.

TABLE 7 Historical Mussel Data Within and Surrounding the Adelaide Study Area

Common Name	Scientific Name	SARA	ESA	MECP data	DFO SAR Mapping
Round Pigtoe	*Pleurobema sintoxia*	END	END	X	
Wavy-rayed Lampmussel	*Lampsilis fasciola*	THR	SC		X

SARA - *Species at Risk Act*
ESA - *Endangered Species Act*
UTRCA - Upper Thames River Conservation Authority
DFO - Fisheries and Oceans Canada
MECP - Ontario Ministry of the Environment, Conservation and Parks

6 SIGNIFICANT NATURAL HERITAGE FEATURES AND FUNCTIONS

Significant natural heritage features and functions include those listed in the Provincial Policy Statement (MMAH 2020), the NHRM (MNR 2010), the SWHTG (MNR 2000) and the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015). The findings of the site investigations were cross-referenced with the criteria provided in these documents to identify the presence of or potential presence of significant natural heritage features.

The following significant features were not present within the study area:

- ANSIs
- ESA
- Significant Valleylands

Significant features that are present within the study area are discussed further in Sections 6.1 to 6.8.

6.1 Significant Woodlands

Woodlands include treed areas, woodlots, or forested areas and vary in their level of significance at the local, regional, and provincial levels.

The City's official plan recognizes significant woodlands and woodlands, which are mapped on Map 5 (Natural Heritage) of the London Plan (City of London 2016). The map indicated that there is a significant woodland directly adjacent to the Adelaide WWTP (Appendix C; Figure 3).

6.2 Wetlands

Wetlands include lands that are seasonally or permanently covered by shallow water, as well as lands where the water is close to or at the surface. In either case, the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. Wetlands also vary in their level of significance at the local, regional, and provincial levels.

Although no PSW's or wetlands are identified on the City of London's Map 5 (Natural Heritage) within the study area, the field investigations identified wetland vegetation communities adjacent the Adelaide WWTP to the east (Figure 4). The City's environmental policies require that wetlands identified via ELC are unevaluated wetlands and should be evaluated by a qualified person in accordance with the Ontario Wetland Evaluation System (OWES; MNRF 2014), with the evaluation approved by the MNRF, to determine its significance.

6.3 Significant Wildlife Habitat

The assessment of SWH follows the guidelines in the NHRM (MNR 2010) and the criteria from the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015), with support from the SWHTG (MNR 2000) as appropriate. There are four categories of SWH which include the following:

- seasonal concentration areas of animals
- rare vegetation communities or specialized habitat for wildlife
- habitat for species of conservation concern
- animal movement corridors

Each of these categories includes various SWH types and with criteria to evaluate significance. These four categories were assessed based on the background studies and field investigations performed by Matrix. A full SWH evaluation is provided in Appendix F, and a summary of the confirmed or candidate SWH is provided in Table 8. To support the evaluation of SCC habitat in Appendix F, a specific evaluation with regards to SCC and their potential to occur within the study area is provided in Appendix G.

TABLE 8 Significant Wildlife Habitat Assessment Summary for Adelaide Wastewater Treatment Plan and Greenway Wastewater Treatment Centre

Category	Wildlife Habitat	Adelaide Wastewater Treatment Plant
Seasonal Concentration Areas of Animals	Waterfowl Stopover and Staging Areas (Terrestrial)	Candidate - Open areas adjacent to wetlands west of facility may be subjected to sheet water flooding conditions following spring freshet.
	Waterfowl Stopover and Staging Areas (Aquatic)	Candidate - MAS2 ecosites present west of facility.
	Turtle Wintering Areas	Candidate - The larger SAM2 ecosite west of the facility may be suitable overwintering habitat.
Rare Vegetation Communities and Specialized Habitat for Wildlife	Waterfowl Nesting Area	Candidate - The wetland complex if MAM, MAS, and SWT ecosites south and west of the facility meets the areal ELC requirements for this habitat type.
	Amphibian Breeding Habitat (Woodland)	Candidate - the FOD7-4 ecosites likely support vernal pooling in the early spring.
	Amphibian Breeding Habitat (Wetland)	Candidate - the MAS ecosites may support wetland-breeding amphibians.

Category	Wildlife Habitat	Adelaide Wastewater Treatment Plant
Habitat for Species of Conservation Concern	Special Concern and Rare Wildlife Species	Candidate • Eastern Wood Pewee • Grasshopper Sparrow • Snapping Turtle • Hackberry Emperor • Monarch Confirmed • none
	Marsh Breeding Bird Habitat	Candidate - the MAS ecosites within the study area contain shallow water with emergent aquatic vegetation.
	Terrestrial Crayfish	Candidate - cultural meadows adjacent to MAM2, MAS2, or SWT ecosites may support terrestrial crayfish habitat.
Animal Movement Corridors	Amphibian Movement Corridor	Candidate - natural areas adjacent or within the contiguous natural corridor of the Thames River should be considered potential amphibian movement corridors.

6.4 Fish and Fish Habitat

Although the Thames River is not within the Adelaide study area, an outlet channel that directs water toward the Thames River (MAS2 on Figure 2) exists and indirectly supports fish habitat within the Thames River through the supply of water and nutrients.

Fish and fish habitat are regulated by DFO under the *Fisheries Ac*. The *Fisheries Act* requires that projects avoid causing the death of a fish or a HADD of fish habitat unless authorized by the Minister or a designated representative. The determination of death of fish or HADD is typically done through a self-assessment process.

6.5 Linkages and Corridors

Linkages and corridors are important features within a natural system. These features are continuous, often linear bands of vegetation in the landscape which provide opportunities to connect natural areas and provide cover for wildlife movement and dispersal of otherwise isolated populations.

The Thames River Valley has been designated as a significant valleyland within *The London Plan* (City of London 2016). This area represents a significant linkage for both terrestrial and aquatic organisms. The wooded riparian area along the edge of the Thames River provides a linkage to other natural areas within the Thames River Valley system.

6.6 Species at Risk

A list of SAR with potential to occur on or adjacent to the study area was complied from the background review and agency consultation. A total of 22 SAR were identified as potentially occurring within the Adelaide study area. Following the field investigations, further evaluation was completed for SAR

probability of occurrence based on the observed habitat characteristics within the study area. A full evaluation is provided in Appendix H, and a summary provided below in Table 14.

The results of the assessment indicated that 7 species within Adelaide study area were considered to have potential habitat. One additional species was confirmed within the Adelaide study area (Table 9).

TABLE 9 Species at Risk Potential Presence within the Greenway and Adelaide Study Area

Species	ESA	SARA	Adelaide Wastewater Treatment Plant
Butternut	END	END	Potential
Kentucky Coffee-tree	THR	THR	Potential
Bank Swallow	THR	THR	N/A
Barn Swallow	THR	THR	N/A
Bobolink	THR	THR	Potential
Chimney Swift	THR	THR	Confirmed
Eastern Meadowlark	THR	THR	Potential
Redheaded Woodpecker	SC	THR	Potential
Eastern Spiny Softshell	END	THR	N/A
Eastern Foxsnake	END	END	N/A
Little Brown Myotis	END	END	Potential
Northern Myotis	END	END	Potential
Tricoloured Bat	END	END	Potential
Black Redhorse	THR	NAR	N/A
Silver Shiner	THR	THR	N/A
Rayed Bean	END	END	N/A
Round Pigtoe	END	END	N/A
Wavvy-rayed Lampmussel	THR	SC	N/A

The species indicated as potentially occurring within the study area were not observed during the surveys conducted by Matrix; however, there is still likelihood that they could be present based on previous observations as well as suitable habitats within the study area. Species with confirmed identification within the study area may require additional habitat protection and considerations. These species and their habitat protections under the ESA are as follows:

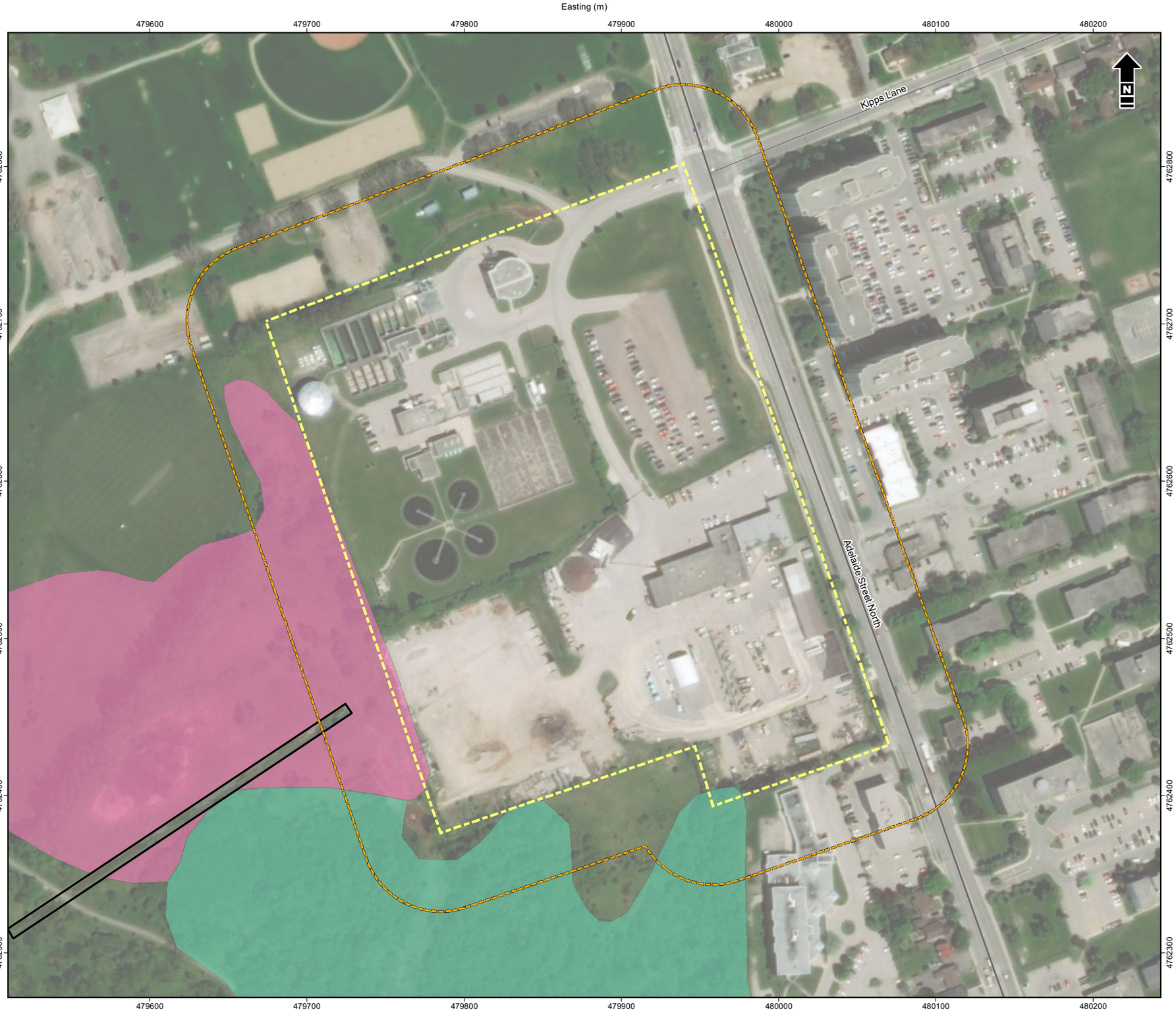
- **Chimney Swifts** were observed flying over the study area. The ESA general habitat protection identifies this species habitat as, human-made nesting/roosting feature, or a natural nesting/roosting tree cavity and the area within 90 m of the tree. Regular building use and building improvements that do not impair the function of the habitat are considered acceptable. The study area did not include any candidate nesting trees or chimneys and as a result are not considered further in the impact assessment for the study area.

6.7 Significant Features and Functions Summary

Based on the background review and site investigations to date, the potential and confirmed significant features and functions that are present within the study area are summarized in Table 10 and depicted in Figures 4.

TABLE 10 Confirmed and Candidate Significant Features within the Adelaide Study Area

Significant Feature	Adelaide Wastewater Treatment Plant
Significant Valleylands	None
Significant Woodland	Confirmed
Woodlands	N/A
Wetlands	Confirmed
Significant Wildlife Habitat	Candidate
Fish and Fish Habitat	Confirmed - Indirect
Species at Risk	Confirmed and Potential



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- Adelaide Wastewater Treatment Plant Study Area
- Adelaide Wastewater Treatment Plant Study Area (50m Buffer)
- Drainage Feature
- Candidate SWH, Potential SAR Habitat
- Significant Woodland (London Plan), Potential SAR Habitat, Candidate SWH
- Highway
- Road

1:2,500 metres
25 0 25 50
NAD 1983 UTM Zone 17N

Reference: Contains information licensed under the Open Government Licence – Ontario. Imagery (2020) Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

City of London
Greenway and Adelaide Wastewater Treatment Plants

Significant Features and Functions Adelaide Wastewater Treatment Plant

Date:	Project:	Submitter:	Reviewer:
November 2021	32667	K. Reis	R. Leppington

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Figure 4

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7 FLOOD PROTECTION ALTERNATIVES

Matrix recommended that site-level flood protection approaches (e.g., berms) form the basis of the short list of alternative solutions developed to conceptual design. This recommendation relies on the key outcome of the hydraulic analysis completed by Matrix (2021a, 2021b), which demonstrates that this mitigation approach results in no or negligible upstream flood impacts (i.e., backwater). In addition, the comparative advantage of site-level flood protection is that it is expected to be fully implemented within the study area. As a result, site-level flood protection is considered more readily constructable, with less environmental and land use impacts compared to the other approaches that were screened out in this assessment.

A total of four options were selected for each site and are summarized in Table 11.

TABLE 11 Shortlist of Alternatives for the Adelaide Study Area

Site-level Flood Protection	Adelaide Wastewater Treatment Plant
Option 1	Berm with Raised Entrance Way
Option 2	Berm with Temporary Measure at Entrance Way in Response Flood Forecasts
Option 3	Berm with Parking Lot Protection
Option 4	Do Nothing

The major undertakings of the flood mitigation alternatives at Adelaide WWTP include the creation of a berm which would encapsulate the north, west, and southern boundaries of the WWTP and would also include varying degrees of flood protection (raise entrance, temporary measures, and berm) for the east side of the property which largely includes the parking lot.

7.1 Project Activities

Although there are four alternatives listed for each site, the construction footprint associated with the creation of a floodwall and/or berm will result in similar habitat alternation with the exception of “do nothing” option. Therefore, the impact assessment will focus on the following activities associated with floodwall/berm construction around the perimeter of the Greenway WTTC and the Adelaide WWTP that will influence the natural environment:

- construction access, staging, and laydown areas
- vegetation clearing, earthworks/grubbing, and disposal
- near-water construction works (Adelaide works will be within 25 m from an outlet channel into the Thames River)

The anticipated effects and mitigations of these construction works will be discussed further in Section 8.

8 EFFECTS ASSESSMENT

The results of the natural heritage assessment indicated a number of ecological features that are present within the study area:

- significant woodlands
- wetlands
- SWH
- fish and aquatic habitat (indirect habitat at Adelaide)
- SAR

Each of these natural features are significant, as they support flora and fauna communities, connections between aquatic and terrestrial environments and, in the case of the SAR, support species that have limited habitats elsewhere both nationally and provincially. If the preferred alternative damages or interferes with these features and their function, habitat and species loss can occur.

Both direct and indirect impacts on natural heritage features and functions can occur as a result of the preferred alternative. Impacts and residual effects on natural heritage features were assessed based on the following criteria:

- duration: long or short-term
- extent: localized or expansive
- permanent: permanent or temporary
- severity: positive or negative

Most direct impacts occur during the construction phase of a project, and contain localized, short-term, temporary, negative effects that can be reduced through avoidance and proper construction practices. After construction, there may be more long-term, indirect impacts while the site recovers, and vegetation growth takes place. Typically, after the site revegetates, there is either a neutral or positive impact due to intentional native plantings, improved sediment control, and runoff control.

Predicted potential impacts associated with the short list of alternatives are described in the sections below including recommended mitigation measures and residual impacts (after mitigation).

8.1 Potential Impacts

The construction of a berms will require construction, permanent land alternation, and re-vegetation of the study area. Table 12 illustrates the potential impacts to the natural heritage features, as well as mitigation measures which should be followed to avoid serious harm. Once the mitigation measures are implemented, the residual effects are assessed to determine their duration, extent, severity, and permanence.

The greatest potential impacts are associated with the construction proximity to the significant woodland along the southern portion of the study area, wetlands along the west perimeter of the facility, as well as the outfall channel along the south-western side of the study area which drains directly into the Thames River, which is SAR habitat.

It is assumed that construction access and staging will utilize the pre-existing roads and parking lots within the study area.

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TABLE 12 Impacts, Mitigations, and Net Effects of the Short List of Alternatives

Natural Heritage Features	Project Activity	Potential Impacts	Mitigation Measures	Net Effects Adelaide
• Fish and Aquatic Habitat • SAR • Habitat of SCC	• Near-water works to create the floodwall/berm along the western section of the Adelaide WWTP (25m from storm water outfall)	Habitat Loss and/or Alteration • temporary loss of habitat • soil compaction and rutting outside of construction zone • damage to edge trees (i.e., outside of construction zone) • changes in moisture regime • changes to the structure and composition of vegetation communities (e.g., introduction of invasive species) • fugitive dust • spills (e.g., fuel) • erosion and sedimentation	Timing Windows • 1A-4A Best Construction Practices • 1B-7B Prevention of Terrestrial Disturbance • 1D-3D, 5D-7D Erosion and Sedimentation Control • 1E-9E	• The vegetation clearing will result in a short-term, isolated, temporary disturbance to the natural features. • If the erosion and sediment controls are followed, no additional sedimentation should enter the existing stormwater drain. • No long-term negative impacts are anticipated following the mitigation measures.
		Disturbance/Avoidance of Habitat • increase noise during construction • increased human presence	Timing Widows • 1A -4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	
		Injury or Incidental Take (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) • increased collision with machinery • removal of nests and eggs • smothering hibernacula or nesting sites	Timing Widows • 1A -4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	

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Natural Heritage Features	Project Activity	Potential Impacts	Mitigation Measures	Net Effects Adelaide
• Significant Woodlands • Wetlands • General Wildlife and Habitat • Potential SWH	• Vegetation clearing, earthworks/ grubbing to create the floodwall/berm along the north, west, and southern portion of the property adjacent to the Significant Woodland and wetlands	Habitat Loss and/or Alteration • temporary loss of habitat • soil compaction • changes in moisture regime • changes to the structure and composition of vegetation communities (e.g., introduction of invasive species) • fugitive dust • spills (e.g., fuel) • erosion and sedimentation	Timing Windows • 1A-2A, 4A Best Construction Practices • 2B, 4B, 6B, 7B Prevention of Terrestrial Disturbance • 1D-7D Erosion and Sedimentation Control • 1E-9E	• The vegetation clearing will result in a short term, isolated, temporary disturbance to the natural features. • As prescribed in the mitigations, construction activities should occur outside of the dripline of the Significant woodland. This will ensure no long-term negative impacts to this system.
		Disturbance/Avoidance of Habitat • increased noise during construction • increased human presence	Timing Widows • 1A-2A, 4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	
		Injury or Incidental Take (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) • increased collision with machinery • removal of nests and eggs • smothering hibernacula or nesting site	Timing Widows • 1A, 2A, 4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	
• General Wildlife and Habitat	• Construction access, staging, and laydown areas within both study areas	Habitat Loss and/or Alteration • temporary loss of habitat • soil compaction • changes in moisture regime • changes to the structure and composition of vegetation communities (e.g., introduction of invasive species) • fugitive dust • spills (e.g., fuel) • erosion and sedimentation	Timing Windows • 1A-2A, 4A Best Construction Practices • 2B, 4B, 6B, 7B Prevention of Terrestrial Disturbance • 1D-7D Erosion and Sedimentation Control 1E-9E	• It is assumed that construction access and staging will utilize the pre-existing roads and parking lots such as the Adelaide Parking lot, or the disturbed area to the south of the WWTP.
		Disturbance/Avoidance of Habitat • increased noise during construction • increased human presence	Timing Widows • 1A-2A, 4A Prevention of Wildlife Mortality and Disturbance 1C-5C	
		Injury or Incidental Take (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) • increased collision with machinery • removal of nests and eggs • smothering hibernacula or nesting site	Timing Widows • 1A, 2A, 4A Prevention of Wildlife Mortality and Disturbance 1C-5C	

9 MITIGATION MEASURES

The following outlines mitigation recommendations for construction and operational effects to the natural heritage features within the study area. These mitigation measures are designed to prevent or significantly reduce impacts to terrestrial habitat communities.

9.1 Timing Windows/Working in the Dry

The magnitude of effects to aquatic habitat and communities is related to the extent, timing, and duration of the project. The following mitigation measures are recommended:

- **1A**: Remove trees outside of the breeding bird window of April 10 to August 15 (Government of Canada 2021) and outside periods where other wildlife are migrating/emerging to hibernacula and/or nesting sites through consultation with UTRCA. If trees are to be removed during the breeding bird window, then an avian biologist must conduct a nesting survey before tree removals.

- **2A**: Confine the contractor to the minimum area necessary to perform the work.

- **3A**: In the event work needs to take place in the river, no in-water work should occur between March 15 and July 15 to protect spawning fish (MNRF 2021)

- **4A**: Ensure candidate SAR bat snag trees are protected during construction. If snag trees can not be avoided, it is recommended that snag removal occur between October 1 and March 31, of a given year.

9.2 Best Construction Practices

Implementation of best construction practices during construction will reduce the potential for spills or other materials/equipment entering the water. The following measures will be employed:

- **1B**: Control all equipment maintenance and refuelling to prevent any discharge of petroleum products. Conduct vehicular maintenance and refuelling at least 30 m from the watercourse, watercourse banks, and natural heritage features.

- **2B**: Implement surface protection measures to minimize soil compaction.

- **3B**: Store construction material, excess material, construction debris, and empty containers at least 30 m from the watercourse and banks to prevent entry.

- **4B**: Enlist an environmental monitor onsite to provide advice and ensure that activities will not have any negative effects. Information for site-specific SAR should be posted in construction trailer.

- **5B**: Implement a stormwater management plan to maintain pre-construction drainage patterns and flows during all project phases.

- **6B**: Implement an emergency and response management plan to address the potential for spills.

- **7B**: Implement "Clean Equipment Protocol for Industry" (Halloran et al. 2013) to inspect and clean equipment for the purposes of invasive species prevention.

9.3 Prevention of Wildlife Mortality and Disturbance

Preventative measures during construction will reduce the potential mortality and disturbance of wildlife within the Study area, and should include the following:

- **1C**: Demarcate wildlife habitat to avoid offsite disturbance and to restrict construction activities to the work areas.

- **2C**: Implement traffic limits if onsite vehicle use is required.

- **3C**: Install exclusionary fencing to prevent wildlife from entering the construction site. Exclusionary fencing should not prohibit access to nearby habitats. Where required, redirect wildlife to areas where they can avoid the potential for incidental take, and still have access to habitats. Exclusionary fencing should be monitored daily throughout construction.

- **4C**: Inspect construction area for wildlife each morning before the commencement of construction activities. Removal of trapped wildlife should be completed by a qualified biologist.

- **5C**: Educate workers to be aware of potential wildlife occurrences and measures to take to minimized potential for injury or incidental take. Maintain a log to record and report incidents of injury and/or mortality.

9.4 Prevention of Terrestrial Disturbance

Preventative measures during construction will reduce the likelihood of disturbance and destruction of the terrestrial features, and should include the following:

- **1D**: Identify setbacks from natural features and trees with the installation of tree protection fencing along the disturbance limit (10 m). No construction activities are to occur outside of these fences (including overhead), nor the piling of construction materials.

- **2D**: Minimize the construction disturbance area to the extent feasible.

- **3D**: Retain an Arborist during detailed design to create a tree preservation plan to protect as many healthy, native trees as possible through the process.

- **4D**: Ensure floodwall and/or berm construction is located outside of the dripline for the Significant Woodland and boundary of wetlands adjacent to Adelaide WWTP

- **5D**: Implement a dust management plan for the suppression of fugitive dust.

- **6D**: Ensure that temporarily disturbed areas are restored with native vegetation and monitored during construction and post construction based on UTRCA and the cities specifications.

- **7D**: Develop a restoration plan to prescribe when and how disturbed areas will be restored. Plantings should consist of native trees, shrubs and seed mixes. Tree replacement should be at a 3:1 tree replacement ratio.

9.5 Erosion and Sediment Control

Effective erosion and sediment control (ESC) will be achieved throughout the project with careful planning and design, stringent construction supervision, monitoring of the site, and maintenance of control works throughout their operational life. ESC measures will include:

- **1E**: Develop an ESC plan to minimize the potential for erosion and construction-related sediment release into nearby natural features/water bodies and prepare ESC plan condition reports as part of the monitoring and maintenance plan.

- **2E**: Install ESC measures before ground breaking.

- **3E**: Monitor and maintain ESC measures as per specifications.

- **4E**: Delineate storage, stockpiling, and staging areas prior to construction and inspected.

- **5F**: Install sediment control fence along the channel margins to prevent the entry of sediment into the watercourse.

- **6E**: Avoid construction during high volume rain events or significant snow melts/thaws. Construction will resume once soils have stabilized to avoid risk of erosion, soil compaction, or the potential for sediment release into nearby natural features/watercourses.

- **7E**: Direct discharge from sediment clean out to a filter bag or taken offsite for disposal.

- **8E**: Implement construction monitoring to ensure erosion and sediment measures are in place and working effectively. ESC should be checked weekly and after major rain events (>10 mm) to ensure it

is installed and functioning properly. Daily monitoring will be completed by the contractor. Any deficiencies should be repaired immediately. A construction monitoring log should be maintained to ensure any deficiencies and corrective actions are documented.

- **9E**: Remove all temporary ESCs following construction once disturbed areas have stabilized.

9.6 Species at Risk

Terrestrial SAR species (i.e., plants, birds, snakes, and bats) identified in Table 14 in Section 6.7 are typically impacted by the loss of habitat and incidental encounters due to vegetation removal, site clearing activities, and construction activities. Aquatic SAR species (i.e., turtles, fish, and mussels) identified in Table 14 in Section 6.7 are all are associated with the Thames River and are typically impacted directly by in-water works through the destruction of habitat (which is not anticipated for the flood protection works at either site) or indirectly by near-water works (i.e., sedimentation, erosion, or other water quality issues arising from nearby construction machinery).

Impacts to both terrestrial and aquatic SAR can be mitigated through the implementation of the mitigations identified in Sections 9.1 to 9.5.

SAR habitat is protected under the ESA; therefore, at the detailed design stage it will be important to confirm potential occurrence (i.e., location of SAR and SAR habitat) as well as permitting report requirements under the ESA. Permitting and additional studies are discussed further in Section 11.

10 RESIDUAL IMPACTS AFTER MITIGATION

The construction of the berm within the Adelaide study area is anticipated to result in an isolated, temporary disturbance and loss of habitat while construction is taking place; however, the long-term impacts associated with this project are expected to create an overall net benefit once the new vegetation has reached maturity.

Within the Adelaide study area, the north and east portions of the site where the berm and raised entrance are to be erected are already disturbed and will include minimal vegetation removal. Any trees removed within this area will be replaced at a 3:1 ratio, which will result in a long-term net benefit for the area once the trees reach maturity. The majority of the natural heritage features within the site are located along the west and south side of the property. It has been recommended within the mitigation measures that the construction of the berm does not impede with the significant woodland located directly south of the proposed berm or the wetland communities located to the west. Tree protection fencing for this area should be located outside of the dripline in order to keep the significant woodland and wetlands intact. Along the western side of the proposed berm, there will be some vegetation removal, which is located within 25 m of a stormwater outfall that outlets into the Thames River. Mitigation measures have been put in place in order to protect this outfall and the Thames River from

erosion, sedimentation, and spills. Any trees removed should be replaced at a 3:1 ratio, which will result in a long-term net benefit for the area once the trees and vegetation reach maturity.

11 NEXT STEPS

11.1 Permitting

At the detailed design stage, potential requirements under the ESA and the City's tree protection bylaw will need to be confirmed. Specifically, the following:

- **UTRCA Permit:** any works with the regulation limit (under Ontario Regulation 157/06) will require a permit through the UTRCA.
- **ESA Permit:** under Section 17 (2) (c) of the ESA, 2007, it identifies permits for activities which may contravene the ESA. Permits related to habitat destruction would require an Overall Benefit Permit.
- **City of London Tree Bylaw Permit:** will be required for the removal of trees within the study area.
- **City of London Park Occupancy Permit:** depending on the footprint of disturbance a park occupancy permit may be required from the City's parks department.

11.2 Future Work

The impact assessment detailed within this EIS report is based on preliminary conceptual design details. Potential impacts and recommended mitigation should be revisited at the detailed design stage of the project as designs are finalized to ensure that negative impacts are minimized or eliminated through implementation of appropriate mitigation or compensation measures.

It is recommended that the following be completed in advance of finalizing construction documents to ensure requirements under the ESA are appropriately addressed and sufficient time is available to obtain the necessary permits. At the detailed design stage, the following additional studies are recommended:

- Confirm wetland boundaries, complete the OWES evaluation and confirm buffer/setbacks. Unevaluated wetlands at the Adelaide study area should be evaluated by a qualified person in accordance with the OWES, with the evaluation approved by the MNRF, to determine its significance. Once the boundaries are confirmed, and evaluation of the appropriate setback should be conducted.
- Confirm significant woodland boundary and buffer/setbacks. The significant woodland (i.e., Huron Street Woods) should be mapped in the field with a City ecologist. Once the boundaries are confirmed, an evaluation of the appropriate setback should be conducted.

- Conduct a tree inventory (by a certified arborist) within the area of disturbance at both facilities to determine if any SAR trees (Kentucky Coffee-tree or Butternut) exist within the disturbance footprint.
    - If a Butternut is found, a Butternut health assessment is recommended on each specimen. If the Butternut is a pure species, no construction works are to occur within 25 m of Butternut. Any construction activities occurring within 25 m of the Butternut that could pose harm will be subject to an MECP Notice of Activity to register the project activities.
    - MECP should be consulted with regards to any potential requirements for the planted Kentucky Coffee-trees and discuss possible transplantation of candidate specimens.
- Consultation with MECP with regards to the candidate SAR bat maternity roost habitat. MECP will confirm if additional bat acoustic surveys should be completed to confirm the presence or absence of potential SAR bats in an individual tree or forested area identified as potential maternity roosting habitat that will be impacted or removed. If SAR bats are present, approval for SAR bat habitat removal from the MECP will be required. Overall benefit permitting for SAR bats may include installation of compensation measures (i.e., bat boxes) to enhance bat roosting habitat adjacent to the facility where habitat is removed.
- identified candidate SWH habitat and potential SAR habitat will need to be reviewed in more detail once the area of impact is confirmed for this project.
- Additional screening as required based on the future changes to species' listings or habitat regulations of the ESA.

12 CONCLUSION

The City retained Matrix to complete two Municipal Class EAs to address climate change resiliency measures at the Greenway WWTC and the Adelaide WWTP. The two facilities have been identified as vulnerable to severe flooding. The EAs will seek to identify a preferred flood protection approach to improve asset resilience, enhance treatment capabilities, and improve plant safety.

This report focused on the natural heritage features and functions of the Adelaide WWTP, with the Greenway WWTP to be discussed in a separate report. The purpose of the Environmental Impact Study (EIS) was to define and record the natural heritage features, discuss implications and constraints to the proposed short list of alternatives, and recommend mitigation measures to offset any potential negative impacts to protected features. The short list of alternatives for Adelaide WWTP recommended developing a berm with varying entrance protection.

Matrix combined information from the ecological field studies with relevant information from previous background studies to identify significant features within the study area. The results indicated a wide

range of terrestrial and aquatic species and habitat features present or likely present within the study area. In the analysis of significance and function, several natural heritage features were identified, which included significant valleylands, significant woodlands and woodland, wetlands, SWH, fish and fish habitat, and SAR.

The most significant ecological functions identified within the Adelaide study area included the significant woodland and unevaluated wetlands. The confirmed avian SAR (Chimney Swift) was observed flying over the study area but did not have confirmed nesting sites within the study area and, therefore, was not anticipated to be directly impacted during construction activities. The major undertakings of the flood mitigation alternatives at Adelaide WWTP include the creation of a berm which would encapsulate the north, west, and southern boundaries of the WWTP and would also include varying degrees of flood protection (raise entrance, temporary measures, and berm) for the east side of the property which largely includes the parking lot. These construction activities, along with construction access, staging, and vegetation clearing, are anticipated to have localized temporary effects to the natural features during construction; however, no long-term negative impacts are expected following the prescribed mitigation measures.

Any long-term effects associated with these projects are expected to improve the natural features through increased native plantings. Appropriate approvals should be obtained during the detailed design phase of this project to ensure the natural features and functions within the study area are adequately protected.

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APPENDIX A
Terms of Reference

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Appendix A

Environmental Impact Study
ISSUES SUMMARY CHECKLIST REPORT

Application Title:

Date Submitted:

Proponent:

Qualifications

Primary Consultant:

Key contact person:

Other consultant / field personnel:

- Hydrogeology / Hydrology:
- Biological – Flora:
- Biological – Fauna:
- Other:

Context for Background Information

Subwatershed:

Tributary Fact Sheet Number:

Planning / Policy Area:

Technical Advisory Review Team

- Ecologist Planner:
- Planner for File:
- EEPAC:
- Conservation Authority:
- Ministry of Natural Resources:
- Ministry of Municipal Affairs and Housing:
- Ministry of Agriculture and food:
- Other Review Groups (e.g., Community Associations , Field Naturalists):

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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.).

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

Soils (surface and subsurface)

Glacial geomorphology - landform type

Subwatershed

Topographic features

Ground water discharge

Shallow ground water/baseflow

Ground water discharge/aquifer

Aggregate resources

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1.2.2 Hydrology

Hydrological catchment boundary and of wetlands + determine the catchment areas of all wetlands

Surface drainage pattern

Watercourses (Permanent, Intermittent)

Stream order (Headwater, 1st, 2nd, 3rd or higher)

Agricultural Drains

Downstream receiving watercourse

Hazard Line (Map 6)

1.2.3 Natural Hazards

100 year Erosion Line

Floodline mapping

Max line mapping – UTRCA mapping + text based regulated areas

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 Sites

Rare Vegetation Communities

1.2.5 Flora

Flora (Inventory dates, Source)

Rare Flora (National, Provincial, Regional)

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1.2.6 Fauna

Fauna (Inventory dates; sources)

Breeding Birds

Migratory Birds

Amphibians

Reptiles

Mammals

Butterflies

Odonata

Other

Partners In Flight (PIF)

Rare Fauna

1.2.7 Wildlife Habitat + as per MNRF 2015 Criteria, as amended from time to time, and all applicable Official Plan policies and In-force London Plan policies

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

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Wildlife trees (snags, cavities, x-large trees > 65 cm DBH)

Forest Interior Birds

Area-sensitive birds

1.2.8 Aquatic Habitat

(SWS Aquatic Resource Management Reports)

Fish Communities

Fish spawning areas

Fish migration routes

Thermal refuge for fish

Benthic inventory

Substrate

Riparian habitat (extent and type)

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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)

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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 'S'. They also address the protection of environmental quality and ecological function with respect to water quality, fish habitat, groundwater recharge, headwaters and aquifers.

A component of a Subject Lands Status Report that is required to be included in the EIS is the evaluation of significance of all potential natural heritage features and areas recognized by In-force London Plan policies and/ or Official Plan policies.

A component of a Subject Lands Status Report that is required to be included in the EIS is the confirmation and mapping of boundaries of all natural heritage features and areas.

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

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Earth Science ANSI

2.4 Habitat of Species-At-Risk (SAR)

Endangered

Threatened

Vulnerable / Special Concern

2.5 Woodlands and Vegetation Patches

Significant Woodlands

Unevaluated Vegetation Patches and/ or other 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

Relationships between species and communities

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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

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4.0 ADDITIONAL COMPONENTS AND NOTES

- EIS to show and demonstrate conformity with the Provincial Policy Statement (2020), in-force London Plan (as of Nov. 2019) policies, and current Official Plan policies (1989), Environmental Management Guidelines (2006).

DRAFT

APPENDIX B
Correspondence

DRAFT

From: Peter De Carvalho
To: Karen Reis
Cc: Robyn Leppington
Subject: FW: [External] RE: SAR Information Request - Central London Sites MECP
Date: September 14, 2021 11:13:21 AM
Attachments: image001.png
image002.png
image003.png

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

MATRIX SOLUTIONS INC.
Environment & Engineering
650 Woodlawn Rd W Unit 7B, Guelph, ON N1K 1B8
D 226.314.1926 **C** 226.332.4392
www.matrix-solutions.com

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From: Species at Risk (MECP) <SAROntario@ontario.ca>
Sent: August 27, 2021 4:40 PM
To: Peter De Carvalho <pdecarvalho@matrix-solutions.com>
Subject: [External] RE: SAR Information Request - Central London Sites

Hello Peter,

RE: Species at Risk Data Request – City of London Wastewater Treatment Plants

I apologize for the delay in response. The Ministry of the Environment, Conservation and Parks (MECP) understands that Matrix Solutions Inc. is conducting natural heritage studies for lands associated with the Greenway Wastewater Treatment Centre and the Adelaide Wastewater Treatment Plant in the City of London, as identified in the information provided.

An initial species at risk (SAR) information screening has been completed under the *Endangered Species Act, 2007* (ESA) by MECP's Species at Risk Branch (SARB) for the above-noted project location with respect to endangered and threatened species in Ontario. The following species at risk, in addition to the species identified in the Matrix memo, are known to occur in the general area of the project and should be considered in any assessment of potential impacts to SAR and/or habitat:

Greenway Wastewater Treatment Centre

- Red Mulberry (endangered) – receives species and general habitat protection.
- Round Pigtoe (endangered) – receives species and general habitat protection.
- Kentucky Coffee-tree (threatened) – receives species and general habitat protection.

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Adelaide Wastewater Treatment Plant

- Kentucky Coffee-tree (threatened) – receives species and general habitat protection.
- Red-headed Woodpecker – this species is currently listed as special concern but will be up-listed to endangered in 2022, which will trigger species and habitat protection.

Please note that this is an initial screening for endangered and threatened 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 Ontario's 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.

The position of SARB is based on the information that has been provided by you on behalf of the proponent. Should information not have been made available and considered in our review, or new information comes to light, or if on-site conditions and circumstances change, please contact SARB as soon as possible (SAROntario@ontario.ca) to discuss next steps.

Regards,

Kathryn Markham
Management Biologist
Permissions and Compliance Section, Species at Risk Branch
Ministry of the Environment, Conservation and Parks

From: Peter De Carvalho <pdecarvalho@matrix-solutions.com>
Sent: May 12, 2021 6:42 PM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Subject: SAR Information Request - Central London Sites

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

Hi there,

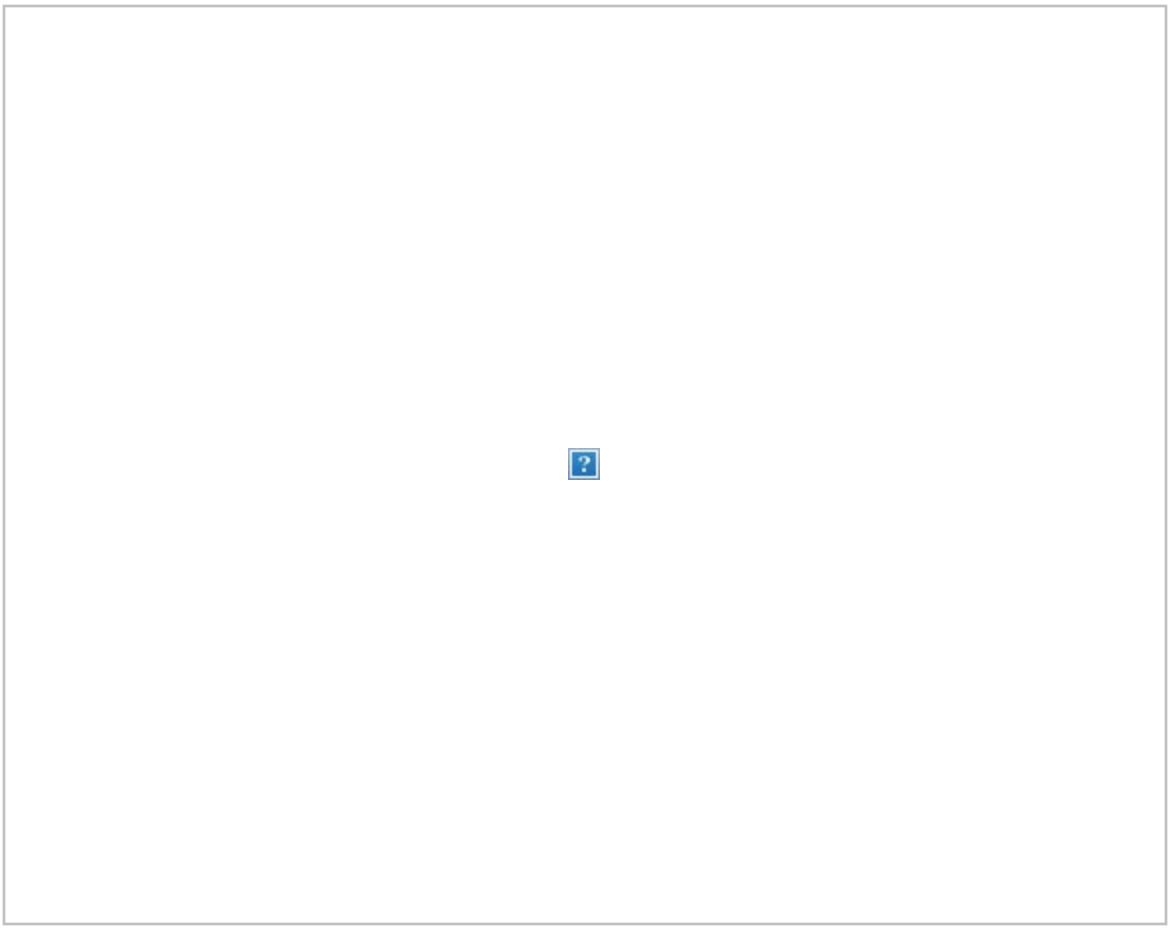
We're currently conducting a natural heritage background review for lands adjacent to the Thames River in London, Ontario. We've completed a background review using LIO, NHIC, iNaturalist, eBird, the OBBA, ORAA, and the Ontario Butterfly Atlas and carried out a preliminary desktop analysis based on the MNRF Natural Heritage Information Request Guide.

At this time we're requesting any additional SAR information from MECP records to evaluate constraints on and adjacent to these properties.

The two sites are the lands within 50 m of two wastewater treatment plants. The first is Greenway Wastewater Treatment Centre (109 Greenside Ave, London, ON N6J 2X5)

DRAFT

And the second is the Adelaide Wastewater Treatment Plant (1153 Adelaide St N #0B1, London, ON N5Y 2N4)



We have identified the following species as potentially present within our study areas:

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Common Name	Scientific Name	ESA	SARA
Birds			
Bank Swallow	Riparia riparia	THR	THR
Barn Swallow	Hirundo rustica	THR	THR
Bobolink	Dolichonyx oryzivorus	THR	THR
Chimney Swift	Chaetura pelagica	THR	THR
Common Nighthawk	Contopus virens	SC	SC
Eastern Meadowlark	Sturnella magna	THR	THR
Eastern Wood-pewee	Contopus virens	SC	SC
Wood Thrush	Hylocichla mustelina	SC	THR
Aquatic			
Black Redhorse	Moxostoma duquesnei	THR	THR
Lake Sturgeon	Acipenser fulvescens pop 3	END	THR
Silver Shiner	Notropis photogenis	THR	THR
Wavy-rayed Lampmussel	Lampsilis fasciola	THR	SC
Rayed Bean	Villosa fabalis	END	END
Spotted Sucker	Minytrema melanops	SC	SC
Reptiles			
Blanding's Turtle	emydoidea blandingii	END	END
Eastern Foxsnake	Pantherophis vulpinus	END	END
Eastern Hog-nosed Snake	Heterodon platirhinos	THR	THR
Northern Map Turtle	Graptemys geographica	SC	SC
Queensnake	Regina septemvittata	END	END
Snapping Turtle	Chelydra serpentina	SC	SC
Spiny Softshell	Apalone spinifera	END	END
Invertebrates			
Monarch	Danaus plexippus	SC	SC
Mammals			
American Badger	Taxidea taxus jacksoni	END	END
Flora			
Broad Beech Fern	Phegopteris hexagonoptera	SC	SC
Butternut	Juglans cinerea	END	END

Any information you can provide regarding the natural heritage of the area and potential presence of additional SAR, SCC, or SWH would be greatly appreciated.

Thanks so much for your time,

Peter

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

DRAFT

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Environment & Engineering

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D 226.314.1926 **C** 226.332.4392

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DRAFT

From: Peter De Carvalho
To: Karen Reis
Cc: Robyn Leppington
Subject: FW: [External] FW: Natural Heritage/SWH Information Request - Central London Sites MNRF
Date: September 14, 2021 11:14:57 AM
Attachments: image001.png
image002.png
image003.png

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

MATRIX SOLUTIONS INC.
Environment & Engineering
650 Woodlawn Rd W Unit 7B, Guelph, ON N1K 1B8
D 226.314.1926 **C** 226.332.4392
www.matrix-solutions.com

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From: Webb, Jason (MNRF) <Jason.Webb@ontario.ca>
Sent: June 9, 2021 8:57 AM
To: Peter De Carvalho <pdecarvalho@matrix-solutions.com>
Subject: [External] FW: Natural Heritage/SWH Information Request - Central London Sites

Hello Peter,

Thank you for sending an email to the Ministry of Natural Resources and Forestry (MNRF) nrisc@ontario.ca email requesting background information for the wastewater treatment plants in London.

Please circulate any future related projects within the MNRF Aylmer District geography to MNRF.Ayl.Planners@ontario.ca.

As requested, please see the following information as it pertains to each site:

Greenway Wastewater Treatment Centre:

- In the event work needs to take place in the river, no in-water work should occur between **March 15 – July 15** to protect spawning fish
- The project is not located within proximity to a Provincially Significant Wetland Complex
- The project is not located within proximity to a provincially significant ANSI
- No known Significant Wildlife Habitat

Adelaide Wastewater Treatment Plant

DRAFT

- In the event work needs to take place in the river, no in-water work should occur between **March 15 – July 15** to protect spawning fish
- The project is not located within proximity to a Provincially Significant Wetland Complex
- The project is not located within proximity to a provincially significant ANSI
- No Known Significant Wildlife Habitat

The Ministry of Environment, Conservation and Parks (MECP) has now assumed responsibility for the Endangered Species Act (ESA), including species at risk (SAR) in Ontario. All future correspondence related to ESA or SAR should be sent to SAROntario@ontario.ca to reach the MECP directly.

Please let me know directly if you have any additional questions or require clarification.

Thanks,

Jason Webb
Management Biologist
Ministry of Natural Resources and Forestry
Aylmer District
226-559-4906
Jason.webb@ontario.ca

Please Note: As part of providing accessible customer service, please let me know if you have any accommodation needs or require communication supports or alternate formats.

From: Peter De Carvalho <pdecarvalho@matrix-solutions.com>
Sent: Wednesday, May 12, 2021 6:47 PM
To: NRISC (MNRF) <NRISC@ontario.ca>
Subject: Natural Heritage/SWH Information Request - Central London Sites

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

Hi there,

We're currently conducting a natural heritage background review for lands adjacent to the Thames River in London, Ontario. We've completed a background review using LIO, NHIC, iNaturalist, eBird, the OBBA, ORAA, and the Ontario Butterfly Atlas and carried out a preliminary desktop analysis based on the MNRF Natural Heritage Information Request Guide.

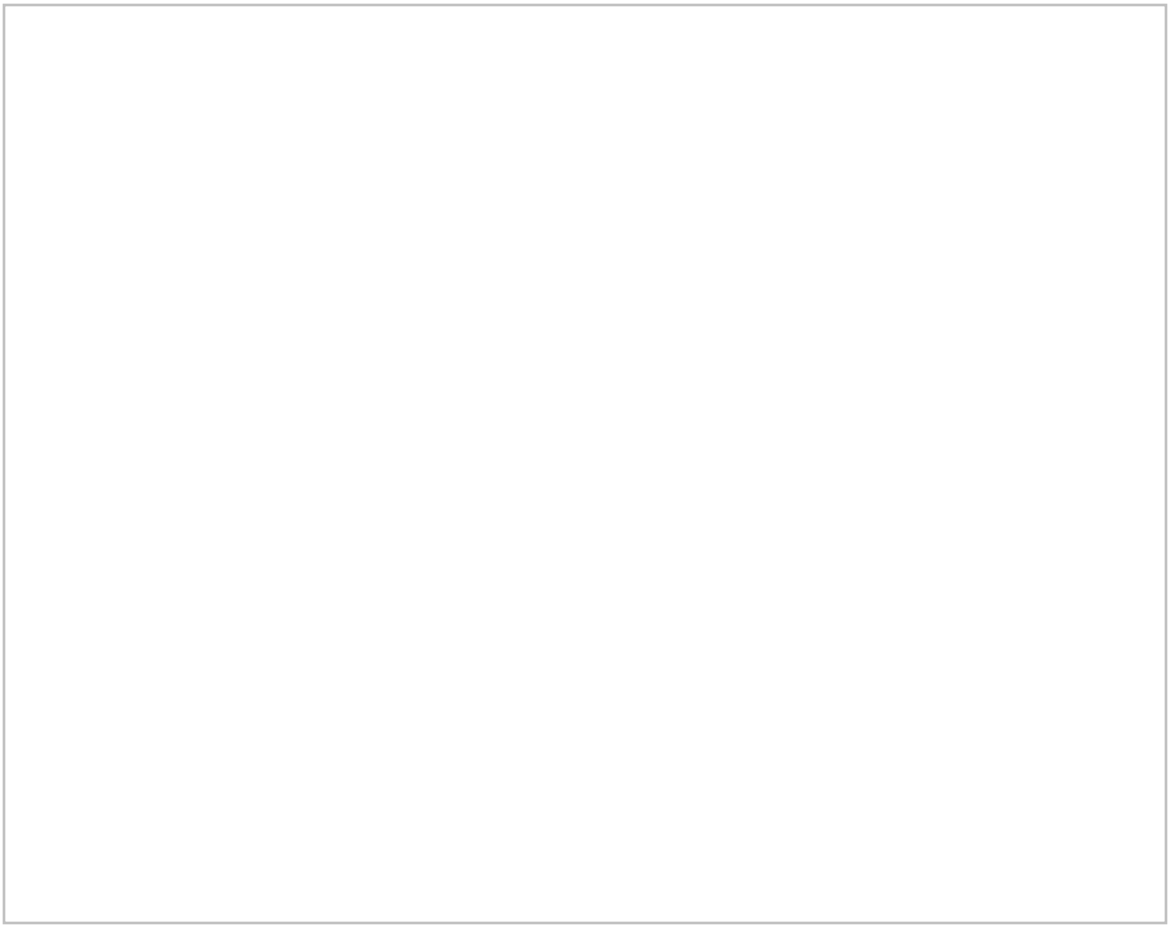
DRAFT

At this time we're requesting any additional natural heritage information (wetland assessments, SWH, other natural heritage features) from MNRF records to evaluate constraints on and adjacent to these properties.

The two sites are the lands within 50 m of two wastewater treatment plants. The first is Greenway Wastewater Treatment Centre (109 Greenside Ave, London, ON N6J 2X5)

And the second is the Adelaide Wastewater Treatment Plant (1153 Adelaide St N #0B1, London, ON N5Y 2N4)

DRAFT



Any information you can provide for these sites would be greatly appreciated.

Thanks for your help,

Peter

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

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650 Woodlawn Rd W Unit 7B, Guelph, ON N1K 1B8
D 226.314.1926 **C** 226.332.4392
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DRAFT

From:	Peter De Carvalho
To:	Karen Reis
Cc:	Robyn Leppington
Subject:	FW: [External] Information Request - Greenway and Adelaide WWTP, London UTRCA
Date:	September 14, 2021 11:14:33 AM
Attachments:	IMAGE.png IMAGE.png IMAGE.png Greenway - regulations mapping.pdf Greenway - mussel records.pdf Greenway - fish records.pdf Greenway - benthic records.pdf Adelaide WTF - regulations mapping.pdf Adelaide WTP - fish records.pdf Adelaide WTP - benthic records.pdf image002.jpg

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Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

MATRIX SOLUTIONS INC.
Environment & Engineering
650 Woodlawn Rd W Unit 7B, Guelph, ON N1K 1B8
D 226.314.1926 **C** 226.332.4392
www.matrix-solutions.com

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From: Cari Ramsey <ramseyc@thamesriver.on.ca>
Sent: June 1, 2021 12:44 PM
To: Peter De Carvalho <pdecarvalho@matrix-solutions.com>
Cc: Brent Verscheure <VerscheureB@thamesriver.on.ca>; Robyn Leppington <rleppington@matrix-solutions.com>
Subject: [External] Information Request - Greenway and Adelaide WWTP, London

Hi Peter;

Attached is the information we have for the two WWTPs noted above:

Greenway
1. fish, mussel, and benthic records are attached
2. regulations mapping attached
3. ESA are present within 1km of the subject property - MNRF should be contacted for most up to date information
4, SARA species are present within 1km of the subject property - DFO should be contacted for most up to date information
5. Please note that we have records of some species at risk snakes and turtle in the area. Please brief all staff/contractors to be aware of the potential presence of these species when working with heavy machinery to ensure they avoid any juveniles and adults that may be inhabitating the area
6. Watercourses in the area are warm water, therefore in-water work can be done between July 1 - March 15.

Adelaide

DRAFT

1. fish and benthic records attached. There are no mussel records for that area.
2. regulations mapping attached
3. ESA are present within 1km of the subject property - MNRF should be contacted for most up to date information
4, SARA species are present within 1km of the subject property - DFO should be contacted for most up to date information
5. Please note that we have records of some species at risk snakes and turtle in the area. Please brief all staff/contractors to be aware of the potential presence of these species when working with heavy machinery to ensure they avoid any juveniles and adults that may be inhabitating the area
6. Watercourses in the area are warm water, therefore in-water work can be done between July 1 - March 15.

If you have any additional information you need please let me know.

Thanks!
Cari

Cari Ramsey
Environmental Regulations Technician/ Health and Safety Specialist
UTRCA
1424 Clarke Side Road
London, ON
N5V 5B9
(519)451-2800 ext. 289
ramseyc@thamesriver.on.ca
>>> Brent Verscheure 5/13/2021 11:55 AM >>>
Thank you for your inquiry and data request, Peter.
UTRCA staff will compile data and provide to you at our earliest opportunity.

Please be patient as this data request may take up to 3 weeks.

Regards,

Brent Verscheure
Land Use Regulations Officer
1424 Clarke Rd, London, ON N5V 5B9
Tel: 519-451-2800 Ext. 318
Email:verscheureb@thamesriver.on.ca
Web:www.thamesriver.on.ca

All UTRCA offices and buildings are closed to the public to help protect the public and staff from COVID-19. I am working remotely during this time and will be monitoring all messages and emails. We apologize for any inconvenience this may cause.

>>> Peter De Carvalho <pdecarvalho@matrix-solutions.com> 5/12/2021 7:04 PM >>>
Mr. Verscheure,

We're currently conducting a natural heritage background review for lands adjacent to the Thames River in London, Ontario in the vicinity of the Adelaide and Greenway wastewater treatment plants.

DRAFT

We've completed our preliminary desktop review and are now reaching out to request any available aquatic data (fish and mussel species, benthic invertebrates, water quality data *etc*.), terrestrial/wetland data (turtles, amphibians, vegetation assemblies, confirmed or candidate significant wildlife habitats, other records of species of conservation concern, *etc*.) and any information or data available for the Huron Street Woods to the south and west of the Adelaide site.

As mentioned, the two sites encompass the lands within the vicinity (appx 120 m) of two wastewater treatment plants. The first is Greenway Wastewater Treatment Centre (109 Greenside Ave, London, ON N6J 2X5)

And the second is the Adelaide Wastewater Treatment Plant (1153 Adelaide St N #0B1, London, ON N5Y 2N4)

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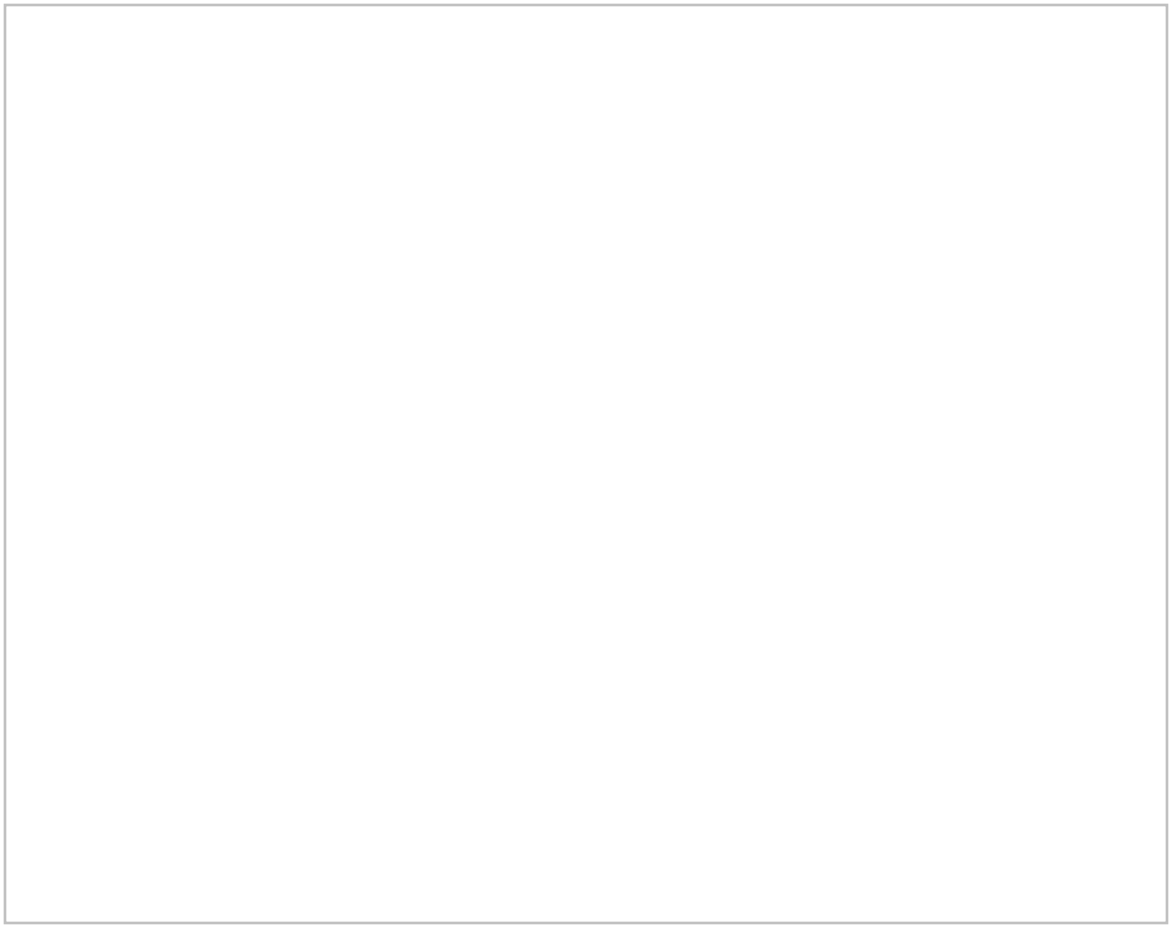

Any information you can provide for these sites would be greatly appreciated.

Thanks very much for your help,

Peter

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

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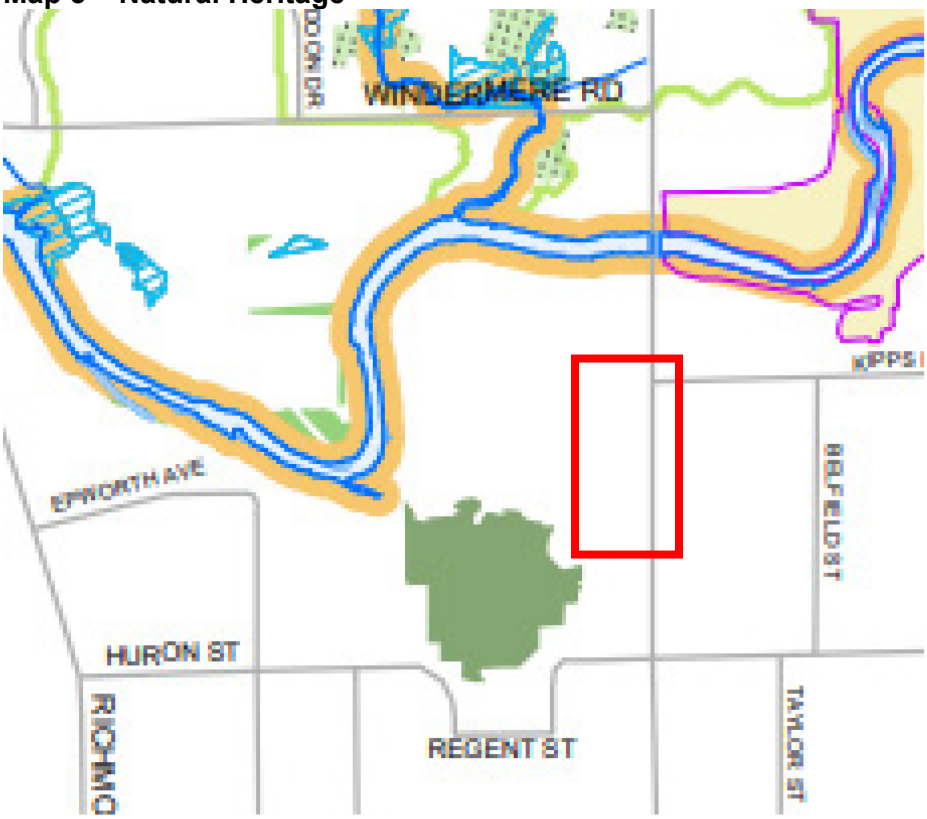
APPENDIX C
Background Data

APPENDIX C

CITY OF LONDON OFFICIAL PLAN MAPPING

Adelaide Study Area
Map 5 – Natural Heritage



LEGEND

NATURAL HERITAGE SYSTEM

- Provincially Significant Wetlands
- Wetlands
- Unevaluated Wetlands
- Significant Woodlands
- Woodlands
- Significant Valleylands
- Valleylands
- Areas of Natural and Scientific Interest
- NAME Environmentally Significant Areas (ESA)
- Potential ESAs
- Upland Corridors
- Potential Naturalization Areas
- Unevaluated Vegetation Patches

BASE MAP FEATURES

- Streets (See Map 3)
- Railways
- Urban Growth Boundary
- Water Courses/Ponds
- Water Bodies
- Conservation Authority Boundary
- Subwatershed Boundary
- STONEY CREEK Subwatershed Name

DRAFT

TABLE C1 Natural Heritage Information Centre - Species Results for Adelaide

OGF ID	Element Type	Common Name	Scientific Name	S-rank	SARO Status	COSEWIC Status	ATLAS NAD83 IDENT
870326	SPECIES	Spiny Softshell	*Apalone spinifera*		END	END	17MH7962
870326	SPECIES	Barn Swallow	*Hirundo rustica*		THR	THR	17MH7962
870326	SPECIES	Chimney Swift	*Chaetura pelagica*		THR	THR	17MH7962
870326	SPECIES	Bobolink	*Dolichonyx oryzivorus*		THR	THR	17MH7962
870326	SPECIES	Northern Map Turtle	*Graptemys geographica*		SC	SC	17MH7962
870326	SPECIES	Snapping Turtle	*Chelydra serpentina*		SC	SC	17MH7962
881436	SPECIES	Lowland Brittle Fern	*Cystopteris protrusa*				17MH8062
881436	SPECIES	Slender Mountain-mint	*Pycnanthemum tenuifolium*				17MH8062
881436	SPECIES	Hairy-fruited Sedge	*Carex trichocarpa*				17MH8062
881436	SPECIES	Striped Cream Violet	*Viola striata*				17MH8062
881436	SPECIES	Rigid Sedge	*Carex tetanica*				17MH8062
881436	SPECIES	Soft-hairy False Gromwell	*Lithospermum parviflorum*				17MH8062
881436	SPECIES	Bobolink	*Dolichonyx oryzivorus*		THR	THR	17MH8062

SARO - Species at Risk Ontario
COSEWIC - Committee on the Status of Endangered Wildlife in Canada
END - endangered
THR - threatened
SC - special concern

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TABLE C2 Ontario Reptile and Amphibian Atlas - Species Results for 17MH76

Species No.	Common Name	No. of Records	Earliest Year	Latest Year
1	Blanding's Turtle	1	1923	1923
3	Midland Painted Turtle	24	1986	2018
4	Northern Map Turtle	41	1986	2019
5	Red-eared Slider	6	2009	2018
6	Snapping Turtle	36	1986	2019
10	Dekay's Brownsnake	8	1921	2019
12	Eastern Gartersnake	27	1986	2019
13	Eastern Hog-nosed Snake	4	1965	1981
18	Milksnake	8	1986	2019
20	Queensnake	11	1955	1997
25	American Bullfrog	8	1994	2018
27	Gray Treefrog	213	1994	2017
28	Green Frog	124	1986	2019
30	Northern Leopard Frog	24	1987	2019
31	Pickerel Frog	11	2000	2009
32	Spring Peeper	285	1989	2017
33	Western Chorus Frog	147	1995	2017
34	Wood Frog	38	1986	1998
35	American Toad	132	1960	2019
40	Red-spotted Newt	1	2018	2018
41	Eastern Red-backed Salamander	10	1986	2019
44	Mudpuppy	2	2002	2010

TABLE C3 Ontario Reptile and Amphibian Atlas - Species Results for 17MH86

Species No.	Common Name	No. of Records	Earliest Year	Latest Year
3	Midland Painted Turtle	33	1986	2019
4	Northern Map Turtle	72	1985	2018
5	Red-eared Slider	1	2009	2009
6	Snapping Turtle	38	1970	2019
10	Dekay's Brownsnake	19	1952	2018
12	Eastern Gartersnake	43	1985	2019
13	Eastern Hog-nosed Snake	2	2013	2013
18	Milksnake	43	1985	2019
20	Queensnake	93	1964	2016
21	Red-bellied Snake	23	1986	2014
27	Gray Treefrog	12	1990	2013
28	Green Frog	43	1985	2018
30	Northern Leopard Frog	50	1985	2011
32	Spring Peeper	32	1986	2017
34	Wood Frog	4	1993	1994
35	American Toad	67	1962	2018
40	Red-spotted Newt	4	1990	2019
41	Eastern Red-backed Salamander	5	1989	1994
49	Five-lined Skink	1	2015	2015

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TABLE C4 Ontario Butterfly Atlas - Species Results for 17MH76

Species No.	Common Name	Scientific Name	No. of Records	Earliest in Year (adults)	Latest in Year (adults)	Earliest Year	Latest Year
120	Aphrodite Fritillary	Speyeria aphrodite	1			(year not recorded)	(year not recorded)
8	Sleepy Duskywing	Erynnis brizo	1	24-May	24-May	1904	1904
40	Hobomok Skipper	Poanes hobomok	1	15-Jun	15-Jun	1904	1904
155	Eyed Brown	Lethe eurydice	1	25-Jun	25-Jun	1905	1905
85	Bog Copper	Lycaena epixanthe	1	27-Jul	27-Jul	1909	1909
63	Mustard White	Pieris oleracea	1	14-May	14-May	1950	1950
149	White Admiral	Limenitis arthemis arthemis	1	16-Jun	16-Jun	1977	1977
38	Delaware Skipper	Anatrytone logan	1	11-Jul	11-Jul	2018	2018
132	Pearl Crescent	Phyciodes tharos	1	16-Jun	16-Jun	2018	2018
154	Northern Pearly-Eye	Lethe anthedon	1	09-Jul	09-Jul	2019	2019
153	Tawny Emperor	Asterocampa clyton	2	22-Jun	16-Jul	1981	2002
88	Acadian Hairstreak	Satyrium acadica	2	26-Jun	04-Jul	2016	2016
91	Banded Hairstreak	Satyrium calanus	2	18-Jul	21-Jul	1912	2018
43	Dion Skipper	Euphyes dion	2	12-Jul	16-Jul	1909	2018
58	Eastern Tiger Swallowtail	Papilio glaucus	2	07-Jun	11-Aug	2018	2019
156	Appalachian Brown	Lethe appalachia	2	07-Jul	12-Jul	2019	2019
33	Long Dash Skipper	Polites mystic	3	18-May	01-Jul	1903	1909
35	Northern Broken-Dash	Wallengrenia egeremet	3	03-Jul	13-Jul	2002	2018
42	Broad-winged Skipper	Poanes viator	3	10-Jul	30-Jul	1904	2018
145	American Lady	Vanessa virginiensis	3	11-May	19-Aug	1972	2019
47	Dun Skipper	Euphyes vestris	3	16-Jul	13-Aug	1909	2019
92	Hickory Hairstreak	Satyrium caryaevorus	3	12-Jul	21-Jul	2018	2019
119	Great Spangled Fritillary	Speyeria cybele	3	23-Jun	07-Aug	2018	2019
157	Little Wood-Satyr	Megisto cymela	3	21-Jun	12-Aug	2018	2019
84	Bronze Copper	Lycaena hyllus	4	25-Jun	21-Sep	1902	2018
143	Lintner's Mourning Cloak	Nymphalis antiopa lintnerii	4	07-Apr	01-Sep	2013	2019
111	Azure sp.	Celastrina sp.	4	17-Apr	31-Jul	2017	2019
15	Wild Indigo Duskywing	Erynnis baptisiae	5	13-Jul	09-Sep	2018	2019
107	Eastern Tailed Blue	Cupido comyntas	5	13-Jul	16-Sep	2018	2019
158	Common Ringlet	Coenonympha tullia	5	03-Jun	24-Aug	2017	2019
146	Painted Lady	Vanessa cardui	6	27-Jun	16-Sep	1968	2019
159	Common Wood-Nymph	Cercyonis pegala	6	03-Jul	15-Aug	1970	2019
57	Eastern Giant Swallowtail	Papilio cresphontes	6	27-Jul	02-Sep	2018	2019
150	Red-spotted Purple	Limenitis arthemis astyanax	6	02-Aug	09-Sep	2019	2019
144	Milbert's Tortoiseshell	Aglais milberti	7	07-Jun	08-Oct	1968	2018
137	Eastern Comma	Polygonia comma	7	07-Apr	18-Oct	1908	2019
31	Tawny-edged Skipper	Polites themistocles	7	07-Jun	09-Jul	1903	2019
23	Least Skipper	Ancyloxypha numitor	7	07-Jun	01-Oct	2018	2019
136	Question Mark	Polygonia interrogationis	8	18-Mar	17-Sep	1965	2019
69	Clouded Sulphur	Colias philodice	9	21-Jun	27-Oct	2017	2019
151	Viceroy	Limenitis archippus	9	06-Jun	16-Sep	2018	2019
25	European Skipper	Thymelicus lineola	11	15-Jun	21-Jul	1910	2019
55	Black Swallowtail	Papilio polyxenes	12	27-May	30-Sep	1972	2019
147	Red Admiral	Vanessa atalanta	12	10-Apr	25-Sep	1908	2019
1	Silver-spotted Skipper	Epargyreus clarus	13	12-Jun	30-Aug	2016	2019
133	Northern Crescent	Phyciodes cocyta	15	02-Jun	04-Oct	2016	2019
30	Peck's Skipper	Polites peckius	17	06-Jun	01-Sep	1909	2019
65	Cabbage White	Pieris rapae	20	07-Jun	28-Sep	1909	2019
167	Monarch	Danaus plexippus	37	13-Jun	28-Sep	1968	2019

TABLE C5 Ontario Butterfly Atlas - Species Results for 17M86

Species No.	Common Name	Scientific Name	No. of Records	Earliest in Year (adults)	Latest in Year (adults)	Earliest Year	Latest Year
61	Checkered White	Pontia protodice	1	19-Oct	19-Oct	1894	1894
19	Common Checkered Skipper	Pyrgus communis	1			1895	1895
109	Northern Azure	Celastrina lucia	1	08-May	08-May	1901	1901
60	Spicebush Swallowtail	Papilio troilus	1			1999	1999
88	Acadian Hairstreak	Satyrium acadica	1	12-Jul	12-Jul	2004	2004
9	Juvenal's Duskywing	Erynnis juvenalis	1	15-Jun	15-Jun	2014	2014
15	Wild Indigo Duskywing	Erynnis baptisiae	1	31-Jul	31-Jul	2014	2014
31	Tawny-edged Skipper	Polites themistocles	1	15-Jun	15-Jun	2014	2014
63	Mustard White	Pieris oleracea	1	31-Jul	31-Jul	2014	2014
93	Striped Hairstreak	Satyrium liparops	1	31-Jul	31-Jul	2014	2014
144	Milbert's Tortoiseshell	Aglais milberti	1	15-Apr	15-Apr	2015	2015
1	Silver-spotted Skipper	Epargyreus clarus	1	11-Jul	11-Jul	2017	2017
35	Northern Broken-Dash	Wallengrenia egeremet	1	11-Jul	11-Jul	2017	2017
153	Tawny Emperor	Asterocampa clyton	1	23-Jul	23-Jul	2018	2018
57	Eastern Giant Swallowtail	Papilio cresphontes	2	21-Aug	25-Aug	1901	2003
30	Peck's Skipper	Polites peckius	2	15-Jun	11-Jul	2014	2017
132	Pearl Crescent	Phyciodes tharos	2	15-Jun	11-Jul	2014	2017
111	Azure sp.	Celastrina sp.	2	08-May	15-Jun	2014	2018
23	Least Skipper	Ancyloxypha numitor	2	15-Jun	10-Aug	2014	2019
40	Hobomok Skipper	Poanes hobomok	2	11-Jun	15-Jun	2014	2019
91	Banded Hairstreak	Satyrium calanus	2	05-Jul	06-Jul	2016	2019
145	American Lady	Vanessa virginiensis	2	27-May	05-Jul	2016	2019
20	Common Sootywing	Pholisora catullus	2	11-Jul	01-Aug	2017	2019
136	Question Mark	Polygonia interrogationis	2	06-Jul	11-Jul	2017	2019
154	Northern Pearly-Eye	Lethe anthedon	2	03-Jul	11-Jul	2017	2019
70	Orange Sulphur	Colias eurytheme	3	15-Jun	11-Jul	2014	2017
69	Clouded Sulphur	Colias philodice	3	05-Jul	11-Jul	2016	2017
107	Eastern Tailed Blue	Cupido comyntas	3	05-Jul	11-Sep	2016	2018
158	Common Ringlet	Coenonympha tullia	3	15-Jun	27-Jun	2014	2019
151	Viceroy	Limenitis archippus	3	01-Aug	11-Sep	2018	2019
108.1	Spring Azure	Celastrina ladon	4	21-Apr	06-May	1899	1904
150	Red-spotted Purple	Limenitis arthemis astyanax	4	23-Jun	07-Aug	2019	2019
119	Great Spangled Fritillary	Speyeria cybele	4	05-Jul	11-Jul	2016	2019
143	Mourning Cloak	Nymphalis antiopa	4	11-Jun	11-Jul	2012	2019
147	Red Admiral	Vanessa atalanta	4	14-Apr	06-Jul	2017	2019
25	European Skipper	Thymelicus lineola	5	15-Jun	11-Jul	2015	2018
159	Common Wood-Nymph	Cercyonis pegala	5	05-Jul	31-Jul	2014	2019
137	Eastern Comma	Polygonia comma	5	07-May	01-Aug	2015	2019
152	Hackberry Emperor	Asterocampa celtis	5	15-Jun	31-Aug	2018	2019
58	Eastern Tiger Swallowtail	Papilio glaucus	6	30-May	11-Jul	1995	2017
65	Cabbage White	Pieris rapae	6	08-May	11-Sep	2014	2018
55	Black Swallowtail	Papilio polyxenes	6	13-May	05-Jul	1965	2019
133	Northern Crescent	Phyciodes cocyta	7	15-Jun	06-Aug	2014	2018
157	Little Wood-Satyr	Megisto cymela	7	15-Jun	01-Aug	2004	2019
167	Monarch	Danaus plexippus	15	12-Jun	27-Sep	1901	2019

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TABLE C6 Ontario Breeding Bird Atlas - Species List for Square 17MH76

Region	Square	Species	Breeding Evidence			
			Max BE	Categ	#Sq	Atlasser Name
4	17MH76	Canada Goose	FY	CONF	1	3 atlassers
4	17MH76	Wood Duck	NE	CONF	1	Ryan Zimmerling
4	17MH76	Mallard	NE	CONF	1	Stephen Bucciarelli
4	17MH76	Ring-necked Pheasant	S	POSS	1	Bob McGee
4	17MH76	Ruffed Grouse	H	POSS	1	Stephen Bucciarelli
4	17MH76	Wild Turkey	FY	CONF	1	Stephen Bucciarelli
4	17MH76	Northern Bobwhite	T	PROB	1	Stephen Bucciarelli
4	17MH76	American Bittern	T	PROB	1	Stephen Bucciarelli
4	17MH76	Great Blue Heron	H	POSS	1	2 atlassers
4	17MH76	Green Heron	A	PROB	1	Stephen Bucciarelli
4	17MH76	Turkey Vulture	V	PROB	1	Stephen Bucciarelli
4	17MH76	Northern Harrier	CF	CONF	1	Dave Martin
4	17MH76	Sharp-shinned Hawk	AE	CONF	1	Stephen Bucciarelli
4	17MH76	Cooper's Hawk	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Red-tailed Hawk	NY	CONF	1	2 atlassers
4	17MH76	American Kestrel	FY	CONF	1	Bob McGee
4	17MH76	Virginia Rail	A	PROB	1	Stephen Bucciarelli
4	17MH76	Sora	A	PROB	1	Stephen Bucciarelli
4	17MH76	Killdeer	DD	CONF	1	2 atlassers
4	17MH76	Rock Pigeon	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Spotted Sandpiper	T	PROB	1	Dave Martin
4	17MH76	Common Snipe	H	POSS	1	Bob McGee
4	17MH76	American Woodcock	FY	CONF	1	Dave Martin
4	17MH76	Black Tern	S	POSS	1	
4	17MH76	Mourning Dove	FY	CONF	1	2 atlassers
4	17MH76	Yellow-billed Cuckoo	H	POSS	1	Stephen Bucciarelli
4	17MH76	Black-billed Cuckoo	CF	CONF	1	Bob McGee
4	17MH76	Eastern Screech-Owl	T	PROB	1	Stephen Bucciarelli
4	17MH76	Great Horned Owl	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Long-eared Owl	H	POSS	1	Stephen Bucciarelli
4	17MH76	Common Nighthawk	P	PROB	1	Stephen Bucciarelli
4	17MH76	Chimney Swift	AE	CONF	1	Bill Lindley
4	17MH76	Ruby-throated Hummingbird	T	PROB	1	2 atlassers
4	17MH76	Belted Kingfisher	AE	CONF	1	Bob McGee
4	17MH76	Red-bellied Woodpecker	NY	CONF	1	Dave Martin
4	17MH76	Yellow-bellied Sapsucker	FY	CONF	1	Bob McGee
4	17MH76	Downy Woodpecker	AE	CONF	1	Bob McGee
4	17MH76	Hairy Woodpecker	NY	CONF	1	2 atlassers
4	17MH76	Northern Flicker	NY	CONF	1	Dave Martin
4	17MH76	Eastern Wood-Pewee	T	PROB	1	Dave Martin
4	17MH76	Willow Flycatcher	CF	CONF	1	2 atlassers
4	17MH76	Least Flycatcher	S	POSS	1	Stephen Bucciarelli
4	17MH76	Eastern Phoebe	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Great Crested Flycatcher	T	PROB	1	2 atlassers
4	17MH76	Eastern Kingbird	NE	CONF	1	Stephen Bucciarelli
4	17MH76	Warbling Vireo	A	PROB	1	Stephen Bucciarelli
4	17MH76	Red-eyed Vireo	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Blue Jay	NY	CONF	1	Stephen Bucciarelli
4	17MH76	American Crow	NE	CONF	1	2 atlassers
4	17MH76	Horned Lark	T	PROB	1	Dave Martin
4	17MH76	Purple Martin	NY	CONF	1	Bob McGee
4	17MH76	Tree Swallow	NY	CONF	1	2 atlassers
4	17MH76	Northern Rough-winged Swallow	FY	CONF	1	Bob McGee
4	17MH76	Cliff Swallow	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Barn Swallow	NY	CONF	1	2 atlassers
4	17MH76	Black-capped Chickadee	NE	CONF	1	Stephen Bucciarelli
4	17MH76	Red-breasted Nuthatch	V	PROB	1	Stephen Bucciarelli
4	17MH76	White-breasted Nuthatch	FY	CONF	1	2 atlassers
4	17MH76	Brown Creeper	FY	CONF	1	Stephen Bucciarelli
4	17MH76	Carolina Wren	NE	CONF	1	Bob McGee
4	17MH76	House Wren	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Winter Wren	S	POSS	1	Stephen Bucciarelli
4	17MH76	Sedge Wren	A	PROB	1	Dave Martin
4	17MH76	Marsh Wren	CF	CONF	1	Stephen Bucciarelli
4	17MH76	Blue-gray Gnatcatcher	H	POSS	1	Stephen Bucciarelli
4	17MH76	Eastern Bluebird	AE	CONF	1	Bob McGee
4	17MH76	Veery	S	POSS	1	Stephen Bucciarelli
4	17MH76	Wood Thrush	A	PROB	1	Dave Martin
4	17MH76	American Robin	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Gray Catbird	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Brown Thrasher	T	PROB	1	Dave Martin
4	17MH76	European Starling	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Cedar Waxwing	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Blue-winged Warbler	S	POSS	1	Bob McGee
4	17MH76	Yellow Warbler	CF	CONF	1	Bob McGee
4	17MH76	Chestnut-sided Warbler	T	PROB	1	Bob McGee
4	17MH76	Blackburnian Warbler	T	PROB	1	Stephen Bucciarelli
4	17MH76	American Redstart	T	PROB	1	Stephen Bucciarelli
4	17MH76	Common Yellowthroat	A	PROB	1	2 atlassers
4	17MH76	Eastern Towhee	A	PROB	1	Stephen Bucciarelli
4	17MH76	Chipping Sparrow	FY	CONF	1	Stephen Bucciarelli
4	17MH76	Field Sparrow	CF	CONF	1	Stephen Bucciarelli
4	17MH76	Vesper Sparrow	T	PROB	1	Stephen Bucciarelli
4	17MH76	Savannah Sparrow	FY	CONF	1	Stephen Bucciarelli
4	17MH76	Song Sparrow	NY	CONF	1	Stephen Bucciarelli
4	17MH76	Swamp Sparrow	DD	CONF	1	Dave Martin
4	17MH76	White-throated Sparrow	S	POSS	1	Bob McGee
4	17MH76	Scarlet Tanager	FS	CONF	1	Stephen Bucciarelli
4	17MH76	Northern Cardinal	NY	CONF	1	Bob McGee
4	17MH76	Rose-breasted Grosbeak	NY	CONF	1	2 atlassers
4	17MH76	Indigo Bunting	FY	CONF	1	Stephen Bucciarelli
4	17MH76	Bobolink	AE	CONF	1	Bob McGee
4	17MH76	Red-winged Blackbird	NE	CONF	1	Dave Martin
4	17MH76	Eastern Meadowlark	A	PROB	1	Stephen Bucciarelli
4	17MH76	Common Grackle	FY	CONF	1	3 atlassers
4	17MH76	Brown-headed Cowbird	FY	CONF	1	2 atlassers
4	17MH76	Orchard Oriole	FY	CONF	1	Stephen Bucciarelli
4	17MH76	Baltimore Oriole	NY	CONF	1	Stephen Bucciarelli
4	17MH76	House Finch	NY	CONF	1	Stephen Bucciarelli
4	17MH76	American Goldfinch	NY	CONF	1	Stephen Bucciarelli
4	17MH76	House Sparrow	NY	CONF	1	2 atlassers

TABLE C7 Ontario Breeding Bird Atlas - Species List for Square 17MH86

Region	Square	Species	Breeding Evidence			
			Max BE	Categ	#Sq	Atlasser Name
4	17MH86	Canada Goose	NE	CONF	1	2 atlassers
4	17MH86	Mute Swan	T	PROB	1	Bill Lindley
4	17MH86	Wood Duck	FY	CONF	1	Bill Lindley
4	17MH86	American Black Duck	NE	CONF	1	Bill Lindley
4	17MH86	Mallard	FY	CONF	1	Bill Lindley
4	17MH86	Blue-winged Teal	D	PROB	1	Bill Lindley
4	17MH86	Green-winged Teal	P	PROB	1	2 atlassers
4	17MH86	Ring-necked Pheasant	T	PROB	1	Bill Lindley
4	17MH86	Wild Turkey	FY	CONF	1	2 atlassers
4	17MH86	Pied-billed Grebe	D	PROB	1	Bill Lindley
4	17MH86	Double-crested Cormorant	NB	CONF	1	Bill Lindley
4	17MH86	American Bittern	FY	CONF	1	Bill Lindley
4	17MH86	Great Blue Heron	H	POSS	1	Bill Lindley
4	17MH86	Green Heron	FY	CONF	1	Bill Lindley
4	17MH86	Turkey Vulture	H	POSS	1	Bill Lindley
4	17MH86	Osprey	NE	CONF	1	Bill Lindley
4	17MH86	Bald Eagle	NY	CONF	1	2 atlassers
4	17MH86	Northern Harrier	CF	CONF	1	Bill Lindley
4	17MH86	Sharp-shinned Hawk	CF	CONF	1	Bill Lindley
4	17MH86	Cooper's Hawk	CF	CONF	1	Bill Lindley
4	17MH86	Red-shouldered Hawk	H	POSS	1	Bill Lindley
4	17MH86	Red-tailed Hawk	NY	CONF	1	Bill Lindley
4	17MH86	American Kestrel	FY	CONF	1	Bill Lindley
4	17MH86	Virginia Rail	T	PROB	1	Bill Lindley
4	17MH86	Sora	T	PROB	1	Bill Lindley
4	17MH86	Common Gallinule	H	POSS	1	Bill Lindley
4	17MH86	American Coot	H	POSS	1	Bill Lindley
4	17MH86	Killdeer	DD	CONF	1	Bill Lindley
4	17MH86	Rock Pigeon	FY	CONF	1	Bill Lindley
4	17MH86	Spotted Sandpiper	NE	CONF	1	Bill Lindley
4	17MH86	Upland Sandpiper	AE	CONF	1	Bill Lindley
4	17MH86	Common Snipe	D	PROB	1	Bill Lindley
4	17MH86	American Woodcock	T	PROB	1	Bill Lindley
4	17MH86	Mourning Dove	FY	CONF	1	Bill Lindley
4	17MH86	Yellow-billed Cuckoo	NB	CONF	1	Bill Lindley
4	17MH86	Black-billed Cuckoo	FY	CONF	1	Bill Lindley
4	17MH86	Eastern Screech-Owl	T	PROB	1	Bill Lindley
4	17MH86	Great Horned Owl	CF	CONF	1	Bill Lindley
4	17MH86	Northern Saw-whet Owl	T	PROB	1	Bill Lindley
4	17MH86	Common Nighthawk	D	PROB	1	Bill Lindley
4	17MH86	Chimney Swift	AE	CONF	1	Bill Lindley
4	17MH86	Ruby-throated Hummingbird	FY	CONF	1	Bill Lindley
4	17MH86	Belted Kingfisher	AE	CONF	1	Bill Lindley
4	17MH86	Red-headed Woodpecker	T	PROB	1	Bill Lindley
4	17MH86	Red-bellied Woodpecker	CF	CONF	1	Bill Lindley
4	17MH86	Yellow-bellied Sapsucker	AE	CONF	1	Bill Lindley
4	17MH86	Downy Woodpecker	NY	CONF	1	Bill Lindley
4	17MH86	Hairy Woodpecker	AE	CONF	1	Bill Lindley
4	17MH86	Northern Flicker	CF	CONF	1	Bill Lindley
4	17MH86	Pileated Woodpecker	AE	CONF	1	Bill Lindley
4	17MH86	Eastern Wood-Pewee	T	PROB	1	2 atlassers
4	17MH86	Alder Flycatcher	NB	CONF	1	Bill Lindley
4	17MH86	Willow Flycatcher	FY	CONF	1	Ian Platt
4	17MH86	Least Flycatcher	T	PROB	1	2 atlassers
4	17MH86	Eastern Phoebe	NE	CONF	1	Bill Lindley
4	17MH86	Great Crested Flycatcher	NB	CONF	1	Bill Lindley
4	17MH86	Eastern Kingbird	NE	CONF	1	Bill Lindley
4	17MH86	Yellow-throated Vireo	T	PROB	1	Bill Lindley
4	17MH86	Warbling Vireo	CF	CONF	1	Bill Lindley
4	17MH86	Red-eyed Vireo	NE	CONF	1	Bill Lindley
4	17MH86	Blue Jay	CF	CONF	1	Bill Lindley
4	17MH86	American Crow	CF	CONF	1	Bill Lindley
4	17MH86	Horned Lark	D	PROB	1	Bill Lindley
4	17MH86	Purple Martin	AE	CONF	1	Bill Lindley
4	17MH86	Tree Swallow	FY	CONF	1	Bill Lindley
4	17MH86	Northern Rough-winged Swallow	AE	CONF	1	2 atlassers
4	17MH86	Bank Swallow	AE	CONF	1	2 atlassers
4	17MH86	Cliff Swallow	FY	CONF	1	Bill Lindley
4	17MH86	Barn Swallow	FY	CONF	1	Bill Lindley
4	17MH86	Black-capped Chickadee	FY	CONF	1	Bill Lindley
4	17MH86	Red-breasted Nuthatch	AE	CONF	1	Bill Lindley
4	17MH86	White-breasted Nuthatch	CF	CONF	1	Bill Lindley
4	17MH86	Brown Creeper	T	PROB	1	Dave Martin
4	17MH86	Carolina Wren	A	PROB	1	Bill Lindley
4	17MH86	House Wren	FS	CONF	1	Bill Lindley
4	17MH86	Marsh Wren	P	PROB	1	Bill Lindley
4	17MH86	Golden-crowned Kinglet	CF	CONF	1	Bill Lindley
4	17MH86	Blue-gray Gnatcatcher	P	PROB	1	Bill Lindley
4	17MH86	Eastern Bluebird	FY	CONF	1	Bill Lindley
4	17MH86	Veery	H	POSS	1	Bill Lindley
4	17MH86	Wood Thrush	T	PROB	1	2 atlassers
4	17MH86	American Robin	NE	CONF	1	Bill Lindley
4	17MH86	Gray Catbird	CF	CONF	1	Bill Lindley
4	17MH86	Northern Mockingbird	T	PROB	1	Bill Lindley
4	17MH86	Brown Thrasher	CF	CONF	1	Bill Lindley
4	17MH86	European Starling	AE	CONF	1	Bill Lindley
4	17MH86	Cedar Waxwing	FY	CONF	1	Bill Lindley
4	17MH86	Yellow Warbler	NE	CONF	1	Bill Lindley
4	17MH86	Chestnut-sided Warbler	P	PROB	1	Bill Lindley
4	17MH86	Black-throated Green Warbler	S	POSS	1	Bill Lindley
4	17MH86	Pine Warbler	CF	CONF	1	Bill Lindley
4	17MH86	American Redstart	T	PROB	1	2 atlassers
4	17MH86	Ovenbird	T	PROB	1	Bill Lindley
4	17MH86	Northern Waterthrush	T	PROB	1	Bill Lindley
4	17MH86	Mourning Warbler	T	PROB	1	2 atlassers
4	17MH86	Common Yellowthroat	NE	CONF	1	Bill Lindley
4	17MH86	Eastern Towhee	T	PROB	1	2 atlassers
4	17MH86	Chipping Sparrow	FY	CONF	1	Bill Lindley
4	17MH86	Field Sparrow	NE	CONF	1	Bill Lindley
4	17MH86	Vesper Sparrow	DD	CONF	1	Bill Lindley
4	17MH86	Savannah Sparrow	CF	CONF	1	Bill Lindley
4	17MH86	Grasshopper Sparrow	CF	CONF	1	Bill Lindley
4	17MH86	Song Sparrow	CF	CONF	1	Bill Lindley
4	17MH86	Swamp Sparrow	T	PROB	1	Bill Lindley
4	17MH86	White-throated Sparrow	T	PROB	1	Bill Lindley
4	17MH86	Scarlet Tanager	T	PROB	1	Bill Lindley
4	17MH86	Northern Cardinal	NE	CONF	1	Bill Lindley
4	17MH86	Rose-breasted Grosbeak	FY	CONF	1	Bill Lindley
4	17MH86	Indigo Bunting	CF	CONF	1	Bill Lindley
4	17MH86	Bobolink	D	PROB	1	Bill Lindley
4	17MH86	Red-winged Blackbird	NE	CONF	1	Bill Lindley
4	17MH86	Eastern Meadowlark	AE	CONF	1	Bill Lindley
4	17MH86	Common Grackle	FY	CONF	1	Bill Lindley
4	17MH86	Brown-headed Cowbird	FY	CONF	1	3 atlassers
4	17MH86	Orchard Oriole	NB	CONF	1	Bill Lindley
4	17MH86	Baltimore Oriole	AE	CONF	1	Bill Lindley
4	17MH86	House Finch	CF	CONF	1	Bill Lindley
4	17MH86	White-winged Crossbill	H	POSS	1	Bill Lindley
4	17MH86	American Goldfinch	FY	CONF	1	Bill Lindley
4	17MH86	House Sparrow	NY	CONF	1	Bill Lindley

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FIGURE C1 Department of Fisheries and Oceans - Species at Risk Results (Adelaide)

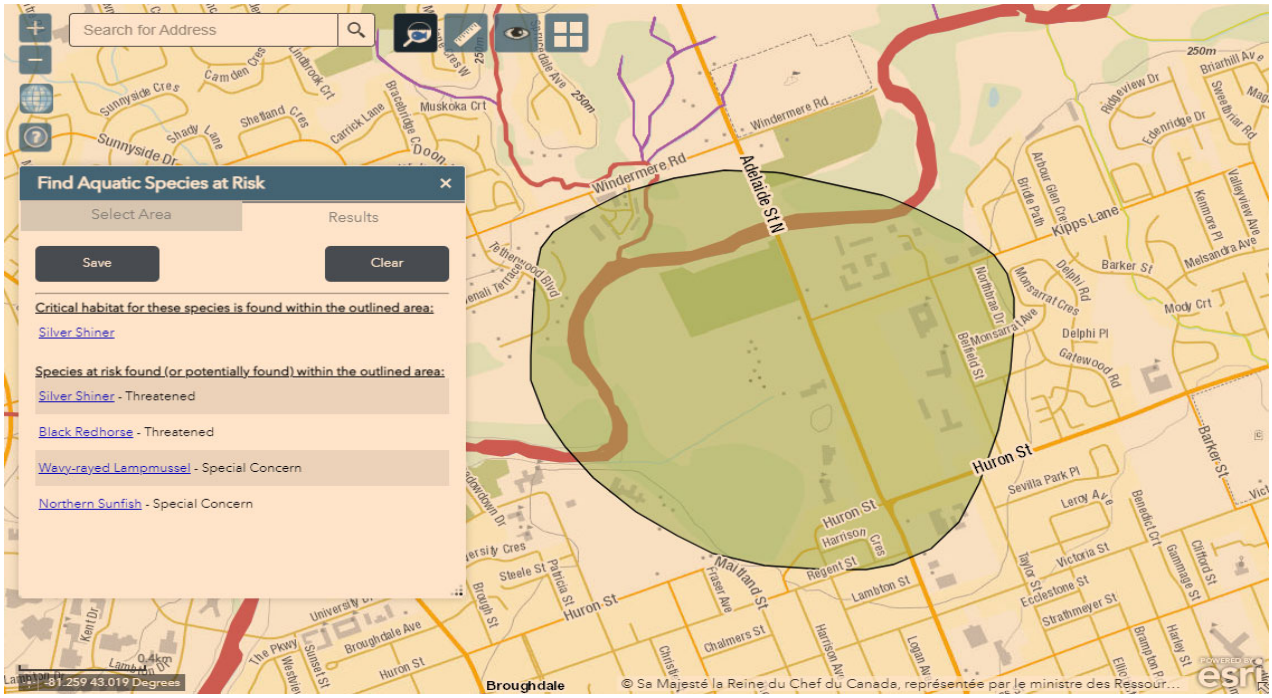

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TABLE C8 Ontario Mammal Atlas Results

Common Name	Scientific Name	Provincial (S-rank)	National (SARA)	Provincial (ESA)
American Badger (Southwestern Ontario Population)	*Taxidea taxus jacksoni*	S1	END	END
Beaver	*Castor canadensis*	S5		
Big Brown Bat	*Eptesicus fuscus*	S4		
Coyote	*Canis latrans*	S5		
Deer Mouse	*Peromyscus maniculatus*	S5		
Eastern Chipmunk	*Tamias striatus*	S5		
Eastern Cottontail	*Sylvilagus floridanus*	S5		
Eastern Gray Squirrel	*Sciurus carolinensis*	S5		
Eastern Small-footed *Myotis*	*Myotis leibii*	S2S3	END	END
Eastern Red Bat	*Lasiurus borealis*	S4		
Ermine	*Mustela erminea*	S5		
Hairy-tailed Mole	*Parascalops breweri*	S4		
Hoary Bat	*Lasiurus cinereus*	S4		
House Mouse	*Mus musculus*	SNA		
Little Brown *Myotis*	*Myotis lucifugus*	S4	END	END
Long-tailed weasel	*Mustela frenata*	S4		
Masked Shrew	*Sorex cinereus*	S5		
Meadow Jumping Mouse	*Zapus hudsonicus*	S5		
Meadow Vole	*Microtus pennsylvanicus*	S5		
Mink	*Mustela vison*	S4		
Muskrat	*Ondatra zibethicus*	S5		
Northern *Myotis*	*Myotis septentrionalis*	S3	END	END
Northern Short-tailed Shrew	*Blarina brevicauda*	S5		
Norway Rat	*Rattus norvegicus*	SNA		
Porcupine	*Erethizon dorsatum*	S5		
Raccoon	*Procyon lotor*	S5		
Red Fox	*Vulpes vulpes*	S5		
Red Squirrel	*Tamiasciurus hudsonicus*	S5		
Silver-haired Bat	*Lasionycteris noctivagans*	S4		
Smoky Shrew	*Sorex fumeus*	S5		
Snowshoe Hare	*Lepus americanus*	S5		
Southern Flying Squirrel	*Glaucomys volans*	S4		
Star-nosed Mole	*Condylura cristata*	S5		
Striped Skunk	*Mephitis mephitis*	S5		
Tricolored Bat	*Perimyotis subflavus*	S3?	END	END
Virginia Opposum	*Didelphis virginiana*	S4		
White-footed Mouse	*Peromyscus leucopus*	S5		
White-tailed Deer	*Odocoileus virginianus*	S5		
Woodchuck	*Marmota monax*	S5		
Woodland Jumping Mouse	*Napaeozapus insignis*	S5		

SARA - *Species at Risk Act*

ESA - *Endangered Species Act*

END - endangered

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APPENDIX D
Flora Inventory Results

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TABLE D1 Adelaide Wastewater Treatment Plant - Flora Results 2021

Tree/Shrub/Herb/Grass	Scientific Name	Common Name	ESA	SARA	S-rank	CUM1	UM1/MAM2-1	CUW1	FOD7	FO7-4	CUT1a	CUT1b	M2/MAS2/SV	MAS2b	MAM2-1	MAS2a	MAS2-1	SWT2-2	CUT1/CUM1	D
Tree	*Ulmus americana*	American Elm	-	-	S5			x												
Herb	*Amphicarpaea bracteata*	American Hog-peanut	-	-	S5					x										
Tree	*Lonicera maackii*	Amur Honeysuckle	-	-	SNA					x										
Tree	*Acer ginnala*	Amur Maple	-	-	SNA														x	
Graminoid	*Poa annua*	Annual Bluegrass	-	-	SNA	x	x	x			x								x	x
Herb	*Erigeron annuus*	Annual Fleabane	-	-	S5					x	x								x	
Graminoid	*Scirpus atrovirens*	Black Bulrush	-	-	S5		x								x		x			
Tree	*Prunus serotina*	Black Cherry	-	-	SNR					x										
Tree	*Robinia pseudoacacia*	Black Locust	-	-	SNA		x	x											x	
Herb	*Medicago lupulina*	Black medic	-	-	SNA		x	x			x							x	x	x
Herb	*Rubus occidentalis*	Black Raspberry	-	-	S5					x	x								x	
Tree	*Juglans nigra*	Black Walnut	-	-	S4?			x	x	x	x		x					x	x	x
Tree	*Salix nigra*	Black Willow	-	-	S4		x											x		
Herb	*Solidago flexicaulis*	Broadleaf Goldenrod	-	-	S5	x	x		x											
Graminoid	*Andropogon virginicus*	Broomsedge	-	-	S4		x								x					
Herb	*Rudbeckia triloba*	Brown-eyed Susan	-	-	SNA		x													
Herb	*Cicuta bulbifera*	Bulb-bearing Water Hemlock	-	-	S5								x							
Herb	*Cirsium vulgare*	Bull Thistle	-	-	SNA					x	x				x			x		x
Herb	*Linaria vulgaris*	Butter-and-eggs	-	-	SNA			x												x
Herb	*Anemone canadensis*	Canada Anemone	-	-	S5					x										
Herb	*Solidago canadensis*	Canada Goldenrod	-	-	SNR	x	x	x	x	x	x								x	
Herb	*Cirsium arvense*	Canada Thistle	-	-	SNA	x	x	x	x	x	x				x			x	x	x
Graminoid	*Elymus canadensis*	Canada Wildrye	-	-	S5	x	x	x		x	x								x	
Tree	*Prunus virginiana*	Chokecherry	-	-	S5														x	
Shrub	*Apocynum cannabinum*	Clasping-leaf Dogbane	-	-	SNR					x										
Herb	*Fallopia scandens*	Climbing False Buckwheat	-	-	S4					x										
Shrub	*Solanum dulcamara*	Climbing Nightshade	-	-	SNA	x	x	x	x		x				x			x	x	x
Tree	*Malus pumila*	Common Apple	-	-	SNA															
Herb	*Eupatorium perfoliatum*	Common Boneset	-	-	S5		x						x	x	x		x	x		
Herb	*Arctium minus*	Common Burdock	-	-	SNA			x	x				x					x	x	x
Herb	*Typha latifolia*	Common Cattail	-	-	S5								x	x		x	x			
Herb	*Taraxacum officinale*	Common Dandelion	-	-	SNA			x	x		x	x	x					x	x	x
Shrub	*Sambucus nigra*	Common Elderberry	-	-	SNA															
Tree	*Celtis occidentalis*	Common Hackberry	-	-	S4			x		x									x	x
Herb	*Equisetum arvense*	Common Horsetail	-	-	S5		x						x		x			x		
Tree	*Syringa vulgaris*	Common Lilac	-	-	SNA			x												
Herb	*Asclepias syriaca*	Common Milkweed	-	-	S5	x	x		x		x								x	
Herb	*Leonurus cardiaca*	Common Motherwort	-	-	SNA			x	x											x
Herb	*Verbascum thapsus*	Common Mullein	-	-	SNA						x								x	
Herb	*Plantago major*	Common Plantain	-	-	SNA			x	x		x		x		x			x	x	x
Herb	*Ambrosia artemisiifolia*	Common Ragweed	-	-	S5			x											x	x
Graminoid	*Phragmites australis*	Common Reed	-	-	SNA		x						x	x	x	x	x	x	x	
Herb	*Hypericum perforatum*	Common St. John's Wort	-	-	SNA			x			x								x	
Herb	*Tanacetum vulgare*	Common Tansy	-	-	SNA	x	x	x			x				x				x	x
Herb	*Dipsacus fullonum*	Common Teasel	-	-	SNA		x	x	x		x								x	
Graminoid	*Phleum pratense*	Common Timothy	-	-	SNA					x	x								x	
Tree	*Salix fragilis*	Crack Willow	-	-	SNA				x	x										x
Herb	*Campanula rapunculoides*	Creeping Bellflower	-	-	SNA			x			x							x	x	x
Herb	*Lysimachia nummularia*	Creeping Jenny	-	-	SNA					x										
Herb	*Rumex crispus*	Curled Dock	-	-	SNA	x	x	x	x				x	x				x	x	
Herb	*Rudbeckia laciniata*	Cut-leaved Coneflower	-	-	S5		x			x										
Tree	*Populus deltoides*	Eastern Cottonwood	-	-	S5	x	x	x	x											x
Shrub	*Physocarpus opulifolius*	Eastern Ninebark	-	-	S5	x	x	x		x	x			x					x	
Tree	*Juniperus virginiana*	Eastern Red-cedar	-	-	S5		x	x				x								
Tree	*Thuja occidentalis*	Eastern White Cedar	-	-	S5	x	x	x										x	x	
Herb	*Circaea Lutetiana*	Enchanter's Nightshade	-	-	S5					x										
Shrub	*Rhamnus cathartica*	European Buckthorn	-	-	SNA	x	x	x	x	x	x	x	x					x	x	x
Shrub	*Ligustrum vulgare*	European Privet	-	-	SNA			x	x	x	x							x	x	x
Herb	*Convolvulus arvensis*	Field Bindweed	-	-	SNA	x	x	x	x	x	x									x
Graminoid	*Carex vulpinoidea*	Fox Sedge	-	-	S5		x													
Shrub	*Rhus aromatica*	Fragrant Sumac	-	-	S4						x								x	
Graminoid	*Bromus ciliatus*	Fringed Brome	-	-	S5					x										
Herb	*Lotus corniculatus*	Garden Bird's-foot Trefoil	-	-	SNA	x	x	x		x	x				x				x	x
Herb	*Alliaria petiolata*	Garlic Mustard	-	-	SNA	x	x	x	x	x	x	x	x		x				x	x
Shrub	*Frangula alnus*	Glossy Buckthorn	-	-	SNA				x				x					x		
Herb	*Aegopodium podagraria*	Goutweed	-	-	SNA					x								x		x
Herb	*Ambrosia trifida*	Great Ragweed	-	-	S5		x						x						x	
Herb	*Chelidonium majus*	Greater Celandine	-	-	SNA				x											

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Tree/Shrub/Herb/Grass	Scientific Name	Common Name	ESA	SARA	S-rank	CUM1	UM1/MAM2-1	CUW1	FOD7	FO7-4	CUT1a	CUT1b	M2/MAS2/SV	MAS2b	MAM2-1	MAS2a	MAS2-1	SWT2-2	CUT1/CUM1	D
Tree	*Fraxinus pennsylvanica*	Green Ash	-	-	S4			x	x	x	x	x							x	
Graminoid	*Setaria viridis*	Green Foxtail	-	-	SNA			x												
Shrub	*Cornus racemosa*	Grey Dogwood	-	-	S5	x	x	x		x	x								x	x
Herb	*Cuscuta gronovii*	Gronovius Dodder	-	-	S5								x							
Herb	*Glechoma hederacea*	Ground-ivy	-	-	SNA				x		x							x		x
Herb	*Epilobium parviflorum*	Hairy Willowherb	-	-	SNA		x													
Shrub	*Salix candida*	Hoary Willow	-	-	S5		x											x		
Herb	*Arisaema triphyllum*	Jack-in-the-Pulpit	-	-	S5					x										
Shrub	*Reynoutria japonica*	Japanese Knotweed	-	-	SNA						x	x								
Herb	*Polygonum virgininanum*	Jump seed	-	-	S4					x										
Graminoid	*Poa pratensis*	Kentucky Bluegrass	-	-	S5	x	x	x		x	x				x			x		x
Tree	*Tilia cordata*	Little-leaved Linden	-	-	SNA															x
Tree	*Acer negundo*	Manitoba Maple	-	-	S5		x	x	x	x	x	x	x					x	x	x
Herb	*Epilobium palustre*	Marsh Willowherb	-	-	S5								x							
Shrub	*Rosa multiflora*	Multiflora Rose	-	-	SNA													x	x	
Herb	*Typha angustifolia*	Narrowleaf Cattail	-	-	SNA								x	x		x	x			x
Herb	*Bidens cernua*	Nodding Beggarticks	-	-	S5					x							x			
Herb	*Alisma triviale*	Northern Water-plantain	-	-	S5								x							
Tree	*Acer Platanoides*	Norway Maple	-	-	SNA			x												
Herb	*Hieracium aurantiacum*	Orange Hawkweed	-	-	SNA															x
Graminoid	*Dactylis glomerata*	Orchard Grass	-	-	SNA		x	x		x	x				x				x	x
Tree	*Betula papyrifera*	Paper Birch	-	-	SNR														x	
Herb	*Eutrochium purpureum*	Purple Joe Pye Weed	-	-	S4		x			x			x	x	x		x	x		
Herb	*Lythrum salicaria*	Purple Loosestrife	-	-	SNA		x				x		x	x	x		x	x	x	x
Graminoid	*Elymus repens*	Quackgrass	-	-	SNA			x	x	x	x								x	
Herb	*Trifolium pratense*	Red Clover	-	-	SNA		x	x	x		x								x	x
Graminoid	*Festuca rubra*	Red Fescue	-	-	SNA														x	
Tree	*Pinus resinosa*	Red Pine	-	-	S5			x												x
Shrub	*Cornus sericea*	Red-osier Dogwood	-	-	S5								x					x		x
Graminoid	*Phalaris arundinacea*	Reed Canarygrass	-	-	S5	x	x	x	x		x		x	x	x	x	x	x	x	x
Herb	*Vitis riparia*	Riverbank Grape	-	-	S5	x	x	x	x	x	x	x	x					x	x	x
Shrub	*Eleagnus angustifolia*	Russian Olive	-	-	SNA						x									x
Tree	*Pinus sylvestris*	Scotch Pine	-	-	SNA			x												
Herb	*Prunella vulgaris*	Self-heal	-	-	S5			x	x											
Tree	*Acer saccharinum*	Silver Maple	-	-	S5															x
Graminoid	*Juncus tenuis*	Slender Rush	-	-	SNR		x													
Shrub	*Salix petiolaris*	Slender Willow	-	-	S5		x						x	x				x		
Herb	*Galium trifidum*	Small Bedstraw	-	-	SNR		x						x							
Herb	*Galium mollugo*	Smooth Bedstraw	-	-	SNA	x	x	x	x		x									x
Graminoid	*Bromus inermis*	Smooth Brome	-	-	SNA		x			x	x								x	
Graminoid	*Digitaria ischaemum*	Smooth Crabgrass	-	-	SNA															x
Graminoid	*Digitaria ischaemum*	Smooth Crabgrass	-	-	SNA			x												x
Herb	*Crepis capillaris*	Smooth Hawk's-beard	-	-	SNA					x									x	x
Herb	*Saponaria officinalis*	Soapwort	-	-	SNA						x									
Herb	*Sonchus sp.*	Sow-thistle	-	-	-			x												x
Herb	*Impatiens capensis*	Spotted Jewelweed	-	-	S5		x		x	x	x	x	x	x	x		x	x		
Herb	*Centaurea stoebe*	Spotted Knapweed	-	-	SNA	x	x		x	x	x									
Shrub	*Rhus typhina*	Staghorn Sumac	-	-	S5			x	x		x								x	x
Herb	*Hackelia virginiana*	Stickseed	-	-	S5				x			x	x							
Herb	*Urtica dioica*	Stinging Nettle	-	-	S5				x				x						x	x
Tree	*Acer saccharum*	Sugar Maple	-	-	S5			x												
Herb	*Asclepias incarnata*	Swamp Milkweed	-	-	S5								x							
Herb	*Solidago altissima*	Tall Goldenrod	-	-	S5	x	x	x	x	x	x								x	
Shrub	*Lonicera tatarica*	Tatarian Honeysuckle	-	-	SNA			x	x		x								x	x
Herb	*Vicia cracca*	Tufted Vetch	-	-	SNA		x												x	
Tree	*Liriodendron tulipifera*	Tulip Tree	-	-	S4			x												
Herb	*Oxalis stricta*	Upright Yellow Wood-sorrel	-	-	SNA			x	x		x									
Herb	*Parthenocissus quinquefolia*	Virginia Creeper	-	-	S4?			x	x	x	x								x	x
Herb	*Clematis virginiana*	Virginia Virgin's-bower	-	-	S5					x										
Herb	*Polygonum amphibium*	Water Smartweed	-	-	S5								x	x						
Herb	*Rorippa nasturtium-aquaticum*	Watercress	-	-	SNA								x							
Herb	*Silene latifolia*	White Campion	-	-	SNA		x			x	x									
Herb	*Trifolium repens*	White Clover	-	-	SNA		x												x	x
Tree	*Morus alba*	White Mulberry	-	-	SNA			x	x										x	
Tree	*Quercus alba*	White Oak	-	-	S5					x										
Herb	*Ageratina altissima*	White Snakeroot	-	-	S5		x			x										
Herb	*Melilotus albus*	White Sweet-clover	-	-	SNA		x				x								x	
Herb	*Verbena urticifolia*	White Vervain	-	-	S5	x	x		x	x		x								
Herb	*Daucus carota*	Wild Carrot	-	-	SNA	x	x		x	x	x				x				x	x

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Tree/Shrub/Herb/Grass	Scientific Name	Common Name	ESA	SARA	S-rank	CUM1	UM1/MAM2-1	CUW1	FOD7	FO7-4	CUT1a	CUT1b	M2/MAS2/SV	MAS2b	MAM2-1	MAS2a	MAS2-1	SWT2-2	CUT1/CUM1	D
Herb	*Cichorium intybus*	Wild Chicory	-	-	SNA		x												x	x
Herb	*Allium vineale*	Wild Garlic	-	-	SNA		x				x								x	
Herb	*Mentha arvensis*	Wild Mint	-	-	SNR	x	x								x					
Shrub	*Ribes triste*	Wild Red Currant	-	-	S5	x	x													
Shrub	*Rubus idaeus*	Wild Red Raspberry	-	-	S5					x										
Shrub	*Salix sp.*	Willow	-	-	-		x		x	x			x	x	x		x	x	x	x
Herb	*Geum urbanum*	Wood Avens	-	-	SNA					x										
Graminoid	*Scirpus cyperinus*	Woolgrass	-	-	S5		x							x						
Herb	*Achillea millefolium*	Yarrow	-	-	SNA		x			x										x
Herb	*Geum aleppicum*	Yellow Avens	-	-	S5				x			x								

ESA - *Endangered Species Act*
SARA - *Species at Risk Act*

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APPENDIX E
Breeding Bird Survey Results

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TABLE E1 Breeding Bird Summary Results for Adelaide Wastewater Treatment Plant

Visit Number	Date	Weather
Visit 1:	June 4, 2021	15-16°C, 0 wind, 70-90% cloud cover, no precipitation
Visit 2:	June 24, 2021	18°C, 1-2 South wind, 40-90% cloud cover, no precipitation

Species		ESA Status	SARA Status	Visit 1: June 4, 2021						Visit 1: June 24, 2021						Highest Breeding Evidence						Comments
Common Name	Scientific Name			BBS-1	BBS-2	BBS-3	BBS4	BBS-5	BBS-6	BBS-1	BBS-2	BBS-3	BBS4	BBS-5	BBS-6	BBS-1	BBS-2	BBS-3	BBS4	BBS-5	BBS-6	
American Goldfinch	*Spinus tristis*			P:H 1		P:H 2						P:H 2 PR:P P:S				Possible		Probable				
American Redstart	*Setophaga ruticilla*			P:S 1	P:S 1	P:S 1		P:S 1	P:S 1	P:S 1	P:S 1			P:S 1		Possible	Possible	Possible		Possible	Possible	
American Robin	*Turdus migratorius*			P:S 2		P:S 2	P:S 3	P:H 8	P:S 3	P:S 1	P:S 2		P:S 5	C:FY 7	C:FY 9	Possible	Possible	Possible	Possible	Confirmed	Confirmed	
Baltimore Oriole	*Icterus galbula*						P:S 1		P:S 1					P:H 1					Possible	Possible	Possible	
Black-capped Chickadee	*Poecile atricapillus*					P:S 1	P:S 1					P:S 1						Possible	Possible			
Brown-headed Cowbird	*Molothrus ater*			P:S 1									P:S 1	P:S 1	P:H 1	Possible			Possible	Possible	Possible	
Blue Jay	*Cyanocitta cristata*				P:H 1	P:H 1					P:H 1						Possible	Possible				
Canada Goose	*Branta canadensis*								O:X 2												Observed	
Cedar Waxwing	*Bombycilla cedrorum*										P:H 1						Possible					
Chipping Sparrow	*Spizella passerina*												P:H 2						Possible			
Chimney Swift	*Chaetura pelagica*	Threatened	Threatened			O:X 1												Observed				BBS-3 Visit 1: Flyover.
Common Grackle	*Quiscalus quiscula*						P:H 1	P:H 2											Possible	Possible		
Downy Woodpecker	*Picoides pubescens*								P:H 1					P:H 1	P:H 1					Possible	Possible	
Eastern Kingbird	*Tyrannus tyrannus*																					
European Starling	*Sturnus vulgaris*				P:H 1	O:X 1	P:H 2			O:X 1						Observed	Possible	Observed	Possible			
Great Blue Heron	*Ardea herodias*								O:X 1												Observed	BBS-6 Visit 1: Flyover toward river.
Great Crested Flycatcher	*Myiarchus crinitus*										P:S 1 P:H				P:S 1		Possible				Possible	
Gray Catbird	*Dumetella carolinensis*			P:S 1	PR:A 2	P:H 1		P:S 1	P:H 1	P:S 1	P:S 2		P:S 1	P:S 1	P:S 1	Possible	Probable	Possible	Possible	Possible	Possible	
Hairy Woodpecker	*Picoides villosus*				P:S 1												Possible					
House Finch	*Haemorhous mexicanus*							PR:P 1												Probable		
House Sparrow	*Passer domesticus*			P:H 1									P:H 10			Possible			Possible			
House Wren	*Troglodytes aedon*			P:S 2	P:S 2	P:S 1		P:S 2	P:S 2		P:S 1	P:S 1		P:S 2		Possible	Possible	Possible		Possible	Possible	
Indigo Bunting	*Passerina cyanea*				P:S 1	P:S 1	P:S 1	P:S1			P:S 1	P:S 1					Possible	Possible	Possible	Possible		
Killdeer	*Charadrius vociferus*						PR:P 1				P:H 1		P:H 1		P:H 1		Possible		Probable		Possible	
Mallard	*Anas platyrhynchos*														O:X 1						Observed	BBS-6 Visit 2: Flying toward river.
Mourning Dove	*Zenaida macroura*										P:S 1						Possible					
Northern Cardinal	*Cardinalis cardinalis*				P:S 1	P:S 2		P:S 1	P:S 1	P:S 1	P:S 1				P:S 1	Possible	Possible	Possible		Possible	Possible	
Northern Pintail	*Anas acuta*							P:S 1												Possible		
Rose-breasted Grosbeak	*Pheucticus ludovicianus*							P:S 1							P:S 1					Possible	Possible	BBS-6 Visit 2: In trees toward river.
Red-bellied Woodpecker	*Melanerpes carolinus*			P:S 1												Possible						
Red-eyed Vireo	*Vireo olivaceus*					P:S 1				P:S 1		P:S 2						Possible				
Red-winged Blackbird	*Agelaius phoeniceus*			P:S 7 PR:A	P:S 1		P:H 2	P:S 3	P:S 5	PR:A 8 PR:P PR:V P:S C:FY	P:S 5 PR:P		P:S 2	P:S 4	P:H 8 P:S	Confirmed	Probable		Possible	Possible	Possible	
Song Sparrow	*Melospiza melodia*			P:S 2	P:S 2	P:H 2 P:S	P:S 1	P:S 2	P:S 2		P:S 1	P:S 1		P:S 1	P:S 2	Possible	Possible	Possible	Possible	Possible	Possible	
Warbling Vireo	*Vireo gilvus*			P:S 1			P:S 1	P:S 1	P:S 1				P:S 2	P:S 1	P:S 1	Possible			Possible	Possible	Possible	
Willow Flycatcher	*Empidonax traillii*				P:S 1												Possible					
Yellow Warbler	*Setophaga petechia*			P:S 2	P:S 1	P:S 1	P:S 1	P:S 2	P:S 3	P:S 1	P:H 1 P:S	P:S 4 PR:P PR:A	P:S 1	P:S 1	P:S 2	Possible	Possible	Probable	Possible	Possible	Possible	

	BBS-1	BBS-2	BBS-3	BBS4	BBS-5	BBS-6
Easting	479706	479797	479917	479763	479324	479477
Northing	4762512	4762373	4762412	4762991	4762775	4762547

Breeding Codes

Observed

O:X - Species observed during breeding season but no breeding evidence

Possible Breeding

P:S - Singing male present, or breeding calls hears, inits breeding season in suitable nesting habita

P:H - species observed during breeding season in suitable habitat

Probable Breeding

PR:P - Pair observed in their breeding season in suitable nesting habita

PR:T - Permanent territory presumed through territorial behaviour on both visits

PR:D - Courtship or display between a male and a female or 2 males, including courship,feeding or copulatio

PR:V - Visiting probable nest site

PR:A - Agitated behaviour or anxiety calls of an adult

PR:B - Brood patch on adult female or cloacal protuberance on adult male

PR:N - Nest-building or exacation of nest hole

Confirmed Breeding

C:DD - Distraction display

C:NU - Used nest or eggshells found

C:FY - Recently fledged young or downy young, including young incapable of sustained fligh

C:AE - Adult leaving or entering nest site

C:FS - Adult carrying fecal sac

C:CF - Adult carrying food for young

C:NE - Nest containing eggs

C:NY - Nest with young (seen or heard)

Note: use lower case if observed outside breeding bird survey time for point coun

ESA - *Endangered Species Act*

SARA - *Species at Risk Act*

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APPENDIX F
Significant Wildlife Habitat Assessment

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TABLE F1 Seasonal Concentration Areas of Animals

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
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 grains in the Long Point, Rondeau, Lk. 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. <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 • Sites documented through waterfowl planning processes (e.g., 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” • 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). • SWH MIST Index #7 provides development effects and mitigation measures.	• Candidate – Open areas adjacent to wetlands west of treatment plant may be subjected to sheet water flooding conditions following spring freshet
Waterfowl Stopover and Staging Areas (Aquatic) **<u>Rationale:</u>** Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	• Canada Goose • Cackling Goose • Snow Goose • American Black Duck • Northern Pintail • Northern Shoveler • American Wigeon • Gadwall • Green-winged Teal • Blue-winged Teal • Hooded Merganser • Common Merganser • Lesser Scaup • Greater Scaup • Long-tailed Duck • Surf Scoter • White-winged Scoter • Black Scoter • Ring-necked duck	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH; however, a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water) <u>Information Sources</u> • Environment Canada • Naturalist clubs often are aware of staging/stopover areas. • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (e.g., EHJV implementation plan)	Studies carried out and verified presence of: • Aggregations of 100 or more of listed species for 7 days, results in >700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH • The combined area of the ELC ecosites and a 100 m radius area is the SWH • Wetland area and shorelines associated with sites identified within the SWHTG Appendix K are significant wildlife habitat. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from	• Candidate – MAS2 ecosites present west of treatment plant.

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
	• Common Goldeneye • Bufflehead • Redhead • Ruddy Duck • Red-breasted Merganser • Brant • Canvasback		• Ducks Unlimited projects • Element occurrence specification by Nature Serve: http://www.natureserve.org • NHIC Waterfowl Concentration Area	past surveys with species numbers and dates recorded). • SWH MIST [cxlix] Index #7 provides development effects and mitigation measures.	
Shorebird Migratory Stopover Area **<u>Rationale:</u>** High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	• 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	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	• Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. • Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. • Sewage treatment ponds and storm water ponds do not qualify as a SWH. <u>Information Sources</u> • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • NHIC Shorebird Migratory Concentration Area	Studies confirming: • Presence of 3 or more of listed species and >1000© shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100© Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100 m radius area [cxlviii] • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" [ccxi] • SWH MIST [cxlix] Index #8 provides development effects and mitigation measures.	• None – Habitat may be present at the nearby Thames River, but no shorelines exist within the study area.
Raptor Wintering Area **<u>Rationale:</u>** Sites used by multiple species, a high number of individuals and used annually are most significant	• Rough-legged Hawk • Red-tailed Hawk • Northern Harrier • American Kestrel • Snowy Owl **<u>Special Concern:</u>** • Short-eared Owl • Bald Eagle	<u>Hawks/Owls:</u> Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM; CUT; CUS; CUW. <u>Bald Eagle:</u> Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	• The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Raptor wintering (hawk/owl) sites need to be >20 ha[cxlviii, cxlix] with a combination of forest and upland.[xvi, xvii, xviii, xix, xx, xxi.] • Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15 ha) with adjacent woodlands[cxlix] • Field area of the habitat is to be wind swept with limited snow depth or accumulation. • Eagle sites have open water and large trees and snags available for roosting[cxlix]	Studies confirm the use of these habitats by: • 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)[cxlix] for a minimum of 20 days by the above number of birds©. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area© • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWH MIST[cxlix] Index #10 and #11 provides development effects and mitigation measures.	• None – no habitat areas >20 ha are present.

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			Information Sources: • OMNRF Ecologist or Biologist • Naturalist clubs • NHIC Raptor Winter Concentration Area • Data from Bird Studies Canada • Results of Christmas Bird Counts • Reports and other information available from Conservation Authorities.		
Bat Hibernacula **Rationale:** Bat hibernacula are rare habitats in all Ontario landscapes.	• Big Brown Bat • Tri-coloured Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as SWH • The locations of bat hibernacula are relatively poorly known. Information Sources • OMNRF for possible locations and contact for local experts • NHIC Bat Hibernaculum • Ministry of Northern Development and Mines for location of mine shafts. • Clubs that explore caves (e.g. Sierra Club) • University Biology Departments with bat experts.	• All sites with confirmed hibernating bats are SWH(E). • The area includes 200 m radius around the entrance of the hibernaculum[cxlviii, ccvii, (E)] for most development types and 1000 m for wind farms[ccv]. • Studies are to be conducted during the peak swarming period (Aug.–Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects"[ccv]. • SWH MIST[cxlix] Index #1 provides development effects and mitigation measures.	• None – Study area did not contain Hibernacula ecosites.
Bat Maternity Colonies **Rationale:** Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.	• Big Brown Bat • Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	• Maternity colonies can be found in tree cavities, vegetation and often in buildings[xxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario[xxii]. • Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx, ccv] with >10/ha large diameter (>25 cm dbh) wildlife trees • 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, lxiv] Information Sources • OMNRF for possible locations and contact for local experts	• Maternity Colonies with confirmed use by: • >10 Big Brown Bats(E) • >5 Adult Female Silver-haired Bats(E) • The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies(E). • Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects"[ccv]. • SWH MIST[cxlix] Index #12 provides development effects and mitigation measures.	• None– an assessment was completed on the number of snag trees per hectare, and the study area did not meet the threshold for bat maternity roosting habitat.

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			• University Biology Departments with bat experts.		
Turtle Wintering Areas **<u>Rationale:</u>** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	• Midland Painted Turtle **<u>Special Concern:</u>** • Northern Map Turtle • Snapping Turtle	Snapping and Midland Painted Turtles; ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO Northern Map Turtle; Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	• For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen[cix, cx, cxi, cxii] • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. <u>Information Sources</u> • EIS studies carried out by Conservation Authorities. • Field Naturalists Clubs • OMNRF Ecologist or Biologist • NHIC	• Presence of 5 over-wintering Midland Painted Turtles is significant(E). • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant(E). • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept.–Oct.) or spring (Mar.–May)[cvii]. • Congregation of turtles is more common where wintering areas are limited and therefore significant.[cix, cxcxi, cxii] • SWH MIST[cxlix] Index #28 provides development effects and mitigation measures for turtle wintering habitat.	• Candidate – The larger SAM2 ecosite west of the treatment plant may be suitable overwintering habitat.
Reptile Hibernaculum **<u>Rationale:</u>** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	**<u>Snakes:</u>** • Eastern Gartersnake • Northern Watersnake • Northern Red-bellied Snake • Northern Brownsnake • Smooth Green Snake • Northern Ring-necked Snake **<u>Special Concern:</u>** • Milksnake • Eastern Ribbonsnake	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator.	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line.[xliv, l, li, lii, 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. <u>Information Sources</u> • In spring, local residents or landowners may have observed the emergence of	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. <u>or</u>; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. <u>or</u>; individuals of two or more snake spp. near potential hibernacula (e.g. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct)(E) • <u>Note</u>: If there are Special Concern Species present, then site is SWH • <u>Note</u>: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e. strong hibernation site fidelity). Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in	• None – Features such as fractured bedrock, old foundations, caves, alvars, rock barrens not present.

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			snakes on their property (e.g. old dug wells). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs • University herpetologists • NHIC	which the hibernacula is located plus a 30 m radius area is the SWH[E] • SWH MIST[cxlix] Index #13 provides development effects and mitigation measures for snake hibernacula.	
Colonially-Nesting Bird Breeding Habitat (Bank and Cliff) **<u>Rationale:</u>** Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are declining in Ontario.	• Cliff Swallow • Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns. Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil, or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation. <u>Information Sources</u> • Reports and other information available from Conservation Authorities. • Ontario Breeding Bird Atlas • Bird Studies Canada; *NatureCounts* http://www.birdscanada.org/birdmon/ • Field Naturalist Clubs	Studies confirming: • Presence of 1 or more nesting sites with 8[cxlix] or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50 m 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] • SWH MIST[cxlix] Index #4 provides development effects and mitigation measures	• None- Study area does not contain exposed banks that would support colonially nesting birds
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs) **<u>Rationale:</u>** Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	• Great Blue Heron • Black-crowned Night-Heron • Great Egret • Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree. <u>Information Sources</u> • Ontario Breeding Bird Atlas,[ccv] colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). • NHIC Mixed Wader Nesting Colony • Aerial photographs can help identify large heronries. • Reports and other information available from Conservation Authorities. • MNRF District Offices. • Field Naturalist Clubs.	Studies confirming: • Presence of 2[E] or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300 m radius or extent of the Forest Ecosite containing the colony or any island <15.0 ha with a colony is the SWH.[cc, ccvii] • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells • SWH MIST[cxlix] Index #5 provides development effects and mitigation measures.	• None- the study area did not contain any of the candidate ecosites

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
Colonially-Nesting Bird Breeding Habitat (Ground) **Rationale:** Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	• Herring Gull • Great Black-backed Gull • Little Gull • Ring-billed Gull • Common Tern • Caspian Tern • Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1–6 MAS1–3 CUM CUT CUS	• 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. Information Sources • Ontario Breeding Bird Atlas, rare/colonial species records • Canadian Wildlife Service • Reports and other information available from Conservation Authorities. • NHIC Colonial Waterbird Nesting Area • MNRF District Offices • Field Naturalist Clubs	Studies confirming: • Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern(E). • Presence of 5 or more pairs for Brewer's Blackbird(E). • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant(E). • The edge of the colony and a minimum 150 m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0 ha 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] • SWH MIST[cxlix] Index #6 provides development effects and mitigation measures.	• None- the study area does not contain rocky islands or peninsulas. Suitable habitat may be present within sections of the nearby Thames River.
Migratory Butterfly Stopover Areas **Rationale:** Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	• Painted Lady • Red Admiral Special Concern • Monarch	Combination of ELC Community Series; need to have present one Community Series from each landclass: Field: CUM CUT CUS Forest: FOC FOD FOM CUP Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Erie or Lake Ontario[cxlix]. • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south.[xxxii, xxxiii, xxxiv, xxxv, xxxvi] • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat. [cxlviii, cxlix] • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes.[xxxvii, xxxviii, xxxix, xl, xli] Information Sources • MNRF District Offices • NHIC • Agriculture Canada in Ottawa may have list of butterfly experts. • Field Naturalist Clubs	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)[xliii]. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100–500/day[xxxvii], significant variation can occur between years and multiple years of sampling should occur.[xl, xlii] • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 **or** >3000 with the presence of Painted Ladies or Red Admirals is to be considered significant. (E) • SWH MIST[cxlix] Index #16 provides development effects and mitigation measures.	• None- the study area is not within 5km from Lake Erie

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			• Toronto Entomologists Association • Conservation Authorities		
Landbird Migratory Stopover Areas **<u>Rationale</u>:** Sites with a high diversity of species as well as high numbers are most significant.	All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1 All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	Woodlots >5 ha(E) in size and within 5 km[iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv] of Lake Erie and Lake Ontario. If woodlands are rare in an area of shoreline, woodland fragments 2–5 ha can be considered for this habitat(E) • If multiple woodlands are located along the shoreline those Woodlands <2 km from Lake Erie and Lake Ontario are more significant[cxlix] • Sites have a variety of habitats; forest, grassland and wetland complexes[cxlix] • The largest sites are more significant[cxlix] • Woodlots and forest fragments are important habitats to migrating birds,[ccxviii] these features located along the shore and located within 5km of Lake Erie and Lake Ontario are Candidate SWH.[cxlviii] <u>Information Sources</u> • Bird Studies Canada • Ontario Nature • Local birders and field naturalist clubs • Ontario Important Bird Areas (IBA) Program	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(E). 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 to Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWH MIST[cxlix] Index #9 provides development effects and mitigation measures.	• None – the study area is not within 5km from Lake Erie.
Deer Winter Congregation Areas **<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]	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50 ha may also be used.	• Woodlots >100 ha in size or if large woodlots are rare in a planning area woodlots >50 ha(E) • 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.[cxlviii] • Large woodlots > 100 ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1–1.5 deer/ha.[ccxxiv] • Woodlots with high densities of deer due to artificial feeding are not significant(E). <u>Information Sources</u> • MNRF District Offices • LIO/NRVIS	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF.[cxlviii] • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF.(E) • Studies should be completed during winter (Jan/Feb) when >20 cm of snow is on the ground using aerial survey techniques,[ccxxiv] ground or road surveys, or a pellet count deer density survey.[ccxxv] • SWH MIST[cxlix] Index #2 provides development effects and mitigation measures.	• None- the study area does not contain woodlots >50ha

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TABLE F2 Rare Vegetation Communities

Rare Vegetation Community	Candidate SWH			Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources		
Cliffs and Talus Slopes **<u>Rationale</u>:** Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3 m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris	Most cliff and talus slopes occur along the Niagara Escarpment. <u>Information Sources</u> • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF Districts • NHIC has location information available on their website • Field Naturalist Clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes[lxxviii] • SWH MIST[cxlix] Index #21 provides development effects and mitigation measures.	• None- the study area does not contain any of the candidate ecosites.
Sand Barren **<u>Rationale</u>:** Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always ≤ 60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered, but less than 60%.	A sand barren area >0.5 ha in size[Ⓔ]. <u>Information Sources</u> • OMNRF Districts • NHIC has location information available on their website. • Field Naturalist Clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens[lxxviii] • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.)[Ⓔ]. • SWH MIST[cxlix] Index #20 provides development effects and mitigation measures.	• None- the study area does not contain any of the candidate ecosites.
Alvar **<u>Rationale</u>:** Alvars are extremely rare habitats in Ecoregion 7E.	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 **Five Alvar Indicator Species:** *1) Carex crawei* *2) Panicum philadelphicum* *3) Eleocharis compressa* *4) Scutellaria parvula* *5) Trichostema brachiatum* These indicator species are very specific to Alvars within Ecoregion 7E[Ⓔcxlix]	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover.[lxxviii]	An Alvar site > 0.5 ha in size.[lxxv] Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie.[cxcix] <u>Information Sources</u> • Alvars of Ontario (2000), Federation of Ontario Naturalists[lxxvi] • Ontario Nature – Conserving Great Lakes Alvars[ccviii] • NHIC has location information available on their website. • OMNRF Staff • Field Naturalist Clubs • Conservation Authorities	• Field studies that identify four of the five[Ⓔ] **Alvar Indicator Species**[lxxv, cxlix] at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses[lxxv] • SWH MIST[cxlix] Index #17 provides development effects and mitigation measures.	• None- the study area does not contain any of the candidate ecosites.
Old Growth Forest **<u>Rationale</u>**: Due to historic logging practices and land	Forest Community Series: FOD FOC FOM	Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of	Woodland area is >0.5 ha.[Ⓔ] <u>Information Sources</u>	Field Studies will determine: • If dominant trees species of the forest are >140 years old, then the area containing	• None- The forest community did not contain a dominate tree community > 140 years.

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Rare Vegetation Community	Candidate SWH			Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources		
clearance for agriculture, old growth forest is rare in Ecoregion 7E.	SWD SWC SWM	a multi-layered canopy and an abundance of snags and downed woody debris.	• OMNRF Forest Resource Inventory mapping • OMNRF Districts • Field Naturalist Clubs • Conservation Authorities • Sustainable Forestry License (SFL) companies will possibly know locations through field operations. • Municipal forestry departments	these trees is Significant Wildlife Habitat[cxlviii] • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities[cxlviii] (cut stumps will not be present) • The area of forest ecosites combined or an ecoelement 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[lxxviii] • SWH MIST[cxlix] Index #23 provides development effects and mitigation measures.	
Savannah **Rationale:** Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25–60%[lxxix, lxxx, lxxxi, lxxxii, lxxxiii] 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).	No minimum size to site.[E] Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • NHIC has location data available on their website. • OMNRF Districts • Field Naturalists Clubs • Conservation Authorities	Field studies confirm one or more of the Savannah indicator species listed in [cxlix] Appendix N should be present[E]. Note: Savannah plant spp. list from Ecoregion 7E should be used.[cxlviii] • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWH MIST[cxlix] Index #18 provides development effects and mitigation measures.	• None- the study area does not contain any of the candidate ecosites.
Tallgrass Prairie **Rationale:** Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover[lxxix, lxxx, lxxxi, lxxxii, lxxxiii] 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).	No minimum size to site.[E] Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • OMNRF Districts • NHIC has location information available on their website. • Field Naturalists Clubs • Conservation Authorities	Field studies confirm one or more of the Prairie indicator species listed in [cxlix] Appendix N should be present.[E] Note: Prairie plant spp. list from Ecoregion 7E should be used[cxlviii] • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWH MIST[cxlix] Index #19 provides development effects and mitigation measures.	• None- the study area does not contain any of the candidate ecosites.
Other Rare Vegetation Communities **Rationale:** Plant communities that often contain rare	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG.[cxlviii] Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in Appendix M.[cxlviii] The OMNRF/NHIC will have up to date listing for rare vegetation communities.	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG.[cxlviii] • Area of the ELC Vegetation Type polygon is the SWH.	• None – no rare vegetation communities as listed for Middlesex County on Appendix M of the SWHTG present.

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Rare Vegetation Community	Candidate SWH			Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources		
species which depend on the habitat for survival.			Information Sources • NHIC has location information available on their website. • OMNRF Districts • Field Naturalists Clubs • Conservation Authorities	• SWH MIST[cxlix] Index #37 provides development effects and mitigation measures.	

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TABLE F3 Specialized Habitat of Wildlife considered SWH

Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
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 120 m from a wetland (> 0.5 ha) or a wetland (>0.5 ha) and any small wetlands (0.5 ha) within 120 m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. • Upland areas should be at least 120 m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40 cm dbh) in woodlands for cavity nest sites. Information Sources • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from Conservation Authorities.	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or; • Presence of 10 or more nesting pairs for listed species including Mallards.[E] • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April–June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m[cxlviii] from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWH MIST[cxlix] Index #25 provides development effects and mitigation measures.	• Candidate – The wetland complex if MAM, MAS, and SWT ecosites south and west of the treatment plant meets the areal ELC requirements for this habitat type.
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat **Rationale:** 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.	Osprey **Special Concern** Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). Information Sources • NHIC compiles all known nesting sites for Bald Eagles in Ontario. • MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat. • Nature Counts, Ontario Nest Records Scheme data.	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area.[cxlviii] • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH[ccvii], maintaining undisturbed shorelines with large trees within this area is important.[cxlviii] • For a Bald Eagle the active nest and a 400–800 m radius around the nest is the SWH.[cvi, ccvii] Area of the habitat from 400–800 m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat.[cvi] • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for ≥ 3 years or	• None – no suitable ecosites are present adjacent to lakes, ponds, river or wetlands within the study area. Suitable BEONFP SWH may be present adjacent to the Thames River

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Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			• OMNRF District • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented. • Reports and other information available from Conservation Authorities. • Field Naturalists clubs	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 early March to mid-August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWH MIST[cxlix] Index #26 provides development effects and mitigation measures.	
Woodland Raptor Nesting Habitat **<u>Rationale:</u>** Nests sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.	• Northern Goshawk • Cooper's Hawk • Sharp-shinned Hawk • Red-shouldered Hawk • Barred Owl • Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD, and CUP3	All natural or conifer plantation woodland/forest stands >30 ha with >4 ha of interior habitat.[lxxxviiii, lxxxix, xc, xci, xciii, xciv, xcv,xcvi, cxxxiii] Interior habitat determined with a 200 m buffer.[cxlviii] • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. <u>Information Sources</u> • OMNRF Districts • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada. • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of 1 or more active nests from species list is considered significant.[cxlviii] • Red-shouldered Hawk and Northern Goshawk – A 400 m radius around the nest or 28 ha area of habitat is the SWH[ccvii] (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest) • Barred Owl—A 200 m radius around the nest is the SWH.[ccvii] • Broad-winged Hawk and Coopers Hawk—A 100 m radius around the nest is the SWH.[ccvii] • Sharp-Shinned Hawk—A 50 m 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. • SWH MIST[cxlix] Index #27 provides development effects and mitigation measures.	• None- the study area does not contain woodlands >30ha
Turtle Nesting Areas **<u>Rationale:</u>** These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	• Midland Painted Turtle <u>Special Concern</u> • Northern Map Turtle • Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100 m)[cxlviii] or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of	Studies confirm: • 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 turtles nest, plus a radius of 30–100 m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH.[cxlviii]	• None- The study area does not contain ecosites with exposed mineral soil suitable for turtle nesting.

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Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			marshes, lakes, and rivers are most frequently used. <u>Information Sources</u> • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • NHIC • Field Naturalist Clubs	• Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30–100 m area of habitat.[cxlix] • 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. • SWH MIST[cxlix] Index #28 provides development effects and mitigation measures for turtle nesting habitat.	
Seeps and Springs **<u>Rationale:</u>** 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 groundwater comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	• Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system.[cxvii, cxlix] • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species.[cxix, cxx, cxxi, cxxii, cxiii, cxiv] <u>Information Sources</u> • Topographical Map • Thermography • Hydrological surveys conducted by Conservation Authorities and MOE • Field Naturalists Clubs and landowners • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped	Field Studies confirm: • Presence of a site with two or more[E] seeps/springs should be considered SWH. • The area of an 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 the habitat.[cxlviii] • SWH MIST[cxlix] Index #30 provides development effects and mitigation measures	• None- the study area does not contain any springs or seeps
Amphibian Breeding Habitat (Woodland) **<u>Rationale:</u>** These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations	• Eastern Newt • Blue-spotted Salamander • Spotted Salamander • Gray Treefrog • Spring Peeper • Western Chorus Frog • Wood Frog	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	• Presence of a wetland, pond or woodland pool (including vernal pools) >500 m^2 (about 25 m diameter) within or adjacent (within 120 m) to a woodland (no minimum size).[clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx] Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat.[cxlviii]	Studies confirm; • Presence of breeding population of one or more of the listed newt/salamander species or two or more of the listed frog species with at least 20 individuals (adults or eggs masses) or two or more of the listed frog species with Call Level Codes of 3.[E] • 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.	• Candidate – the FOD7-4 ecosites likely support vernal pooling in the early spring.

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Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF Districts and wetland evaluations • Field Naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	• The habitat is the wetland area plus a 230 m radius of woodland area.[lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi] If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • SWH MIST[cxlix] Index #14 provides development effects and mitigation measures.	
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 (>120 m) from woodland ecosites; however, larger wetlands containing predominantly aquatic species (e.g. Bullfrog) may be adjacent to woodlands	• Wetlands >500 m^2 (about 25 m diameter),[ccvii] supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats.[clxxxii] • 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. Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) • Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. • OMNRF Districts and wetland evaluations. • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of breeding population of one or more of the listed newt/salamander species or two or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or two or more of the listed frog/toad species with Call Level Codes of 3. Ⓔ **or;** Wetland with confirmed breeding Bullfrogs are significant.Ⓔ • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys[cviii] will be required during the spring (March–June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWH MIST[cxlix] Index #15 provides development effects and mitigation measures.	• Candidate – the MAS ecosites may support wetland-breeding amphibians.
Woodland Area-Sensitive Bird Breeding Habitat **Rationale:** Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area	• Yellow-bellied Sapsucker • Red-breasted Nuthatch • Veery • Blue-headed Vireo • Northern Parula • Black-throated Green Warbler	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha.[cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxxv, cxxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvi, clvii, clviii, clix] • Interior forest habitat is at least 200 m from forest edge habitat.	Studies confirm: • Presence of nesting or breeding pairs of three or more of the listed wildlife species.Ⓔ • Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH.Ⓔ	• None- the study area does not contain any woodlands >30ha

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Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
sensitive interior forest song birds.	• Blackburnian Warbler • Black-throated Blue Warbler • Ovenbird • Scarlet Tanager • Winter Wren • Pileated Woodpecker **Special Concern:** • Cerulean Warbler • Canada Warbler		<u>Information Sources</u> • Local birder clubs. • Canadian Wildlife Service (CWS) for the location of forest bird monitoring. • Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species • Reports and other information available from Conservation Authorities.	• Conduct field investigations in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWH MIST[cxlix] Index #34 provides development effects and mitigation measures.	

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TABLE F3 Habitat of Species of conservation Concern considered SWH

Wildlife Habitat	Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
Marsh Breeding Bird Habitat **Rationale:** Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	• American Bittern • Virginia Rail • Sora • Common Moorhen • American Coot • Pied-billed Grebe • Marsh Wren • Sedge Wren • Common Loon • Green Heron • Trumpeter Swan **Special Concern:** • Black Tern • Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	• Nesting occurs in wetlands. • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present.[cxxiv] • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. Information Sources • OMNRF District and wetland evaluations. • Field Naturalist clubs • NHIC Records. • Reports and other information available from Conservation Authorities. • Ontario Breeding Bird Atlas.	Studies confirm: • Presence of five or more nesting pairs of Sedge Wren or Marsh Wren **or** breeding by any combination of four or more of the listed species.Ⓔ • Note: any wetland with breeding of one 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"[ccxi] • SWH MIST[cxlix] Index #35 provides development effects and mitigation measures.	• Candidate – the MAS ecosites within the study area contain shallow water with emergent aquatic vegetation.
Open Country Bird Breeding Habitat **Rationale:** This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	• Upland Sandpiper • Grasshopper Sparrow • Vesper Sparrow • Northern Harrier • Savannah Sparrow **Special Concern** • Short-eared Owl	CUM1 CUM2	• Large grassland areas (includes natural and cultural fields and meadows) >30 ha.[clx, clxi, clxii, clxiii, clxiv, clxv, clxvi, clxvii, clxviii, clxix] • Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years).Ⓔ • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. • The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. Information Sources • Agricultural land classification maps, Ministry of Agriculture • Local bird clubs • Ontario Breeding Bird Atlas • EIS Reports and other information available from Conservation Authorities.	Field Studies confirm: • Presence of nesting or breeding of two or more of the listed species.Ⓔ • A field with one 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] • SWH MIST[cxlix] Index #32 provides development effects and mitigation measures	• None- the study area does not include large grassland areas >30ha.
Shrub/Early Successional Bird Breeding Habitat	Indicator Spp: • Brown Thrasher • Clay-coloured Sparrow	CUT1 CUT2 CUS1	Large field areas succeeding to shrub and thicket habitats >10 ha[clxiv] in size.	Field Studies confirm:	• None- the study area does not contain large

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Wildlife Habitat	Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
Rationale: This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records.	Common Spp. • Field Sparrow • Black-billed Cuckoo • Eastern Towhee • Willow Flycatcher **Special Concern:** • Yellow-breasted Chat • Golden-winged Warbler	CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species	• Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years).Ⓔ • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species.[clxxiii] • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Information Sources • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs • Ontario Breeding Bird Atlas • Reports and other information available from Conservation Authorities.	• Presence of nesting or breeding of one of the indicator species and at least two of the common species.Ⓔ • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat.Ⓔ • 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] • SWH MIST[cxlix] Index #33 provides development effects and mitigation measures.	shrub/thicket habitats >10ha.
Terrestrial Crayfish **Rationale:** Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare.[ccii]	Chimney or Digger Crayfish; (*Fallicambarus fodiens)* Devil Crayfish or Meadow Crayfish; (*Cambarus Diogenes*)	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) 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. Information Sources • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998	Studies Confirm: • Presence of one or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites.[cci] • Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult.[cci] • SWH MIST[cxlix] Index #36 provides development effects and mitigation measures.	• Candidate – cultural meadows adjacent to MAM2, MAS2, or SWT ecosites may support terrestrial crayfish habitat.
Special Concern and Rare Wildlife Species **Rationale:** These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1–S3, SH) plant and animal species. Lists of these species are tracked by the NHIC.	All plant and animal element occurrences (EO) within a 1- or 10-km grid. Older element occurrences were recorded prior to GPS being available; therefore, location information may lack accuracy	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites.[lxxviii] Information Sources • NHIC will have Special Concern and Provincially Rare (S1–S3, SH) species lists with element occurrences data. • NHIC Website "Get Information": http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life	Candidate – • Eastern Wood Pewee • Grasshopper Sparrow • Snapping Turtle • Hackberry Emperor • Monarch Confirmed – none •

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Wildlife Habitat	Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			• Expert advice should be sought as many of the rare spp. have little information available about their requirements.	stage component for a species e.g. specific nesting habitat or foraging habitat. • SWH MIST[cxlix] Index #37 provides development effects and mitigation measures.	

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TABLE F5 Animal Movement Corridors

Wildlife Habitat	Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		ELC Ecosites	Habitat Criteria and Information Sources		
Amphibian Movement Corridors **Rationale:** Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	• 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	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. • Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 **(Amphibian Breeding Habitat –Wetland)** of this Schedule. Information Sources • MNRF District Office • NHIC • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant • Corridors should have at least 15 m of vegetation on both sides of waterway or be up to 200 m wide of woodland habitat and with gaps <20 m • Shorter corridors are more significant than longer corridors; however, amphibians must be able to get to and from their summer and breeding habitat • SWH MIST Index #40 provides development effects and mitigation measures	• Candidate – natural areas adjacent or within the contiguous natural corridor of the Thames River should be considered potential amphibian movement corridors.

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TABLE F6 Significant Wildlife Habitat Expectations for Eco-districts within Eco-Region 7E

Ecodistrict	Wildlife Habitat and Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Adelaide WWTP
		Ecosites and Habitat Description	Habitat Criteria and Information		
7E-2	**Bat Migratory Stopover Area** Rationale: Stopover areas for long distance migrant bats are important during fall migration. • Hoary Bat • Eastern Red Bat • Silver-haired Bat	No specific ELC types or habitat descriptions	• Long-distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. Their annual fall migration may concentrate these species of bats at stopover areas. • This is the only known bat migratory stopover habitats based on current information. <u>Information Sources</u> • OMNRF for possible locations and contact for local experts • University of Waterloo, Biology Department	• Long Point (42°35'N, 80°30'E, to 42°33'N, 80°03'E) has been identified as a significant stop-over habitat for fall migrating Silver-haired Bats, due to significant increases in abundance, activity and feeding that was documented during fall migration. • The confirmation criteria and habitat areas for this SWH are still being determined. • SWH MIST Index #38 provides development effects and mitigation measures	• None- the study area is not included within the known stopover areas

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APPENDIX G
Species of Conservation Concern Assessment

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APPENDIX G

SPECIES OF CONSERVATION CONCERN ASSESSMENT
ADELAIDE WASTEWATER TREATMENT PLANT

TABLE G1 Avian Species of Conservation Concern Assessment for Adelaide Wastewater Treatment Plant

Common Name	*Scientific Name*	Priority species[1]	ESA 2007	SARA 2002	Preferred Habitat[2]	Status and Observations
Eastern Wood-Pewee	*Contopus virens*	Regional Concern - Recovery Objective	SC	SC	Wooded habitats	Potential- Suitable habitat for this species is present in any mature wooded ecosite within the study area.
Grasshopper Sparrow	*Ammodramus savannarum*	Regional Concern - Increase	SC	SC	Open grassland areas with well-drained, sandy soil.	Potential -Suitable habitat for this species may be found within sections of CUM1 ecosite on the study area.

[1] Government of Canada 2014.
[2] Cornell lab of Ornithology 2021.

TABLE G2 Herpetofauna Species of Conservation Concern Assessment for Adelaide Wastewater Treatment Plant

Common Name	*Scientific Name*	S-rank	ESA 2007	SARA 2002	Preferred Habitat[1]	Status and Observation
Eastern Ribbonsnake	*Thamnophis sauritus*	S4	SC	SC	Aquatic habitats with forested riparian zone	Unlikely- the Thames river and the riparian zone is outside of the study area
Snapping Turtle	*Chelydra serpentina*	S4	SC	SC	Prefers shallow aquatic habitats and gravel/sand banks for nesting.	Candidate – The larger MAS2-1 ecosite may be suitable habitat to support this species.
Northern Map Turtle	*Graptemys geographica*	S3	SC	SC	Aquatic habitats with mollusc prey and basking areas	Unlikely- the Thames river and the riparian zone is outside of the study area

Notes:
[1] Ontario Nature 2021

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Table G3 Insects Species of Conservation Concern Assessment for Adelaide Wastewater Treatment Plant

Common name	Scientific name	S-Rank	ESA 2007	SARA 2002	Preferred Habitat[1]	Status and Observation
Hackberry Emperor	*Asterocampa celtis*	S3	-	-	Habitats which support Hackberry trees	Potential – Hackberry trees are present within treed ecosites on the study area.
Monarch	*Danaus plexippus*	S2N, S4B	SC	SC	Caterpillars are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats.	Potential – Common milkweed is present within CUM1 ecosites on the study area.

Notes:
[1] IUCN 2021

TABLE G4 Fish Species of Conservation Concern Assessment for Adelaide Wastewater Treatment Plant

Common name	Scientific name	S-rank	ESA 2007	SARA 2002	Preferred Habitat[1]	Status and Observation
Northern Sunfish (Great Lakes - Upper St. Lawrence populations)	*Lepomis peltastes*	S5	SC	SC	Shallow vegetated areas of quiet, slow flowing rivers and streams, as well as warm lakes and ponds	None- the Thames River is located outside of the study area, and is not anticipated to be impacted.

[1] IUCN 2021

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TABLE G5 Plant Species of Conservation Concern Assessment for Adelaide Wastewater Treatment Plant

Common name	*Scientific Name*	S-rank	ESA 2007	SARA 2002	Preferred Habitat[1]	Status and Observation
Lowland Brittle Fer	*Cystopteris protrusa*	S2S3	-	-	In soil of moist, deciduous forests	Unlikely- the study area did not include the preferred habitat, and the species was not observed during the 2020 field study.
Slender Mountain-mint	*Pycnanthemum tenuifolium*	S3	-	-	Typically grows in dry, open, rocky woods, dry prairies and fields.	Unlikely- the study area did not include the preferred habitat, and the species was not observed during the 2020 field study.
Hairy Fruited Sedge	*Carex trichocarpa*	S3	-	-	Openings in bottomlands, marshes, wet meadows, wet thickets along streams and rivers	Unlikely- the study area did not include the preferred habitat, and the species was not observed during the 2020 field study.
Striped Cream Violet	*Viola striata*	S3	-	-	Riparian or alluvial woods, floodplains in silty loam, meadows	Unlikely- the study area did not include the preferred habitat, and the species was not observed during the 2020 field study.
Rigid Sedge	*Carex tetanica*	S3?	-	-	Calcareous fens, bogs, and swales	Unlikely- the study area did not include the preferred habitat, and the species was not observed during the 2020 field study.
Soft-hairy False Gromwell	*Lithospermum parviflorum*	S2	-	-	Dry, open, rocky or gravelly hillsides, fields, thickets, and prairies in calcareous regions.	Unlikely- the study area did not include the preferred habitat, and the species was not observed during the 2020 field study.

[1]FNAA 2020

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APPENDIX H
Species at Risk Assessment

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APPENDIX H

SPECIES AT RISK HABITAT ASSESSMENT

TABLE H1 Habitat Assessment for Potential Species at Risk within Adelaide Wastewater Treatment Plant

Common name	Scientific Name	ESA	SARA	Habitat Requirements (MECP 2021)	Year and General Location of Species Record	Observations and Likelihood of Occurrence within Study area
Flora (1)						
Kentucky Coffee-tree	*Gymnocladus dioicus*	THR	THR	This tree is found in floodplains and river valleys	MECP records for Adelaide WWTP	Potential – Suitable habitat for this species is present within treed ecosites on the study area.
Butternut	*Juglans cinerea*	END	END	This species prefers moist, well-drained soil, often found along streams. Also found on well-drained gravel sites.	This species was identified within the Thames Valley Parkway North Branch Connection, Class Environmental Assessment Environmental Impact Study (Dillon Consulting 2016)	Potential – Suitable habitat for this species is present within treed ecosites on the study area. This species was no observed within the study area during the 2021 field study.
Birds (9)						
Bank Swallow	*Riparia riparia*	THR	THR	Bank swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits.	This species was identified within the Thames Valley Parkway North Branch Connection, Class Environmental Assessment Environmental Impact Study (Dillon Consulting 2016). Species identified within OBBA 10 km square	Unlikely – The study area does not contain the preferred habitat for this species.
Barn Swallow	*Hirundo rustica*	THR	THR	This species prefers human-made structures, such as open barns, bridges, or culverts to build their nests.	This species was identified within the Thames Valley Parkway North Branch Connection, Class Environmental Assessment Environmental Impact Study (Dillon Consulting 2016). Species identified within *OBBA* 10 km square.	Unlikely – The study area does not contain the preferred habitat for this species.
Bobolink	*Dolichonyx oryzivorus*	THR	THR	This species prefers open prairie or meadow habitat and builds its nests on the ground in the dense grasses.	Species identified within OBBA 10 km square.	Potential – Open meadow habitat is present within CUM1 ecosites on the study area.
Chimney Swift	*Chaetura pelagica*	THR	THR	This species establishes colonies within unused chimneys to roost or build their nest.	This species was identified within the Thames Valley Parkway North Branch Connection, Class Environmental Assessment Environmental Impact Study (Dillon Consulting 2016). Species identified within OBBA 10 km square.	Confirmed – The species was identified during the breeding bird survey flying over the study area. The study area does not contain suitable chimneys for nesting, and therefore it is assumed that this species is nesting within one of the surrounding neighbourhoods. Since no habitat exists within study area, no further impact assessment is required.
Common Nighthawk	*Chordeiles minor*	SC	THR	Open areas with little to no ground vegetation, such as, forest clearings, rock barrens, peat bogs, lakeshores, and mine tailings.	Species identified within OBBA 10 km square.	Unlikely – The study area does not contain the preferred habitat for this species.
Eastern Meadowlark	*Sturnella magna*	THR	THR	This species primarily breeds in prairie and grassland habitats, but may also breed in croplands, orchards, or overgrown fields.	Species identified within OBBA 10 km square.	Potential – Open meadow habitat is present within CUM1 ecosites on the study area.
Northern Bobwhite	*Colinus virginianus*	END	END	This species nests in savannahs, grasslands, around abandoned farm fields, along brushy fencerows.	Species identified within OBBA 10 km square.	Unlikely – The study area does not contain the preferred habitat for this species.
Red-headed Woodpecker	*Melanerpes erythrocephalus*	SC	THR	This species prefers forest communities with an open understory.	MECP records for Adelaide WWTP	Potential – Suitable habitat for this species may be present within any wooded ecosite on the study area.
Wood Thrush	*Hylocichla mustelina*	SC	THR	This species prefers mature, unfragmented, deciduous forests.	Species identified within OBBA 10 km square.	Unlikely – The study area does not contain the preferred habitat for this species.
Herpetofauna (4)						
Eastern Spiny	*Apalone spinifera*	END	THR	This species prefers slow-moving large	This species was identified within the Thames Valley Parkway North Branch	None – This species inhabits the Thames River which is not included in the

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Common name	Scientific Name	ESA	SARA	Habitat Requirements (MECP 2021)	Year and General Location of Species Record	Observations and Likelihood of Occurrence within Study area
Softshell				water bodies or rivers with soft, muddy bottoms and aquatic vegetation. Nests are located near water on sandy beaches or gravel banks with sun.	Connection, Class Environmental Assessment Environmental Impact Study (Dillon Consulting 2016). Species identified within NHIC 1km square	study area, and is not likely to be impacted by construction works.
Eastern Hog-nosed Snake	*Heterodon platirhinos*	THR	THR	This species prefers sandy, well-drained soils to burrow and lay eggs. Such as beaches and dry forests.	Species identified within ORAA 10km square	Unlikely – The study area does not contain the preferred habitat for this species.
Five-lined Skink (Carolinian population)	*Plestiodon fasciatus*	END		The Carolinian population can be found under woody debris in clearings with sand dunes, open forested areas, and wetlands.	Species identified within ORAA 10km square	Unlikely – The study area does not contain the preferred habitat for this species.
Queensnake	*Regina septemvittata*	END	THR	This species prefers water bodies with clear water, rocky or gravel bottoms, and an abundance of crayfish. Suitable hibernation sites include abutments of old bridges and crevices in bedrock.	Species identified within ORAA 10km square	None – This species inhabits the Thames River which is not included in the study area, and is not likely to be impacted by construction works.
Mammals (4)						
Eastern Small-footed Myotis	*Myotis leibii*	END	END	Day and maternity roosts typically in cavities of trees, under rocks, in bedrock fissures, under bridges, culverts, abandoned buildings, etc. Hibernate in caves and abandoned mines.	Species distribution in the province poorly understood. Suitable habitat potential assessed for due diligence.	Unlikely – Though suitable roosting habitat may be present in the form of tree cavities, this species prefers rock crevices and anthropogenic structures. No overwintering habitat present.
Little Brown Myotis	*Myotis lucifugus*	END	END	Mature trees, roost within cavities and under loose bark. Can also utilize anthropogenic structures such as abandoned buildings, barns, and attics. Hibernate in caves and abandoned mines.	Species potential based on the Mammal atlas of Ontario	Potential – The FOD and CUW ecosites contain mature trees that may contain suitable day and maternity roosting features as cavities and loose bark. No overwintering habitat present.
Northern Myotis	*Myotis septentrionalis*	END	END	Mature trees, roost within cavities and under loose bark. Can also utilize anthropogenic structures such as abandoned buildings, barns, and attics. Hibernate in caves and abandoned mines.	Species potential based on the Mammal atlas of Ontario	Potential – The FOD and CUW ecosites contain mature trees that may contain suitable day and maternity roosting features as cavities and loose bark. No overwintering habitat present.
Tri-colored Bat	*Perimyotis subflavus*	END	END	Mature trees, with preference for downed foliage of oak and maple species. Has been observed to utilize anthropogenic structures such as abandoned buildings, barns, and attics. Hibernate in caves and abandoned mines.	Species distribution in the province poorly understood. Suitable habitat potential assessed for due diligence.	Potential – The FOD and CUW ecosites contain mature trees that may contain suitable day and maternity roosting features as cavities and loose bark. No overwintering habitat present.
Fish (2)						
Black Redhorse	*Moxostoma duquesnei*	THR	NAR	This species prefers pools and riffle of medium-sized rivers that are usually less than 2 m deep. This species has been observed in moderate to fast currents, with sandy or gravel substrates.	Species identified within the Thames River adjacent to the Adelaide facility during 2002-2012 studies (Ramsey 2021, Pers. Comm.)	None – This species inhibits the Thames River which is not included in the study area, and is not likely to be impacted by construction works.
Silver Shiner	*Notropis photogenis*	THR	THR	This species prefers deep riffles or pools of medium to large rivers with moderate to high gradients. Preferred substrates are variable.	Critical habitat and species presence were documented by Fisheries and Oceans Canada (DFO 2019)	None – This species inhibits the Thames River which is not included in the study area, and is not likely to be impacted by construction works.

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Common name	Scientific Name	ESA	SARA	Habitat Requirements (MECP 2021)	Year and General Location of Species Record	Observations and Likelihood of Occurrence within Study area
Mussels (2)						
Round Pigtoe	*Pleurobema sintoxia*	END	END	This species is found in rivers of various sizes with deep water and sandy, rocky, or mud bottoms. Host species for larvae include Bluegill (*Lepomis macrochirus*), Spotfin shiner (*Cyprinella spiloptera*), Bluntnose minnow (*Pimephales notatus*), and Northern redbelly dace (*Chrosomus eos*).	Species potential or presence identified by the MECP	None – This species inhibits the Thames River which is not included in the study area, and is not likely to be impacted by construction works.
Wavy-rayed Lampmussel	*Lampsilis fasciola*	THR	SC	This species prefers riffle areas of clear, small to medium sized streams and rivers of various sizes with gravel and sand stabilized with cobble and boulders. Larvae hosts for this species include: Smallmouth Bass and Largemouth Bass	Species was documented within DFO SAR records (DFO 2019)	None – This species inhibits the Thames River which is not included in the study area, and is not likely to be impacted by construction works.

ESA - *Endangered Species Act*
SARA - *Species at Risk Act*

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Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

ENVIRONMENTAL IMPACT STUDY
GREENWAY WASTEWATER TREATMENT PLANT
CITY OF LONDON

Prepared for:
THE CITY OF LONDON

Prepared by:
MATRIX SOLUTIONS INC.

Version 0.2
November 2021
Guelph, Ontario

650 Woodlawn Rd W, Unit 7B
Guelph, ON N1K 1B8
T 519.772.3777 F 226.314.1908
www.matrix-solutions.com

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ENVIRONMENTAL IMPACT STUDY

GREENWAY WASTEWATER TREATMENT PLANT

CITY OF LONDON

Prepared for City of London, November 2021

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

reviewed by
Robyn Leppington, B.Sc.
Senior Aquatic Biologist

Karen Reis, B.E.S. (Hons)
Ecologist

DISCLAIMER

Matrix Solutions Inc. certifies that this report is accurate and complete and accords with the information available during the project. Information obtained during the project or provided by third parties is believed to be accurate but is not guaranteed. Matrix Solutions Inc. has exercised reasonable skill, care, and diligence in assessing the information obtained during the preparation of this report.

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VERSION CONTROL

Version	Date	Issue Type	Filename	Description
V0.1	19-Oct-2021	Draft	32667-531 Greenway and Adelaide EIS R 2021-10-20 draft V0.1.docx	Issued to client for review
V0.2	26-Nov-2021	Draft revised	32667-531 Greenway and Adelaide EIS R 2021-11-26 draft V0.2.docx	Reports split into two; revisions issued to client for review

EXECUTIVE SUMMARY

The City of London retained Matrix Solutions Inc. to complete two Municipal Class Environmental Assessments (EA) to address climate change resiliency measures at the Greenway Wastewater Treatment Plant (WWTP) and Adelaide Wastewater Treatment Plant (WWTP). The two facilities have been identified as vulnerable to severe flooding and the EA will seek to identify a preferred flood protection approach to improve asset resilience, enhance treatment capabilities, and improve plant safety.

This report will focus on the natural heritage features and functions of the Greenway WWTP, with the Adelaide WWTP to be discussed in a separate report. The purpose of the Environmental Impact Study (EIS) was to define and record the natural heritage features, discuss implications and constraints to the proposed short list of alternatives, and recommend mitigation measures to offset any potential negative impacts to protected features. The short list of alternatives for Greenway WWTP recommended developing a floodwall/berm.

Matrix combined information from the ecological field studies with relevant information from background reviews to identify significant features within the Greenway WWTP study area. The results indicated several natural heritage features, which included:

- significant valleylands
- woodland
- candidate and confirmed significant wildlife habitat
- candidate and confirmed species at risk (SAR)
- fish and fish habitat

The most significant ecological functions identified within the Greenway WWTP study area include a significant valleyland, fish and fish habitat, the woodland, as well as confirmed aquatic SAR (Eastern Spiny Softshell, Silver Shiner, and Black Redhorse). Additional SAR were also observed within the study area, including Bank Swallow, Barn Swallow, and Chimney Swift; however, these species do not have confirmed nesting sites within the study area and are not anticipated to be directly impacted during construction activities. Furthermore, a confirmed SAR plant (Kentucky Coffee-tree) was identified as a planted species; therefore, it does not receive protection under the *Endangered Species Act*.

The major undertakings of the flood mitigation alternatives at the Greenway WWTP include the creation of a floodwall/berm along the northern and eastern boundaries of the WWTP, extending slightly south into the outer edge of the existing woodland. The greatest risk to the natural heritage features within the Greenway WWTP study area is the proximity of the proposed construction works to the Thames River (approximately 25 m north). However, if mitigation measures are followed, there are no anticipated impacts to this system while construction works are occurring. The southwest portion of the property contains an off-leash dog park, a parking lot, and a small woodland. This section will require some vegetation removal of edge species adjacent to the Greenway WWTP in order to erect the proposed berm.

This will result in a short-term disturbance to the area; however, it has been recommended within the mitigation measures to create a tree preservation plan and replanting plan for those disturbed areas. This should include a replacement of trees at a 3:1 ratio as well as native seed mix as per *The London Plan* (City of London 2016). It is anticipated that the long-term effects of this project shall result in a net benefit for the area once the trees and vegetation reach maturity.

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1 INTRODUCTION

The City of London (the City) retained Matrix Solutions Inc. to complete two Municipal Class Environmental Assessments (EAs) to address climate change resiliency measures at the Greenway Wastewater Treatment Plant (WWTP) and Adelaide Wastewater Treatment Plants (WWTP) in London, Ontario. The two facilities have been identified as vulnerable to severe flooding, and the EA will seek to identify a preferred flood protection approach to improve asset resilience, enhance treatment capabilities, and improve plant safety.

One component of the EA process is the completion of an Environmental Impact Study (EIS) to define and record the natural heritage features, discuss implications and constraints to the proposed short list of alternative designs and recommend mitigation measures to offset any potential negative impacts to protected features.

This report will focus on the natural heritage features and functions of the Greenway WWTP, with the Adelaide WWTP to be discussed in a separate report.

1.1 Study Area

The study area includes the fenced in area of the WWTP and the 50 m surrounding the facility.

The Greenway WWTP is located at 109 Greenside Avenue (Figure 1). Greenway is situated within 25 m of the Thames River to the north. The property is bordered on the east and west by Greenway Park and associated amenities. South of the site is Kensal Park and some private residential land. The Greenway property features some coniferous hedgerows, lone trees, and remnant woodlot associated with a steep slope on the southern edge of the parcel.

1.2 Study Objectives

The objective of the EIS is to define and record the natural heritage features within each facilities study area, discuss implications and constraints to the proposed short list of alternative designs and recommend mitigation measures to offset any potential negative impacts to protected features. The short list of alternatives recommends developing a floodwall/berm for the Greenway WWTP.

This EIS document was completed to meet the objectives and criteria as defined within the approved Terms of Reference (Appendix A) as well as applicable federal, provincial, and municipal policies and guidelines as defined in Section 2.

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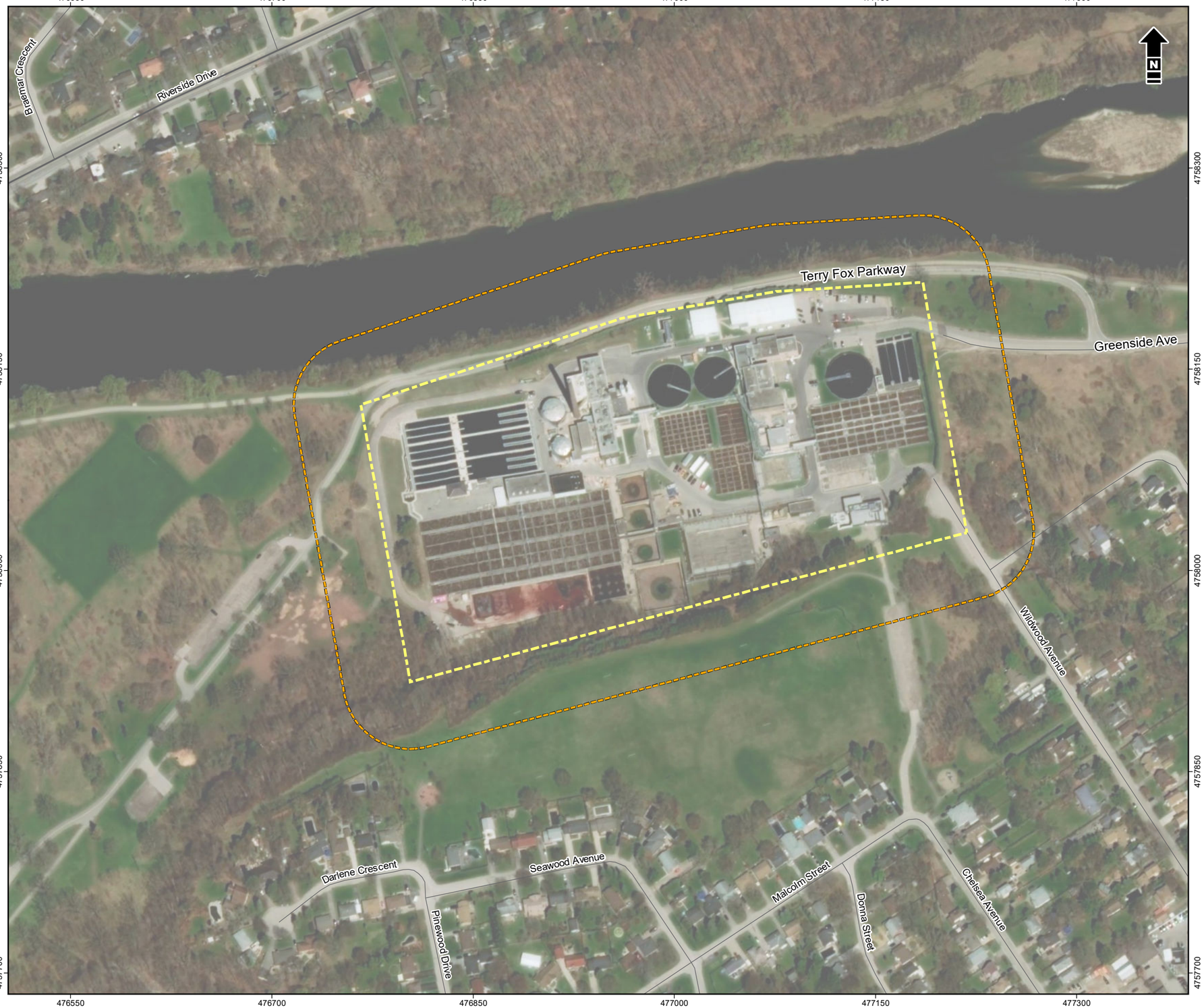
Easting (m)

476550 476700 476850 477000 477150 477300

Northing (m)

4758300 4758150 4758000 4757850 4757700



- Greenway Wastewater Treatment Plant Study Area
- Greenway Wastewater Treatment Plant Study Area (50m Buffer)
- Highway
- Road

Reference: Contains information licensed under the Open Government Licence – Ontario. Imagery (2020) Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

1:3,000 metres

30 0 30 60

NAD 1983 UTM Zone 17N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

City of London
Greenway and Adelaide Wastewater Treatment Plants

Greenway Study Area

Date:	Project:	Submitter:	Reviewer:
November 2021	32667	K. Reis	R. Leppington

Disclaimer: The information contained herein may be compiled from numerous third party materials that are subject to periodic change without prior notification. While every effort has been made by Matrix Solutions Inc. to ensure the accuracy of the information presented at the time of publication, Matrix Solutions Inc. assumes no liability for any errors, omissions, or inaccuracies in the third party material.

Figure 1

I:\City\London\32667\FiguresAndTables\EA\2021\Report\EIS_Reporting\Greenway\Figure-1-Greenway_Study_Area.mxd - TabloId_L - 25-Nov-21, 06:05 PM - mwright - TID005

2 REGULATORY FRAMEWORK

This section provides an overview of key federal, provincial, and local environmental legislation, policies, and regulations that are directly applicable/relevant to the Greenway study area. This policy framework provides guidance on the protection of natural heritage features and the evaluation of significance. Features identified within the study area were evaluated against relevant federal, provincial, and municipal planning policies applicable to the local site context, to determine natural heritage constraints and recommend appropriate mitigation measures to minimize risks of negative impacts to the environment.

2.1 Federal Legislation

2.1.1 Species at Risk Act

Species classified as extirpated, endangered, and threatened in Schedule 1 of the *Species at Risk Act* (SARA) are protected under the provisions of SARA. This includes protection to the species and their critical habitat. Critical habitat is defined as those habitats necessary for the survival or recovery of a listed species, as identified in the recovery strategy or in an action plan for the species. While SARA applies to species on federal land, such as Canadian oceans and waterways, national parks, national wildlife areas, some migratory bird sanctuaries, and First Nations reserve lands, it also applies to species at risk (SAR) migratory birds protected under the *Migratory Birds Convention Act* (MBCA) and fish, anywhere they occur. Therefore, SARA only applies to SAR migratory birds, fish, and mussels for this project.

General prohibitions (does not apply to Special Concern species except for provisions related to EAs, in which case, all Schedule 1 species apply) that apply:

- kill, harm, harass, capture, or take an individual of a species listed in Schedule 1 of SARA as Endangered, Threatened, or Extirpated (Section 32[1] of SARA)
- possess, collect, buy, sell, or trade an individual, or any part or derivative of a species listed in Schedule 1 of SARA as Endangered, Threatened, or Extirpated (Section 32[2] of SARA)
- damage or destroy the residence (e.g., nest or den) of one or more individuals of a species listed in Schedule 1 of SARA as Endangered or Threatened, or that an activity is listed as Extirpated, if a recovery strategy has recommended the reintroduction of the Extirpated species (Section 33 of SARA)

Destruction of critical habitat of any listed Endangered species or of any listed Threatened species if the following apply:

- the critical habitat is on federal land, in the exclusive economic zone of Canada, or on the continental shelf of Canada

- the listed species is an aquatic species
- the listed species is a species of migratory birds protected by the MBCA (Section 58[1] of SARA)

General habitat (necessary for the species survival and recovery) (S.80) by Emergency Order only:

- applies to all species, including aquatic and migratory birds on federal land or Exclusion Economic Zone (relates to the sea)
- migratory birds on non-federal lands or Exclusion Economic Zone (relates to the sea)
- all species, except aquatic and migratory birds, on non-federal lands or Exclusion Economic Zone (relates to the sea)

2.1.2 Fisheries Act

The *Fisheries Act* outlines the framework for the management and regulation of fisheries and the conservation and protection of fish and fish habitat within the fishing zones of Canada, all waters in the territorial sea of Canada, and all internal waters of Canada. The most recent revision to the *Fisheries Act* restricts activities that cause "death of fish, other than by fishing" as well as the "harmful alteration, disruption, or destruction of fish habitat (HADD; Government of Canada 2019)" and the release of substances that are known or suspected to be deleterious to fish or fish habitat.

Proposed works that are anticipated to directly or indirectly result in negative impacts to fish and fish habitat as described in the *Fisheries Act* will require a review by Fisheries and Oceans Canada (DFO) to determine whether the proposed activities may be permitted under the *Fisheries Act*. If so, the project may require an authorization or ministry approval under the *Fisheries Act* (DFO 2021a).

2.1.3 Migratory Birds Convention Act

The MBCA and associated regulations, including the Migratory Birds Regulations protect certain native species of migratory birds and their nests and eggs. Any migratory bird species that meets all three of the following criteria is protected under the MBCA:

- birds referred to in Article 1 of the Migratory Birds Convention, as amended under the 1995 Protocol, either directly by species name, directly by the listing of their family, or indirectly by interpretation of the original convention
- species that are native or naturally occurring in Canada:
    - A native migratory bird is one that is present entirely as a result of natural biological or ecological processes.

- Species known to have regularly occurred in Canada. Although species that occur frequently (i.e., “accidentals”) and that meet criteria 1 and 2 are not included on this list, they continue to be considered as having protection under the MBCA any time they occur in Canadian territory.

General prohibitions under the MBCA and associated regulations protect migratory birds, their nests, and eggs and prohibit the deposit of harmful substances in waters and areas frequented by them. It also prohibits deposition of harmful substances that have the potential to enter waters where they occur. The associated regulations also include an additional prohibition against the incidental take, which is defined as “the inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs.”

Environment and Climate Change Canada (ECCC) administers the MBCA and its associated regulations. Compliance with the MBCA and associated regulations is best achieved through a due diligence approach based on the consideration of avoidance guidelines on the ECCC website. Any vegetation removals would need to be completed outside of the breeding bird season for Zone C2 (April 10 to August 15) to avoid disturbing active nests of migratory birds protected under the MBCA (Government of Canada 2021).

2.2 Provincial Legislation, Policies, and Guidelines

2.2.1 Endangered Species Act

The *Endangered Species Act* (ESA) provides for the conservation and protection of fauna and flora species within the Province of Ontario that are at risk of extinction. Section 9(1) of the ESA prohibits the killing, harming, harassment, capture, taking, possession, transport, collection, buying, selling, leasing, trading, or offering to buy, sell, lease, or trade species listed as extirpated, endangered, or threatened on the Species at Risk in Ontario (SARO) list. Section 10(1) of the ESA prohibits damaging or destroying habitat of endangered or threatened species on the SARO list and may apply to extirpated species through special regulations. General habitat protection applies to all endangered and threatened species. Species-specific habitat protection is also given to those species with regulated habitat, as identified in Ontario Regulation 242/08. Species designated as special concern are not given species or habitat protection under the ESA; however, this designation aids in identification of significant wildlife habitat (SWH) at the municipal level.

Should an ESA protected species be encountered, impacts to the species or its habitat must be avoided or mitigated. Strategies to avoid contravention of the ESA include avoidance (e.g., through design modifications or timing of works), adherence to an applicable Notice of Activity, or by obtaining an Overall Benefit Permit.

2.2.2 Provincial Policy Statement

The Provincial Policy Statement, 2020 (PPS; MMAH 2020) provides policy direction related to land use planning and development in Ontario. The updated PPS, issued under Section 3 of the *Planning Act*, came into effect May 1, 2020, and applies to planning decisions made on or after that date. The PPS addresses

the need to protect natural heritage features to ensure Ontario's long-term prosperity, environmental health, and social well-being.

Section 2.1 of the PPS provides direction to regional and local municipalities regarding planning policies for the protection and management of natural heritage features and resources. The natural heritage policies that are relevant to this project state (MMAH 2020):

2.1.1 Natural features and areas shall be protected for the long term.

2.1.2 The diversity and connectivity of natural features in an area, and the long term ecological function and biodiversity of natural heritage systems, 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.

2.1.3 Natural heritage systems shall be identified in Ecoregions 6E & 7E1, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas.

2.1.4 Development and site alteration shall not be permitted in: a) significant wetlands in Ecoregions 5E, 6E and 7E; and b) significant coastal wetlands.

2.1.5 Development and site alteration shall not be permitted in:

a) significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;
b) significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
c) significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
d) significant wildlife habitat;
e) significant areas of natural and scientific interest; and
f) coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4(b) unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

2.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

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

2.1.8 Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and, 2.1.6 unless the ecological function of the

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

2.1.9 Nothing in policy 2.1 is intended to limit the ability of agricultural uses to continue.

2.2.2.1 Natural Heritage Reference Manual

The *Natural Heritage Reference Manual for the Natural Heritage Policies of the Provincial Policy Statement, 2005* (NHRM; MNR 2010) was developed to provide technical guidance for implementing the natural heritage policies of the PPS. Although not yet updated to reflect changes adopted by the 2020 PPS update, it still functions as an important tool for those involved in development and review of policy documents, review and approval of development applications, and matters before provincial boards and tribunals. The NHRM is organized by specific natural heritage policies and provides basic guidance materials in the main sections, supported by more technical material in its appendices. The NHRM provides criteria in which to evaluate natural heritage features for their significance as well as recommendations for mitigation. Natural heritage features covered under the NHRM include:

- significant habitat of endangered and threatened species
- significant wetlands and significant coastal wetlands
- significant woodlands
- significant valleylands
- SWH
- significant areas of natural and scientific interest (ANSIs)
- fish habitat

Some of these features (i.e., Provincially Significant Wetlands [PSWs] and ANSIs) are identified, often with input from consultants, by the Ontario Ministry of Natural Resources and Forestry (MNRF). Others are to be identified by the local area municipalities or planning authorities (i.e., significant woodlands, significant valleylands, SWH). Threatened and endangered species are designated at the provincial level, but their habitat is typically not identified or verified until site-specific studies are completed and, if present, confirmed by MNRF. It is expected that even where features have been identified at the provincial, regional, or local levels that verification and some level of refinement will be required at the site-specific level.

2.2.2.2 Significant Wildlife Habitat Technical Guide

Pre-dating the NHRM, the *Significant Wildlife Habitat Technical Guide* (SWHTG; MNR 2000) was prepared to assist planning authorities and other participants in the land use planning systems. The SWHTG provides a technical manual that presents information on the identification, description, and prioritization of SWH. The document describes in detail some of the techniques, issues, and processes identified in the NHRM and provides a compilation of relevant technical support materials and references. Though it is

based on a former version of the NHRM, it provides additional information for evaluating SWH. In order to ensure a comprehensive approach identifying and evaluating SWH, the SWHTG divides wildlife habitat into four categories:

- seasonal concentration areas
- rare vegetation communities or specialized habitats for wildlife
- habitats of species of conservation concern
- animal movement corridors

More recently, due to Ontario's size and biodiversity, MNRF also created SWH ecoregion criteria schedules that support the SWHTG and provide criteria that are reflective of regional significance. Information provided in the schedules includes descriptions of wildlife habitat, wildlife species, and the criteria required to determine SWH. For this project, the assessment of SWH follows the guidelines in *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015).

2.2.3 Conservation Authorities Act

Section 28(1) of the *Conservation Authorities Act* empowers conservation authorities with the ability to make regulations governing development that can have an impact on watercourses, water bodies, and other hazard lands such as floodplains and wetlands.

Greenway WWTP is within the Upper Thames Region Conservation Authority (UTRCA) regulation limits. As such, development on these lands must adhere to the policies and regulations of Ontario Regulation 157/06: *Upper Thames River Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*.

Proposed developments or associated works that may impact UTRCA-regulated areas may require permitting from UTRCA.

2.2.3.1 Upper Thames River Conservation Authority Environmental Planning Policy Manual

The *Environmental Planning Policy Manual for the Upper Thames River Conservation Authority* was approved on June 28, 2006, and was revised on October 24, 2017 (UTRCA 2017). The purpose of the manual is to provide local Upper Thames watershed policies that will guide development and site alteration while protecting, preserving, and enhancing the natural environment (UTRCA 2017).

The document identifies natural hazards (floodplains and slopes) and natural heritage resources (wetlands, woodlands, valleylands, wildlife habitat, threatened and endangered species, aquatic/fish habitat, and life science areas), and illustrates the UTRCA protection and preservation policies for these features. The goal of this planning document is to protect natural heritage features from negative impacts

and to maintain, restore, and enhance the biodiversity, ecological function, and connectivity of natural heritage features within the watershed (UTRCA 2017).

2.2.4 Accessibility for Ontarians with Disabilities Act

Ontario Regulation 413/12: *Integrated Accessibility Standards* provides for the development, implementation, and enforcement of accessibility standards in order to achieve accessibility for Ontarians with disabilities with respect to goods, services, facilities, accommodation, employment, buildings, structures, and premises on or before January 1, 2025.

2.3 Municipal Legislation, Policies, and Guidelines

2.3.1 The London Plan (City of London Official Plan)

The London Plan is the City's new official plan adopted by City council on June 23, 2016, and was approved by the Minister on December 28, 2016 (City of London 2016). The plan establishes a policy framework to guide the City's growth and development. The objectives and policies of this plan were drafted by City council to assist in making decisions for the physical development of the municipality, while having regard for relevant social, economic, and environmental matters.

The City has mapped the natural heritage system and identified areas as Green Space Place Type or Environmental Review Place Type. Natural heritage areas that are within the Green Space Place Type represent significant natural features and ecological functions. Natural heritage features and areas and other areas included in the Green Space Place Type include:

- fish habitat
- habitat of endangered species and threatened species
- PSWs
- significant woodlands and woodlands
- significant valleylands
- SWH
- ANSIs
- water resource systems
- Environmentally Significant Areas (ESAs)
- upland corridors
- potential naturalization areas
- adjacent lands

Natural heritage features and areas included in the Environmental Review Place Type include:

- unevaluated wetlands
- unevaluated vegetation patches
- other vegetation patches larger than 0.5 ha
- valleylands
- potential ESAs

The environmental policies section of *The London Plan* further describes the natural heritage features as well as the permitted and unpermitted development and alternation within these features.

2.3.2 City of London Environmental Management Guidelines

In 2007, the City completed and approved a set of six Environmental Management Guidelines (City of London 2007). These guidelines provide a consistent template, which has clear expectations and ensures that relevant issues are not overlooked and that unnecessary items are excluded.

The City's *Guidelines for the Preparation and Review of Environmental Impact Statements* was utilized most extensively during the planning process for this project to determine the scope of the EIS (City of London 2003). The project is subject to EIS requirements, as it is located within a significant river corridor (among other components discussed in Section 5 of this report). A review of the EIS Issues Summary Checklist was completed to scope the EIS and identify ecological data gaps within the Greenway WWTP study area. The EIS final Terms of Reference was approved by the City on May 4, 2021 (Appendix A).

2.3.3 Thames Valley Corridor Plan

The *City of London Thames Valley Corridor Plan* (Dillon Consulting and D.R. Poulton 2011) recommends measures to protect and enhance the natural features within the Thames River Valley in support of *The London Plan* (City of London 2016). A key ecological goal of the *City of London Thames Valley Corridor Plan* is to preserve, enhance, and create ecological corridors and linkages between natural features in order to establish a continuous corridor along the Thames River and enhance linkages to tributary watersheds (Dillon Consulting and D.R. Poulton 2011).

2.3.4 Middlesex County Official Plan

The *Middlesex County Official Plan* was most recently consolidated in 2006 (Middlesex County 2006). Middlesex County surrounds the City, but the City itself is politically separate from Middlesex County.

The *Middlesex County Official Plan* endeavours to work with the City and provide seamless policy integration with *The London Plan*.

3 STUDY APPROACH AND METHODOLOGY

Information pertaining to natural heritage resources within or adjacent to the Greenway WWTP study area was obtained through a review of available background studies, databases, and field investigations.

3.1 Background Review

The following information sources were reviewed for records related to natural heritage features that have the potential or are known to occur within the Greenway and study area.

Initial background requests regarding terrestrial sensitivities and SAR were submitted to the Ministry of the Environment, Conservation and Parks (MECP) and to the UTRCA. In addition to information provided by these regulatory agencies, other publicly available data sources were reviewed to determine potential species of conservation concern (SCC) and SAR whose occurrence ranges overlap with the study area. Background review material for the study area has also been obtained from available secondary source reports. The majority of background information was provided by the UTRCA. The sources reviewed are outlined in Table 1.

TABLE 1 Background Data Sources Reviewed

Source	Type	Description
Ministry of Environment, Conservation and Parks (MECP; Markham 2021, Pers. Comm.)	Agency Correspondence	A project screening request was sent to MECP on May 12, 2021, for information related to natural heritage features and species at risk (SAR) potential within the study area. The MECP responded on August 27, 2021, indicating additional SAR and species of conservation concern (SCC), which were incorporated into Appendix B
Upper Thames Region Conservation Authority (UTRCA; Ramsey 2021, Pers. Comm.)	Agency Correspondence	A background request for natural heritage information was submitted to UTRCA on May 12, 2021. This information was received on June 9, 2021, and was incorporated into Appendix B.
Ministry of Natural Resources and Forestry (MNRF; Webb 2021, Pers. Comm.)	Agency Correspondence	A background request for natural heritage information was submitted to MNRF on May 12, 2021. This information was received on June 9, 2021, and was incorporated into Appendix B.
Aquatic Species at Risk Maps (DFO 2021b)	Online Database	Aquatic SAR mapping is made available online by Fisheries and Oceans Canada for species listed endangered, threatened, or special concern under the *Species at Risk Act*. Results are included in Appendix C.
Natural Heritage Information Center (NHIC) Make-a-Map: Natural Heritage Areas (NHA MaM) (MNRF 2021a)	Online Database	A web application that provides information on provincial parks, conservation reserves, and natural heritage features (i.e., Areas of Natural and Scientific Interest (ANSI), wetlands, woodlands, and natural heritage systems related to provincial policy plan areas, such as the Niagara Escarpment, Oak Ridges Moraine, and Greenbelt Plans.) The NHA MaM also provides NHIC data, which is organized into 1 km^2 map squares and includes information on SCC and SAR records. Results are included in Appendix C.

Source	Type	Description
Lands Information Ontario (LIO) Geospatial Data (MNRF 2021b)	Online Database	LIO data is maintained by MNRF and provides key provincial geospatial data for Ontario. Shapefiles obtained from the LIO open datasets were used to show the natural features within the study area. Key datasets that were reviewed for the study area include policy plan areas, municipal land use designations, ANSIs, provincial parks and conservation areas, wetlands, woodlands, and watercourses.
Atlas of the Mammals of Ontario (Dobbyn 1994)	Online Atlas	The *Atlas of the Mammals of Ontario* shows the geographic distribution of mammals for three time periods: pre-1900, 1900 to 1969, and 1970 to 1993. A review of the 1970 to 1993 period was completed. Results are included in Appendix C.
Ontario Reptile and Amphibian Atlas (ORAA; Ontario Nature 2015)	Online Atlas	The ORAA provides known ranges of reptiles and amphibian species in Ontario based on historic and current species occurrences. Results are included in Appendix C.
Ontario Breeding Bird Atlas Guide for Participants (OBBA; OBBA 2001)	Online Atlas	The OBBA provides a list of bird species that have been observed during surveys completed between 1981 and 1985, and 2001 and 2005. Species that were documented between 2001 and 2005 were considered as part of this study. Results are included in Appendix C.
Ontario Butterfly Atlas (OBA; TEA 2019)	Online Atlas	The OBA collects observations of butterflies within Ontario. Sightings were reviewed from 2016 onward. Results are included in Appendix C.
Important Bird Areas of Canada (IBA; Bird Studies Canada 2021)	Online Atlas	The IBA was reviewed to determine if there are any important bird areas within the study area. Reviewed and study area are not located within an important bird area.
The London Plan (City of London 2016)	Online Mapping	*The London Plan* is the City of London's official plan, and schedules were reviewed to determine if there were any identified natural heritage features within the study area. Results are included in Appendix C
One River Master Plan Environmental Assessment, River Characterization, City of London, Thames River (Matrix 2019)	Report	One River Master Plan Municipal Class EA was initiated to integrate the outcomes of the dam, Ribbon of the Thames design, and other various improvement projects along the Thames River and adjacent valley corridor. The EA included lands adjacent to the Thames River from "the Forks" to Springbank Dam. Significant findings were incorporated into this report.
City of London Thames Valley Corridor Plan (Dillon Consulting and D.R. Poulton 2011)	Report	The *City of London Thames Valley Corridor Plan* recommends measures to protect and enhance the natural features within the Thames River Valley in support of *The London Plan*

3.2 Analysis of Significance and Sensitivity

The ecological features identified within the study area are evaluated to determine the significance of each feature. Significance is based on regional, provincial, and federal designations, which are described in the following subsections.

3.2.1 Natural Area Designations

Natural area designations are those that are recognized as significant on official plans or in other policy planning documents. This includes ANSIs (provincially, regionally, or other), significant wetlands (provincially, regionally, or locally), significant woodlands, and ESAs. ANSIs and ESA are evaluated by the province or municipality, while of these designations, only wetlands and woodlands can be assessed for significance by non-government organizations.

3.2.2 Significant Wildlife Habitat Screening

MNRF provides specific guidance on identifying and assessing wildlife habitat in the SWHTG (MNR 2000), the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015), and the NHRM (MNR 2010). The MNRF recognizes five main categories of wildlife habitat, each with several wildlife habitat types, each with criteria to evaluate significance. A description of each wildlife habitat category is provided below.

- **Seasonal concentration areas of animals:** defined as “areas where animals occur in relatively high densities for the species at specific periods in their life cycles and/or in particular seasons” and areas that are “localized and relatively small in relation to the area of habitat used at other times of the year” (MNR 2010).

- **Rare vegetation communities:** defined as “areas that contain a provincially rare vegetation community and areas that contain a vegetation community that is rare within the planning area” (MNR 2010).

- **Specialized habitat for wildlife:** defined as “areas that support wildlife species that have highly specific habitat requirements, areas with high species and community diversity, and areas that provide habitat that greatly enhances species' survival” (MNR 2010).

- **Habitat for SCC:** defined as “habitats of species that are designated at the national level as Endangered or Threatened by COSEWIC [the Committee on the Status of Endangered Wildlife in Canada], which are not protected in regulation under Ontario's ESA [the *Endangered Species Act*]; habitats of species listed as Special Concern under the ESA on the SARO [Species at Risk in Ontario] List (formerly referred to as "Vulnerable" in the SWHTG); and habitats of species that are assigned a provincial (i.e., sub-national) conservation status rank of S1 to S3 and are not on the SARO List” (MNR 2010).

- **Animal movement corridors:** defined as “elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another” (MNR 2010).

3.2.3 Species at Risk Screening

The background review identified potential SAR that could occur within the Greenway study area. All SAR identified were screened to determine the likelihood of occurrence and whether suitable habitat is present.

SAR are defined in this report to include the following provincial and federal designations:

- ESA (provincial): all provincially designated species that are listed as extirpated, endangered, or threatened on the SARO list and protected under the ESA; species listed as special concern are considered a SCC, as they are not protected under the ESA.

- SARA (federal): only applies to fish and migratory birds protected under the MBCA, anywhere they occur (e.g., includes non-federal land), that are designated as extirpated, endangered, and/or threatened under the SARA. All other species are only protected if special provisions or executive orders are made.

To determine if suitable habitat for SAR is available within the study area, the preferred habitat requirements for reported SAR were compared to vegetation communities, aquatic habitats, and niche habitats identified during field inventories and the background review. The results of the SAR habitat screening are provided in Section 6.7.

4 FIELD METHODOLOGY

Matrix staff completed field inventories within the Greenway study area during the spring and summer of 2021 as part of the EIS. Field inventories completed by each staff member are provided in Table 2. Detailed methods are described in the following subsections.

TABLE 2 Field Survey Summary

Field Inventory	Date	Matrix Staff
Vegetation (Ecological Land Classification, Botanical Inventory, Invasive Species)	April 16, 2021 August 9, 2021 August 13, 2021	Peter De Carvalho
Bat Maternity Roosting Habitat Survey	April 16, 2021(Leaf-off) August 9, 2021(Leaf -on)	Peter De Carvalho
Breeding Birds	June 4, 2021 June 24, 2021	Matthew Ilse
Incidental Observations	Collected during all site visits	All Staff

4.1.1 Ecological Land Classification

Vegetation community delineation was completed within the study area using aerial photography and refined thorough investigations in the field. The standard Ecological Land Classification (ELC) system for southern Ontario (Lee 2008; Lee et al. 1998) was applied. Details of the vegetation communities were

recorded, including species composition and dominance, community structure, uncommon species or features, and evidence of anthropogenic disturbance. Vegetation community status rarity was assessed through National Heritage Information Plant vegetation community rankings (MNRF 2021c).

4.1.2 Botanical Inventories

A botanical inventory was completed during the field inventories for each of the vegetation communities. The field investigations were completed during spring and summer. A list of species was compiled to determine the presence of SCC, SAR, and invasive species. Habitats of SCC, SAR, and invasive species identified during the field inventories were mapped for the ELC community in which they encompassed.

Plants were identified to family, genus, species, subspecies, and hybrid level according to the Newmaster (1998) *Ontario Plant List* and cross-referenced with the *Database of Vascular Plants of Canada* (Brouillet et al. 2020) for scientifically accepted nomenclature.

4.1.3 Breeding Birds

Breeding bird surveys were conducted following the protocol outlined in the *Ontario Breeding Bird Atlas Guide for Participants* (OBBA 2001). The protocol states that two rounds of surveys should be completed between May 24 and July 10, between 05:00 and 10:00, and under reasonable weather conditions. Surveys should not be completed if there is heavy rain, heavy fog, or if winds are greater than 3 on the Beaufort scale (i.e., >19 km/hour). A total of 6 stations were surveyed to reflect the different habitats within the study area. These stations were spaced approximately 300 m apart to reduce any overlap in observations between stations. Observations were made using direct (visual observation) and indirect (songs and alarm call) methods to identify the level of breeding evidence. Observations of breeding evidence for each species were recorded based on the definitions provided by the *Ontario Breeding Bird Atlas Guide of Participants* (OBBA 2001).

4.1.4 Bat Maternity Roosting Survey

The location of suitable bat maternity roosting habitat, including snags, was identified following the modified methodology of the Guelph District *Survey Protocol for Species at Risk Bats within Treed Habitats: Little Brown Myotis, Northern Myotis, and Tri-coloured Bat* (MNRF 2017). This scoped assessment will indicate the likelihood that appropriate habitat for SAR bats is present; however, it will not confirm the presence or absence of any bat species.

Phase 1 Bat Habitat Suitability Assessment consists of evaluating the study area and deciding whether any area would be designated as a coniferous, deciduous, or mixed wooded ELC ecosite. Preliminary analyses indicated deciduous treed areas present adjacent to the Greenway WWTP. These treed areas were surveyed for suitable maternity roost trees through a leaf-off habitat assessment.

Identifying suitable roost trees for Little Brown Myotis and Northern Myotis includes recording the location of all snags that exhibit appropriate attributes including cavities, loose bark, cracks, or knot holes. Identifying suitable roost trees for Tri-Coloured Bats includes recording the location of any Oak trees greater than 10 cm diameter at breast height (DBH), Maple trees greater than 10 cm DBH if the tree includes dead/dying leaf clusters, and any Maple tree greater than 25 cm DBH. A formal leaf-on habitat assessment was not completed, though the presence of appropriately sized Oak and Maple trees were noted during subsequent ELC field studies.

4.1.5 Incidental Wildlife

All wildlife observations were documented on all field visits. This included actual direct observations (including vocalizations) of individuals and signs of wildlife presence (i.e., tracks, scats, dens, nests, etc.).

4.1.6 Significant Wildlife Habitat and Species at Risk Assessment

An assessment of potential SWH and potential SAR habitat within the study area was conducted during the field surveys. The study area was assessed for habitat identified within the criteria outlined in the *Significant Wildlife Habitat Technical Guide* (MNR 2000) and the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015). Natural areas were also assessed for their potential to provide habitat for those SAR and SCC identified during background review or observed during field investigations.

5 DESCRIPTION OF THE NATURAL ENVIRONMENT

5.1 Terrain Setting

The Greenway study area is located adjacent to the Thames River, one of the largest river systems in southern Ontario. The Thames River is set in southern Ontario in the Carolinian Zone (Ecoregion 7E), which extends from Windsor to Toronto. The Carolinian Zone is the most human-populated zone in Canada and hosts more species than any other region in Canada (Carolinian Canada 2021). However, development over the past few hundred years had reduced the biodiversity of the ecoregion by over 90%. Ongoing conservation measures and expanding urban populations and development makes this zone uniquely situated for governance and regulatory measures.

The Greenway study area is located within the Caradoc Sand Plains and London Annex physiographic regions of southern Ontario. This region generally consists of gravel alluvium, which is spread over the Thames River and includes fox fine sandy loam, berrien sandy loam, and burford gravely loam (Chapman and Putnam 1984).

5.2 Identified Natural Heritage Features

There are no ESAs, PSWs or locally significant wetlands, or ANSIs present within the Greenway study area.

The London Plan (City of London 2016) Map 5 (Natural Heritage) has identified a "Woodland" to the southeast, "Significant Valleyland" to the north of the Greenway study area (Appendix C).

5.3 Terrestrial Habitat

5.3.1 Vegetation Communities

Vegetation communities within the Greenway study area are mapped on Figure 3 and described in further detail in Table 3. The Greenway study area contains seven terrestrial ELC community types as confirmed during the 2021 field visits.

TABLE 3 Ecological Land Classification Communities - Greenway Wastewater Treatment Plant

Ecological Land Classification Community Type	Community Description
FOD7-4 Fresh-Moist Black Walnut Lowland Deciduous Forest	This community represents the forested bank to the south of the Greenway Wastewater Treatment Plant (WWTP). The canopy was dominated by Black Walnut (*Juglans nigra*), with Sugar Maple (*Acer saccharum*), Red Maple (*Acer rubrum*), Manitoba Maple (*Acer negundo*), Black Cherry (*Prunus serotina*), Hackberry (*Celtis occidentalis*), Paper Birch (*Betula papyrifera*), and American Beech (*Fagus grandifolia*) appearing as common canopy constituents. Manitoba Maple (*Acer negundo*) approaching co-dominance in sections. The understory was relatively open, with common species including Manitoba Maple, European Buckthorn (*Rhamnus cathartica*), River Grape (*Vitis riparia*), young Green Ash (*Fraxinus pennsylvanica*), and Choke Cherry (*Prunus virginiana*). Standing snags and downed woody debris were common. Ground cover was variable, though Yellow Avens (*Geum aleppicum*), Virginia Stickseed (*Hackelia virginiana*), White Vervain (*Verbena urticifolia*), and Burdock (*Arctium minus*). There was also evidence of significant growth of Garlic Mustard (*Alliaria petiolata*) persisting from earlier in the growing season.
CUW1 Mineral Cultural Woodland	Several small woodland areas are present west and south of the Greenway WWTP. These wooded areas are fragmented and individually result in a canopy cover of approximately 60%. Canopy species are largely heterogeneous, though common species include Sugar Maple, Manitoba Maple, Hackberry (*Celtis occidentalis*), Black Walnut, and Tamarack (*Larix laricina*). Under-canopy was relatively open, and commonly include Bird Cherry (*Prunus avium*), European Buckthorn, River Grape, Virginia Creeper (*Parthenocissus quinquefolia*). Groundcover was generally consistent with the adjacent open cultural ecosites.
CUW1/CUT1 Mineral Cultural Woodland/Mineral Cultural Thicket	West of the Greenway WWTP, a patchy cultural woodland/cultural thicket is present. Treed sections of this ecosite have a variable canopy, though they are dominated in some areas by Black Walnut and in other areas by Silver Maple (*Acer saccharinum*). Other common canopy constituents include Bur Oak (*Quercus macrocarpa*), Norway Maple (*Acer platanoides*), thornless Honey Locus (*Gleditsia thoacanthos ssp. inermis*), Green Ash, and Manitoba Maple. Thicket portions of this ecosite are generally dominated by a thick growth of Staghorn Sumac, though European Buckthorn, River Grape, and Virginia Creeper are common. The ground layer is influenced by adjacent CUM1 ecosites, though shade-tolerant species such as White Vervain, Yellow Avens, and Enchanter's Nightshade (*Circaea Lutetiana*) are present at the interior as well.

Ecological Land Classification Community Type	Community Description
CUT1 Buckthorn Mineral Cultural Thicket	An off-leash dog park is present southwest of the Greenway WWTP. Approximately half of this dog park contains a cultural thicket comprised predominantly of tall European Buckthorn. The thicket extends west to margin the southern FOD7-4 in these areas. Other common species include young Manitoba Maple, Gray Dogwood (*Cornus racemosa*), Tatarian Honeysuckle (*Lonicera tatarica*), European Privet (*Ligustrum vulgare*), River Grape, and Virginia Creeper. Understory is generally sparse, likely due to the presence of dogs, but common species include Giant Ragweed (*Ambrosia trifida*), Burdock, Yellow Avens, Goutweed (*Aegopodium podagraria*), and Ground Ivy (*Glechoma hederacea*).
CUT/CUM Mineral Cultural Thicket/ Mineral Cultural Meadow	Multiple open areas are present with little to no presence of trees. The shrub layer in these areas is variable, but common species include European Buckthorn, Fragrant Sumac (*Rhus aromatica*), Staghorn Sumac (*Rhus typhina*), River Grape, and Virginia Creeper. Ground layer is generally graminoid-dominated, with common species including Orchard Grass (*Dactylis glomerata*), Kentucky Bluegrass (*Poa pratensis*), Annual Bluegrass (*Poa annua*), Timothy (*Phleum pratense*), Smooth Brome (*Bromus inermis*), Quackgrass (*Elymus repens*), and Green Foxtail (*Setaria viridis*). Common non-graminoid species include Common Dandelion (*Taraxacum officinale*), Canada Thistle (*Setaria viridis*), Bird's-foot Trefoil (*Lotus corniculatus*), White Clover (*Trifolium repens*), Red Clover (*Trifolium pratense*), Perforate St. John's Wort (*Hypericum perforatum*), and Canada Goldenrod (*Solidago canadensis*).
CUH1/BBO1 Mineral Cultural Hedgerow/ Mineral Open Beach	The southern riparian shoreline of the Thames north of the Greenway WWTP consists of a narrow band of mature trees with intermittent mineral open beach beyond. The upper canopy of the linear corridor was dominated by Crack Willow (*Salix fragilis*), with Little-leaf Linden (*Tilia cordata*), Maniotba Maple, Black Walnut, and Hackberry relatively common. Occasional large Eastern Cottonwood (*Populus deltoides*) dominate the intermittent super-canopy in areas. The BBO1 areas were not accessible but appear to be sparsely vegetated with low sedges (*Carex sp*.) and forbs.
CUH1 White Cedar Mineral Cultural Hedgerow	Two small cultural hedgerows are present adjacent to the northern and eastern fences of the Greenway WWTP. These hedgerows predominantly consist of Eastern White Cedar (*Thuja occidentalis*), with common presence of River Grape and Virginia Creeper. Young Manitoba Maple are intermittently present at the margins.
D Open/Disturbed	Multiple areas were identified as having been heavily modified or disturbed within the Greenway study area. This includes granular and paved pathways, informal trail systems, sports fields, and other manicured or landscaped areas. Manicured lawns are typically graminoid-dominated with sod-forming species interspersed with common weeds. Waste areas are similarly dominated by weedy or non-native species. Habitat potential in these areas is typically low, though lone mature trees do have potential to support nesting birds and mammals.

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Easting (m)

476600 476800 477000 477200 477400 477600

Northing (m)

4758600 4758400 4758200 4758000 4757800 4757600

Braemar Crescent
Riverside Drive
Old Riverside Drive
Forward Avenue
Hutton Place
Terry Fox Parkway
Greenside Ave
Darlene Crescent
Seawood Avenue
Malcolm Street
Donna Street
Chelsea Avenue
Springbank Drive
Wildwood Avenue
Forest Hill Avenue
Greenwood Avenue
Carol Street
Pinewood Drive
Randol Drive
Trowbridge Avenue
Mary Avenue

CUH1 | CUH1/BBO1 | CUW1/CUT1 | CUT/CUM | CUW1 | CUT1 | FOD7-4 | D

BBS-1 BBS-2 BBS-3 BBS-4 BBS-5 BBS-6

N

Greenway Wastewater Treatment Plant Study Area
Greenway Wastewater Treatment Plant Study Area (50m Buffer)
Highway
Road
Railway
Breeding Bird Survey Point

ELC Code | Description

- CUH1 | White Cedar Mineral Cultural Hedgerow
- CUH1/BBO1 | Mineral Cultural Hedgerow/Mineral Open Beach
- CUT/CUM | Mineral Cultural Thicket/Mineral Cultural Woodland
- CUT1 | Buckthorn Mineral Cultural Thicket
- CUW1 | Mineral Cultural Woodland
- CUW1/CUT1 | Mineral Cultural Woodland/Mineral Cultural Thicket
- D | Open/Disturbed
- FOD7-4 | Fresh-Moist Black Walnut Lowland Deciduous Forest

Reference: Contains information licensed under the Open Government Licence – Ontario. Imagery (2020). Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

1:4,500 metres
45 0 45 90
NAD 1983 UTM Zone 17N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

City of London
Greenway and Adelaide Wastewater Treatment Plants

Greenway Wastewater Treatment Plant Ecological Land Classification Communities

Date:	Project:	Submitter:	Reviewer:
November 2021	32667	K. Reis	R. Leppington

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Figure 2

I:\City of London\32667\Figures and Tables\EA\2021\Report\EIS_Reporting\Greenway\Figure-2-Greenway_Wastewater_Treatment_Plant_Ecological_Land_Classification_Communities.mxd - Tabloid_L - 25-Nov-21, 06:06 PM - imwright - TID005

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5.3.2 Flora

5.3.2.1 Greenway Study Area

Based on the background review, a total of three SAR and six SCC were identified as potentially occurring within the Greenway study area. These SAR and SCC species and their potential to occur within the habitat found within the Greenway study area are discussed further in Sections 6.6 and 6.3, respectively.

A total of 120 vascular plant species were observed within the Greenway study area during field observations. A complete vascular plant list is provided in Appendix D. Of these species, 10 are considered S4, 44 are considered S5, and 65 are considered species not applicable(SNA)/species not ranked (SNR). One plant SAR was identified within the Greenway study area: the threatened Kentucky Coffee-tree (*Gymnocladus dioicus*). This tree appears to be commonly planted as a landscape tree along the footpath/parkway corridor to the northwest of the Greenway WWTP. No other SAR or SCC were observed within the Greenway study area.

5.4 Wildlife and Wildlife Habitat

5.4.1 Birds

Based on the background review, there were a total of 91 avian species with the potential to occur within the Greenway study area. Of the 91 species identified, 7 SAR and 1 SCC were noted within the Greenway study area. These SAR and SCC species and their potential to occur within the habitat found within the Greenway study area are discussed further in Sections 6.6 and 6.3, respectively.

A total of 44 bird species were observed during surveys within the Greenway study area (Appendix E). A total of three SAR birds were observed within the Greenway study area: Bank Swallow, Barn Swallow and Chimney Swift. For all three SAR birds, they were observed as foraging within or as flyovers for the study area, and it was noted that no nesting habitat exists within the study for these three species. The confirmed SAR birds are discussed further in Section 6.6. No SCC birds were observed within the Greenway study area.

5.4.2 Herpetofauna

No site-specific field surveys were conducted for herptofauna within the Greenway study area. However, the background review noted a total of 19 herpetofauna species that have a potential to occur. Of the 19 species identified, there are 3 SAR and 3 SCC noted within the Greenway study area. These SAR and SCC species and their potential to occur within the habitat found within the Greenway study area are discussed further in Sections 6.6 and 6.3, respectively.

5.4.3 Mammals

Based on the background review, there are a total of 40 mammal species that have a potential to occur within the Greenway study area. Of the 40 species identified, 5 SAR are noted within the Greenway study area and no SCC were identified. The SAR were assessed to identify the habitat potential within the study area within Section 6.6.

5.4.3.1 Bat Maternity Roosting Survey

The Tri-coloured Bat and the two Myotis species require different roosting habitat characteristics. Little Brown Myotis and Northern Myotis roost in tree cavities, crevices, and under loose exfoliating bark in wooded areas located near water. The Tri-coloured Bat most often roost in foliage (both dead and alive) within or below the canopy. Often, Oak (*Quercus sp.*) species are utilized for roosting because the leaves are retained longer in the fall season; however, Maple (*Acer sp.*) species are also used. Tri-Coloured Bats forage along riparian corridors and open water.

Identifying suitable roost trees for Little Brown Myotis and Northern Myotis included recording the location of all snags that exhibit appropriate attributes including cavities, loose bark, cracks, or knot holes.

A total of 30 snags greater than 10 cm DBH were located within the Greenway study area, of which 20 have been assessed as high-quality snags (Table 4). These high-quality snags should be considered potential SAR bat habitat for Myotis species, and removal of high-quality habitat trees as identified in Table 5 should be treated as though candidate SAR bat habitat is being removed.

No formal leaf-on survey was conducted, but the FOD7-4, CUW1, and CUH1/BBO1 ecosites were noted to contain Oak and/or Maple trees greater than 10 cm DBH. These areas should be assumed to contain habitat that may support Tri-colored Bat. Removal of mature Oak or Maple trees, or other project works that may otherwise result in significant encroachment/impacts within these ecosites, should be treated as potential impact to candidate Tri-colored Bat habitat.

It should be noted that a large portion of the FOD7-4 ecosite within the WWTP compound was inaccessible due to lack of access within the fenced area of the Greenway WWTP. Snag trees and mature Oak and Maples were identified from a distance, indicating that additional habitat potential is present within this feature beyond that survey findings indicate.

TABLE 4 Summary of Little Brown Myotis and Northern Myotis Suitable Roost Trees within the Greenway Study Area (Leaf-off Survey)

Tree Number	Tree Species	Diameter at Breast Height	Height Class	Description
1	Sugar Maple[(1)]	122	1	Cavities numerous from 5 to 15m
2	c.f. American Basswood[(1)]	43	3	Dead and hollow
3	Crack Willow[(1)]	55	3	Dead limb knotholes/cavities at 12 m and sloughed bark from 4 to 9 m
4	Manitoba Maple	29, 34	2	Sloughed bark and woodpecker holes at 5 m
5	Sugar Maple[(1)]	87	1	Sloughed bark 3 to 15 m, knotholes on upper limbs m. Declining tree
6	Unknown deciduous	120	3	Sloughed bark/cavities at base, cavity at 8 m
7	Red Oak[(1)]	58	1	Cavity/knot hole apps 12 m high; declining live tree
8	Sugar Maple[(1)]	88	1	Knothole at 15 m
9	Deciduous dead	31	4	Dead with numerous low cavities
10	Deciduous dead	20	NA	Significant sloughed bark at 3 m
11	Ash sp. (dead)[(1)]	32, 26	2	Dead with sloughed bark along main stem
12	Ash sp. (dead)[(1)]	26	2	Dead with sloughed bark along main stem
13	Manitoba Maple	47, 38, 31	1	Hollow at base, knot/woodpecker holes at 4 m
14	Crack Willow[(1)]	Approximately 35, 55, 50	2	Sloughed bark, live declining tree
15	Unknown deciduous[(1)]	Unknown	1	Potential cavities at 10+ m
16	Norway Maple	Approximately 60	1	Sloughed bark appx 4 m high
17	Crack Willow	Approximately 65, 55, 80, 70	2	Knotholes and sloughed bark from 2 to 7 m
18	Sugar Maple[(1)]	Approximately 225	1	Knothole cavity at 10, 12 m
19	Ash sp. (dead)	44	3	Sloughed bark 1 to 5 m
20	Sugar Maple[(1)]	84	1	Knothole at 15 m
21	Ash sp. (dead)	46	2	Bark sloughing at base
22	Ash sp. (dead)[(1)]	Unknown	2	Dead standing ash with sloughed bark/cavities at 8 to 14 m
23	Ash sp. (dead)[(1)]	Unknown	2	Dead standing ash with sloughed bark/cavities at 8 to 14 m
24	Ash sp. (dead)[(1)]	Unknown	2	Dead standing ash with sloughed bark/cavities at 8 to 14 m
25	Sugar Maple[(1)]	Approximately 95	2	Dead or nearly so, sloughed bark at 9 to 13 m, cavity at 20 m
26	Deciduous dead[(1)]	62	3	Dead, no bark cavity at 9 m, 11 m, hollow at 6 m
27	Norway Maple[(1)]	Approximately 60	1	Sloughed bark approximately 15 m high

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Tree Number	Tree Species	Diameter at Breast Height	Height Class	Description
28	Crack Willow(1)	Approximately 200+	1	Sloughed bark 8 m, 12+ m, potential bat box/tree box installed
29	Crack Willow	Approximately 45	3	Sloughed bark at 8 m
30	Sugar Maple(1)	97	1	Hollow at 1 m, cavities at 10 m, 14 m

(1) High-quality snag tree

Significant Wildlife Habitat - Bat Maternity Colonies

As per the criteria from the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015) and the Bats and Bat Habitats: Guidelines for Wind Power Projects (MNR 2011), forested ELC communities that have a snag density greater than 10 snags per hectare for trees greater than 25 cm DBH that are in early decay (i.e., decay class 1 to 3) are considered to be candidate SWH for bat maternity roosting habitat.

The forested ELC polygons within the Greenway study area have a total of 5.51 ha; therefore, a total of 55 or more snags are required for the forested areas within Greenway study area to be considered candidate SWH for bat maternity roosting habitat. Of the 30 total snags within the Greenway study area, only 18 trees are considered to be high-quality maternity roosting trees (i.e., decay class 1 to 3; Table 5 and Figure 3).

Therefore, the forested communities within the study area is not considered SWH for bat maternity roosting.

TABLE 5 Summary of High-quality Snags per Ecological Land Classification Community Type, Greenway Wastewater Treatment Plant

Ecological Land Classification Community	Surveyed Area (ha)	No. of High-quality Snags	Snag Density (snag/ha)
CUW1	1.53	4	2.61
CUW1/CUT1	1.22	1	0.82
CUH1/BBO1	0.89	4	4.49
FOD7-4	1.87	9	4.81
TOTAL AREA	**5.51**		

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Easting (m)

476550 476700 476850 477000 477150 477300

Northing (m)

4758300 4758150 4758000 4757850 4757700

Braemar Crescent
Riverside Drive
Terry Fox Parkway
Greenside Ave
Wildwood Avenue
Darlene Crescent
Seawood Avenue
Pinewood Drive
Malcolm Street
Donna Street
Chelsea Avenue

GW01 GW02 GW04 GW09 GW11 GW12 GW15 GW16 GW17 GW18 GW19 GW20 GW21 GW22 GW23 GW24 GW25 GW26 GW29 GW30

N

Greenway Wastewater Treatment Plant Study Area
Greenway Wastewater Treatment Plant Study Area (50m Buffer)
Highway
Road
High-Quality Bat Tree

Reference: Contains information licensed under the Open Government Licence – Ontario. Imagery (2020) Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

1:3,000 metres
30 0 30 60
NAD 1983 UTM Zone 17N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

City of London
Greenway and Adelaide Wastewater Treatment Plants

Greenway Wastewater Treatment Plant High-Quality Bat Trees

Date:	Project:	Submitter:	Reviewer:
November 2021	32667	K. Reis	R. Leppington

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Figure 3

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5.4.4 Insects

Based on the background review, there are a total of 60 species within the Greenway study area. Of these, four SCC species were noted within the Greenway study area. No SAR were identified within the study area. The potential SCC noted in the background review were assessed to identify their potential to occur within the study area within Section 6.3.

5.5 Aquatic Resources

The main branch of the Thames River adjacent to Greenway WWTP consists of a wide, low-gradient, fairly homogenous channel with a series of pools, riffles, runs, and several bar formations. Through London, the River Valley is encroached by urban land use and confined by several flood protection dykes and natural and constructed slopes (Matrix 2019). The Coves ESA is located 350 m upstream of the Greenway WWTP. This area was once a meander of the Thames River and now encompasses a series of oxbow ponds (Matrix 2019).

5.5.1.1 Fish Community

Background fisheries data was compiled from fish sampling records from DFO, MNRF, MECP, and UTRCA (Table 6). The results of these records indicate the potential for 37 fish species within the Greenway study area, which include 2 SAR and 1 SCC species. The confirmed SAR species include Silver Shiner (*Notropis photogenis*), which is classified as threatened under the ESA and under SARA, and Black Redhorse (*Moxostoma duquesnei*), which is classified as threatened under the ESA and under SARA. This species and its protected habitat are discussed in Section 6.6. The SCC include the Spotted Sucker (*Minytrema melanops*), which is classified as special concern under the ESA and SARA. This species is discussed further in Section 6.3.

TABLE 6 Historical Fisheries Data Within and Surrounding the Greenway Study Area

Common Name	Scientific Name	SARA	ESA	UTRCA Data 2005-2020	DFO SAR Mapping
Bigmouth Buffalo	*Ictiobus cyprinellus*	-	-	X	-
Black Redhorse	*Moxostoma duquesnei*	Threatened	Threatened	X	X
Blackside Darter	*Percina maculata*	-	-	X	-
Bluntnose Minnow	*Pimephales notatus*	-	-	X	-
Brown Bullhead	*Ameiurus nebulosus*	-	-	X	-
Central Stoneroller	*Campostoma anomalum*	-	-	X	-
Common Carp	*Cyprinus carpio*	-	-	X	-
Common Shiner	*Luxilus cornutus*	-	-	X	-
Fathead Minnow	*Pimephales promelas*	-	-	X	-
Greenside Darter	*Etheostoma blennioides*	-	-	X	-
Green Sunfish	*Lepomis cyanellus*	-	-	X	-
Golden Redhorse	*Moxostoma erythrurum*	-	-	X	-
Johnny Darter	*Etheostoma nigrum*	-	-	X	-

Common Name	Scientific Name	SARA	ESA	UTRCA Data 2005-2020	DFO SAR Mapping
Largemouth Bass	*Micropterus salmoides*	-	-	X	-
Longnose Gar	*Lepisosteus osseus*	-	-	X	-
Northern Hog Sucker	*Hypentelium nigricans*	-	-	X	-
Northern Pike	*Esox lucius*	-	-	X	-
Mimic Shiner	*Notropis volucellus*	-	-		-
Pumpkinseed	*Lepomis gibbosus*	-	-	X	-
Quillback	*Carpiodes cyprinus*	-	-	X	-
Rainbow Darter	*Etheostoma caeruleum*	-	-	X	-
Rainbow Trout	*Oncorhynchus mykiss*	-	-	X	-
Rock Bass	*Ambloplites rupestris*	-	-	X	-
Roseyface Shiner	*Notropis rubellus*	-	-	X	-
Sea Lamprey	*Petromyzon marinus*	-	-	X	-
Shorthead Redhorse	*Moxostoma macrolepidotum*	-	-	X	-
Silver Redhorse	*Moxostoma anisurum*	-	-	X	-
Silver Shiner	*Notropis photogenis*	Threatened	Threatened		X
Smallmouth Bass	*Micropterus dolomieu*	-	-	X	-
Spotfin shiner	*Cyprinella spiloptera*	-	-	X	-
Spotted Sucker	*Minytrema melanops*	Special Concern	Special Concern	X	X
Stonecat	*Noturus flavus*	-	-		-
Stripped Shiner	*Luxilus chrysocephalus*	-	-	X	-
Walleye	*Sander vitreus*	-	-	X	-
White Sucker	*Catostomus commersonii*	-	-	X	-
Yellow Bullhead	*Ameiurus natalis*	-	-	X	-
Yellow Perch	*Perca flavescens*	-	-	X	-

SARA - *Species at Risk Act*
ESA - *Endangered Species Act*
UTRCA - Upper Thames Region Conservation Authority
DFO - Fisheries and Oceans Canada

5.5.1.2 Mussel Community

Data collected from UTRCA as well as federal and provincial databases indicate the potential for 10 species of mussels, which include 3 SAR and 3 SCC (Table 7). All three SAR species are considered to have potential habitat within the Thames River and are discussed further in Section 6.6.

Two of the SCC are considered to have potential habitat within the Thames River and include Black Sandshell (*Ligumia recta*) and Mucket (*Actinonaias ligamentina*). These species are discussed further in Section 6.3.

TABLE 7 Historical Mussel Data Within and Surrounding the Greenway Study Area

Common Name	Scientific Name	S-rank	SARA[1]	ESA[2]	UTRCA Data 2005-2020	DFO SAR Mapping	MECP Data
Black Sandshell	*Ligumia recta*	S3	-	-	X	-	-
Elktoe	*Alasmidonta marginata*	S3	-	-	X	-	-
Fluted-shell	*Lasmigona costata*	S5	-	-	X	-	-
Fragile Papershell	*Leptodea fragilis*	S4	-	-	X	-	-
Mucket	*Actinonaias ligamentina*	S3	-	-	X	-	-
Plain Pocketbook	*Lampsilis cardium*	S4	-	-	X	-	-
Rayed Bean	*Villosa fabalis*	S1	Endangered	Endangered	-	X	-
Round Pigtoe	*Pleurobema sintoxia*	S1	Endangered	Endangered	-	X	X
White Heelsplitter	*Lasmigona complanata*	S5	-	-	X	-	-
Wavy-rayed Lampmussel	*Lampsilis fasciola*	S2	Special Concern	Threatened	X	X	X

SARA - *Species at Risk Act*
ESA - *Endangered Species Act*
UTRCA - Upper Thames River Conservation Authority
DFO - Fisheries and Oceans Canada
MECP - Ontario Ministry of the Environment, Conservation and Parks

6 SIGNIFICANT NATURAL HERITAGE FEATURES AND FUNCTIONS

Significant natural heritage features and functions include those listed in the Provincial Policy Statement (MMAH 2020), the NHRM (MNR 2010), the SWHTG (MNR 2000) and the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015). The findings of the site investigations were cross-referenced with the criteria provided in these documents to identify the presence of or potential presence of significant natural heritage features.

The following significant features were not present within the Greenway study area:

- ANSIs
- ESA
- Significant woodlands
- Provincially Significant Wetlands
- Wetlands and Unevaluated Wetlands

Significant features that are present within the study area are discussed further in Sections 6.1 to 6.6.

6.1 Significant Valleylands and Corridors

Valleylands are linear natural areas that occur in a valley or other landform depression that have water flowing through or standing for some period of the year (MNR 2010). These areas are important corridors which provide unique features and functions to an area as well as linkages to terrestrial and aquatic habitats.

The City's official plan recognizes significant valleylands, which are mapped on Map 5 (Natural Heritage) of *The London Plan* (City of London 2016). The map indicated that the Thames River Valley is considered a Significant Valleyland (Appendix C).

The Greenway WWTP is located directly adjacent to the Thames River Valley (approximately 20 m south of the river).

6.2 Woodlands

Woodlands include treed areas, woodlots, or forested areas and vary in their level of significance at the local, regional, and provincial levels.

No significant woodlands were identified within the Greenway study area; however, the City did indicate the presence of a woodland directly southwest of the Greenway WWTP (Appendix C; Figure 4). The City describes woodlands as "woodlands that are not determined to be ecologically significant but are to be retained for public open space or park purposes, or woodlands to be retained at the property owner's request as a private woodland, will be included in the Green Space Place Type on Map 1 and identified as woodlands on Map 5" (City of London 2016).

6.3 Significant Wildlife Habitat

The assessment of SWH follows the guidelines in the NHRM (MNR 2010) and the criteria from the *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015), with support from the SWHTG (MNR 2000) as appropriate. There are four categories of SWH which include the following:

- seasonal concentration areas of animals
- rare vegetation communities or specialized habitat for wildlife
- habitat for species of conservation concern
- animal movement corridors

Each of these categories includes various SWH types and with criteria to evaluate significance. These four categories were assessed based on the background studies and field investigations performed by Matrix. A full SWH evaluation is provided in Appendix F, and a summary of the confirmed or candidate SWH is provided in Table 8. To support the evaluation of SCC habitat in Appendix F, a specific evaluation with regards to SCC and their potential to occur within the study area is provided in Appendix G.

TABLE 8 Significant Wildlife Habitat Assessment Summary for Greenway Wastewater Treatment Plant

Category	Wildlife Habitat	Greenway Wastewater Treatment Plant
Seasonal Concentration Areas of Animals	Shorebird Migratory Stopover Area	Candidate - Patchy BBO1 ecosites are present adjacent to the Thames River
	Turtle Wintering Areas	Candidate - Thames River contains open water areas with deep pools
Rare Vegetation Communities and Specialized Habitat for Wildlife	Turtle Nesting Habitat	Candidate - The Thames River shoreline within the study area contains sand and gravel soil for nesting.
Habitat for Species of Conservation Concern	Special Concern and Rare Wildlife Species	Candidate • Eastern Wood Pewee • Eastern Ribbonsnake • Hackberry Emperor • Monarch • Tawny Emperor • Spotted Sucker • Black Sandshell • Mucket • Eastern Stiff-leaved Goldenrod • Hairy Fruited Sedge Confirmed • Northern Map Turtle • Snapping Turtle
Animal Movement Corridors	Amphibian Movement Corridor	Candidate - natural areas adjacent or within the contiguous natural corridor of the Thames River should be considered potential amphibian movement corridors

6.4 Fish and Fish Habitat

As presented in Section 5.5, the Greenway study area includes the Thames River, which contains fish as well as permanent fish habitat.

Fish and fish habitat are regulated by DFO under the *Fisheries Ac*. The *Fisheries Act* requires that projects avoid causing the death of a fish or a HADD of fish habitat unless authorized by the Minister or a designated representative. The determination of death of fish or HADD is typically done through a self-assessment process.

6.5 Linkages and Corridors

Linkages and corridors are important features within a natural system. These features are continuous, often linear bands of vegetation in the landscape which provide opportunities to connect natural areas and provide cover for wildlife movement and dispersal of otherwise isolated populations.

The Thames River Valley has been designated as a significant valleyland within *The London Plan* (City of London 2016). This area represents a significant linkage for both terrestrial and aquatic organisms. The wooded riparian area along the edge of the Thames River provides a linkage to other natural areas within the Thames River Valley system.

6.6 Species at Risk

A list of SAR with potential to occur on or adjacent to the Greenway study area was complied from the background review and agency consultation. A total of 23 SAR were identified as potentially occurring within the Greenway study area. Following the field investigations, further evaluation was completed for SAR probability of occurrence based on the observed habitat characteristics within the study area. A full evaluation is provided in Appendix H, and a summary provided below in Table 9.

The results of the assessment indicated that 10 species were considered to have potential habitat, and a total of 7 species were confirmed (Table 9).

TABLE 9 Species at Risk Potential Presence within the Greenway Study Area

Species	ESA	SARA	Greenway Wastewater Treatment Plant
Butternut	END	END	Potential
Kentucky Coffee-tree	THR	THR	Confirmed
Bank Swallow	THR	THR	Confirmed
Barn Swallow	THR	THR	Confirmed
Bobolink	THR	THR	Potential
Chimney Swift	THR	THR	Confirmed
Eastern Meadowlark	THR	THR	Potential
Redheaded Woodpecker	SC	THR	N/A
Eastern Spiny Softshell	END	THR	Confirmed
Eastern Foxsnake	END	END	Potential
Little Brown Myotis	END	END	Potential
Northern Myotis	END	END	Potential
Tricoloured Bat	END	END	Potential
Black Redhorse	THR	NAR	Confirmed
Silver Shiner	THR	THR	Confirmed
Rayed Bean	END	END	Potential
Round Pigtoe	END	END	Potential
Wavvy-rayed Lampmussel	THR	SC	Potential

The species indicated as potentially occurring within the study area were not observed during the surveys conducted by Matrix; however, there is still likelihood that they could be present based on previous observations as well as suitable habitats within the study area. Species with confirmed identification

within the study area may require additional habitat protection and considerations. These species and their habitat protections under the ESA are as follows:

- **Bank Swallows** were observed foraging within the Greenway study area. Habitat used exclusively during the breeding season includes the nest (nest burrow and nest cup material), the nest site (bank), and the surrounding open foraging habitat (MECP 2020). The Bank Swallow is afforded species and general habitat protection under the ESA. No nest sites were observed within the study area and as a result are not considered further in the impact assessment for the study area.

- **Barn Swallows** were observed foraging within the Greenway study area. The ESA general habitat protection identifies three categories of protection which ranges from the lowest tolerance to alteration (Category 1) to the highest tolerance to alteration (Category 3). Category 1 includes the nest, Category 2 is the area within 5 m of the nest, and Category 3 is the area between 5 to 20 m of the best. General building use and building improvements that do not impair the function of the habitat have been identified as compatible with the habitat legislation. No Barn Swallow nests were observed within the study area and as a result are not considered further in the impact assessment for the study area.

- **Chimney Swifts** were observed flying over the study area. The ESA general habitat protection identifies this species habitat as, human-made nesting/roosting feature, or a natural nesting/roosting tree cavity and the area within 90 m of the tree. Regular building use and building improvements that do not impair the function of the habitat are considered acceptable. The study areas did not include any candidate nesting trees or chimneys and as a result are not considered further in the impact assessment for the study area.

- **Kentucky Coffee-tree** was identified within the open parking area and appeared to be planted specimens. The species and habitat protection under the ESA only apply to natural growing species. The species within the study area appears to be planted and therefore would not be awarded protection under the ESA.

- **Spiny Softshell** was identified within 1 km of the study area by UTRCA staff during recent studies. This species uses highly aquatic habitats during its life cycle, and prefers sandy substrates for nesting, shallow soft bottom areas for nursery habitat, deep pools for hibernation, and riffle areas for foraging (MECP 2020). The Spiny Softshell is afforded species and general habitat protection under the ESA, 2007. Habitat and basking areas may occur over a large area to satisfy all habitat requirements for the Spiny Softshell (MECP 2020).

- **Silver Shiner** utilizes deep riffles and pools of large rivers to carry out its lifecycle. The ESA general habitat protection identifies three categories of protection which ranges from the lowest tolerance to alteration (Category 1) to the highest tolerance to alteration (Category 3). Category 1 habitats have been identified as flowing pools, run, and riffles in occupied reaches; Category 2 has been identified

as shallow, nearshore habitats; and areas with aquatic vegetation in occupied reaches, and Category 3 has been identified as floodplains and riparian edges adjacent to occupied reaches (MECP 2020).

- **Black Redhorse** was identified within 1 km of the study area by UTRCA staff during recent studies. This species lives in pools and riffle areas of medium-sized rivers that are usually less than two metres deep (MECP 2020). The Black Redhorse is afforded species and general habitat protection under the ESA.

6.7 Significant Features and Functions Summary

Based on the background review and site investigations to date, the potential and confirmed significant features and functions that are present within the study area are summarized in Table 10 and depicted in Figures 4.

TABLE 10 Confirmed and Candidate Significant Features within the Greenway Study Area

Significant Feature	Greenway Wastewater Treatment Plant
Significant Valleylands	Confirmed
Significant Woodland	None
Woodlands	Confirmed
Wetlands	None
Significant Wildlife Habitat	Confirmed and Candidate
Fish and Fish Habitat	Confirmed - direct
Species at Risk	Confirmed and Potential

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Easting (m)

476600 476700 476800 476900 477000 477100 477200 477300

Northing (m)

4758300 4758200 4758100 4758000 4757900 4757800

Riverside Drive

Terry Fox Parkway

Greensi

Windwood Avenue

Darlene Crescent

Seawood Avenue

Malcolm Street

Donna Street

Chelsea Avenue

N

- Greenway Wastewater Treatment Plant Study Area
- Greenway Wastewater Treatment Plant Study Area (50m Buffer)
- Candidate SWH, Potential SAR Habitat
- Confirmed SAR Habitat, Confirmed SWH
- Significant Valleyland (London Plan), Candidate SWH, Potential SAR Habitat
- Woodland (London Plan), Candidate SWH, Potential SAR Habitat
- Highway
- Road

1:2,500 metres

25 0 25 50

NAD 1983 UTM Zone 17N

Reference: Contains information licensed under the Open Government Licence – Ontario. Imagery (2020) Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

City of London
Greenway and Adelaide Wastewater Treatment Plants

Significant Features and Functions
Greenway Wastewater Treatment Plant

Date:	Project:	Submitter:	Reviewer:
November 2021	32667	K. Reis	R. Leppington

Disclaimer: The information contained herein may be compiled from numerous third party materials that are subject to periodic change without prior notification. While every effort has been made by Matrix Solutions Inc. to ensure the accuracy of the information presented at the time of publication, Matrix Solutions Inc. assumes no liability for any errors, omissions, or inaccuracies in the third party material.

Figure 4

I:\City\of\London\32667\FiguresAndTables\EA\2021\Report\EIS_Reporting\Greenway\Figure-4-Significant_Features_And_Functions_Greenway_Wastewater_Treatment_Plant.mxd - Tabbud_L - 25-Nov-21, 06:09 PM - Imwright - TID005

7 FLOOD PROTECTION ALTERNATIVES

Matrix recommended that site-level flood protection approaches (e.g., berms, floodwalls) form the basis of the short list of alternative solutions developed to conceptual design. This recommendation relies on the key outcome of the hydraulic analysis completed by Matrix (2021a, 2021b), which demonstrates that this mitigation approach results in no or negligible upstream flood impacts (i.e., backwater). In addition, the comparative advantage of site-level flood protection is that it is expected to be fully implemented within the study area. As a result, site-level flood protection is considered more readily constructable, with less environmental and land use impacts compared to the other approaches that were screened out in this assessment.

A total of four options were selected are summarized in Table 11.

TABLE 11 Shortlist of Alternatives for the Greenway Study Area

Site-level Flood Protection	Greenway Wastewater Treatment Plant
Option 1	Floodwall
Option 2	Berm
Option 3	Combination of Floodwall and Berm
Option 4	Do Nothing

The major undertakings of the flood mitigation alternatives at Greenway WWTP include the creation of a floodwall and/or berm along the northern and eastern potions of the WWTP and extending slightly south into the outer edge of the current woodland.

7.1 Project Activities

Although there are four alternatives listed for each site, the construction footprint associated with the creation of a floodwall and/or berm will result in similar habitat alternation with the exception of “do nothing” option. Therefore, the impact assessment will focus on the following activities associated with floodwall/berm construction around the perimeter of the Greenway WWTP that will influence the natural environment:

- construction access, staging, and laydown areas
- vegetation clearing, earthworks/grubbing, and disposal
- near-water construction works

The anticipated effects and mitigations of these construction works will be discussed further in Section 8.

8 EFFECTS ASSESSMENT

The results of the natural heritage assessment indicated a number of ecological features that are present within the study area:

- significant valleylands
- woodlands
- SWH
- fish and aquatic habitat
- SAR

Each of these natural features are significant, as they support flora and fauna communities, connections between aquatic and terrestrial environments and, in the case of the SAR, support species that have limited habitats elsewhere both nationally and provincially. If the preferred alternative damages or interferes with these features and their function, habitat and species loss can occur.

Both direct and indirect impacts on natural heritage features and functions can occur as a result of the preferred alternative. Impacts and residual effects on natural heritage features were assessed based on the following criteria:

- duration: long or short-term
- extent: localized or expansive
- permanent: permanent or temporary
- severity: positive or negative

Most direct impacts occur during the construction phase of a project, and contain localized, short-term, temporary, negative effects that can be reduced through avoidance and proper construction practices. After construction, there may be more long-term, indirect impacts while the site recovers, and vegetation growth takes place. Typically, after the site revegetates, there is either a neutral or positive impact due to intentional native plantings, improved sediment control, and runoff control.

Predicted potential impacts associated with the short list of alternatives are described in the sections below including recommended mitigation measures and residual impacts (after mitigation).

8.1 Potential Impacts

The construction of a floodwall and/or berms will require construction, permanent land alternation, and re-vegetation of the study area. Table 12 illustrates the potential impacts to the natural heritage features, as well as mitigation measures which should be followed to avoid serious harm. Once the mitigation measures are implemented, the residual effects are assessed to determine their duration, extent, severity, and permanence.

The greatest potential impacts are associated with the removal of vegetation along the west and southwest side of the Greenway WWTP, which could include the removal of SAR trees or SAR bat habitat, as well as the proximity of construction activities to the Thames River (25 m), which is also aquatic SAR habitat.

It is assumed that construction access and staging will utilize the pre-existing roads and parking lots within the study area.

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TABLE 12 Impacts, Mitigations, and Net Effects of the Short List of Alternatives

Natural Heritage Features	Project Activity	Potential Impacts	Mitigation Measures	Net Effects Greenway
• Significant Valleylands • Fish and Aquatic Habitat • SAR • Habitat of SCC	• Near-water Works to create the floodwall/berm along the northern section of the Greenway WWTP (25m from the Thames River)	Habitat Loss and/or Alteration • temporary loss of habitat • soil compaction and rutting outside of construction zone • damage to edge trees (i.e., outside of construction zone) • changes in moisture regime • changes to the structure and composition of vegetation communities (e.g., introduction of invasive species) • fugitive dust • spills (e.g., fuel) • erosion and sedimentation	Timing Windows • 1A-4A Best Construction Practices • 1B-7B Prevention of Terrestrial Disturbance • 1D-6D Erosion and Sedimentation Control • 1E-9E	• The vegetation clearing will result in a short-term, isolated, temporary disturbance to the natural features. • The Thames River system is not anticipated to be negatively affected if mitigation measures are followed. • No long-term negative impacts are anticipated following the mitigation measures.
		Disturbance/Avoidance of Habitat • increase noise during construction • increased human presence	Timing Widows • 1A -4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	
		Injury or Incidental Take (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) • increased collision with machinery • removal of nests and eggs • smothering hibernacula or nesting sites	Timing Widows • 1A -4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	

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Natural Heritage Features	Project Activity	Potential Impacts	Mitigation Measures	Net Effects Greenway
• Woodlands • General Wildlife and Habitat • Potential SWH	• Vegetation clearing, earthworks/ grubbing to create the floodwall/berm along the south-west side of the Greenway WWTP adjacent to the dog park and woodland.	Habitat Loss and/or Alteration • temporary loss of habitat • soil compaction • changes in moisture regime • changes to the structure and composition of vegetation communities (e.g., introduction of invasive species) • fugitive dust • spills (e.g., fuel) • erosion and sedimentation	Timing Windows • 1A-2A, 4A Best Construction Practices • 2B, 4B, 6B, 7B Prevention of Terrestrial Disturbance • 1D-6D Erosion and Sedimentation Control • 1E-9E	• The vegetation clearing will result in a short term, isolated, temporary disturbance to the natural features. • If the prescribed mitigation measures are followed, then the planting of new, native, vegetation within the area should result in no long-term impacts to the environment.
		Disturbance/Avoidance of Habitat • increased noise during construction • increased human presence	Timing Widows • 1A-2A, 4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	
		Injury or Incidental Take (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) • increased collision with machinery • removal of nests and eggs • smothering hibernacula or nesting site	Timing Widows • 1A, 2A, 4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	
• General Wildlife and Habitat	• Construction access, staging, and laydown areas	Habitat Loss and/or Alteration • temporary loss of habitat • soil compaction • changes in moisture regime • changes to the structure and composition of vegetation communities (e.g., introduction of invasive species) • fugitive dust • spills (e.g., fuel) • erosion and sedimentation	Timing Windows • 1A-2A, 4A Best Construction Practices • 2B, 4B, 6B, 7B Prevention of Terrestrial Disturbance • 1D-6D Erosion and Sedimentation Control 1E-9E	• It is assumed that construction access and staging will utilize the pre-existing roads and parking lot such as the Greenway PCP entry, Terry Fox Parkway, and the dog park parking area.
		Disturbance/Avoidance of Habitat • increased noise during construction • increased human presence	Timing Widows • 1A-2A, 4A Prevention of Wildlife Mortality and Disturbance 1C-5C	
		Injury or Incidental Take (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) • increased collision with machinery • removal of nests and eggs • smothering hibernacula or nesting site	Timing Widows • 1A, 2A, 4A Prevention of Wildlife Mortality and Disturbance 1C-5C	

9 MITIGATION MEASURES

The following outlines mitigation recommendations for construction and operational effects to the natural heritage features within the study area. These mitigation measures are designed to prevent or significantly reduce impacts to terrestrial habitat communities.

9.1 Timing Windows/Working in the Dry

The magnitude of effects to aquatic habitat and communities is related to the extent, timing, and duration of the project. The following mitigation measures are recommended:

- **1A**: Remove trees outside of the breeding bird window of April 10 to August 15 (Government of Canada 2021) and outside periods where other wildlife are migrating/emerging to hibernacula and/or nesting sites through consultation with UTRCA. If trees are to be removed during the breeding bird window, then an avian biologist must conduct a nesting survey before tree removals.

- **2A**: Confine the contractor to the minimum area necessary to perform the work.

- **3A**: In the event work needs to take place in the river, no in-water work should occur between March 15 and July 15 to protect spawning fish (MNRF 2021)

- **4A**: Ensure candidate SAR bat snag trees are protected during construction. If snag trees can not be avoided, it is recommended that snag removal occur between October 1 and March 31, of a given year.

9.2 Best Construction Practices

Implementation of best construction practices during construction will reduce the potential for spills or other materials/equipment entering the water. The following measures will be employed:

- **1B**: Control all equipment maintenance and refuelling to prevent any discharge of petroleum products. Conduct vehicular maintenance and refuelling at least 30 m from the watercourse, watercourse banks, and natural heritage features.

- **2B**: Implement surface protection measures to minimize soil compaction.

- **3B**: Store construction material, excess material, construction debris, and empty containers at least 30 m from the watercourse and banks to prevent entry.

- **4B**: Enlist an environmental monitor onsite to provide advice and ensure that activities will not have any negative effects. Information for site-specific SAR should be posted in construction trailer.

- **5B**: Implement a stormwater management plan to maintain pre-construction drainage patterns and flows during all project phases.

- **6B**: Implement an emergency and response management plan to address the potential for spills.

- **7B**: Implement "Clean Equipment Protocol for Industry" (Halloran et al. 2013) to inspect and clean equipment for the purposes of invasive species prevention.

9.3 Prevention of Wildlife Mortality and Disturbance

Preventative measures during construction will reduce the potential mortality and disturbance of wildlife within the Study area, and should include the following:

- **1C**: Demarcate wildlife habitat to avoid offsite disturbance and to restrict construction activities to the work areas.

- **2C**: Implement traffic limits if onsite vehicle use is required.

- **3C**: Install exclusionary fencing to prevent wildlife from entering the construction site. Exclusionary fencing should not prohibit access to nearby habitats. Where required, redirect wildlife to areas where they can avoid the potential for incidental take, and still have access to habitats. Exclusionary fencing should be monitored daily throughout construction.

- **4C**: Inspect construction area for wildlife each morning before the commencement of construction activities. Removal of trapped wildlife should be completed by a qualified biologist.

- **5C**: Educate workers to be aware of potential wildlife occurrences and measures to take to minimized potential for injury or incidental take. Maintain a log to record and report incidents of injury and/or mortality.

9.4 Prevention of Terrestrial Disturbance

Preventative measures during construction will reduce the likelihood of disturbance and destruction of the terrestrial features, and should include the following:

- **1D**: Identify setbacks from natural features and trees with the installation of tree protection fencing along the disturbance limit (10 m). No construction activities are to occur outside of these fences (including overhead), nor the piling of construction materials.

- **2D**: Minimize the construction disturbance area to the extent feasible.

- **3D**: Retain an Arborist during detailed design to create a tree preservation plan to protect as many healthy, native trees as possible through the process.

- **4D**: Implement a dust management plan for the suppression of fugitive dust.

- **5D**: Ensure that temporarily disturbed areas are restored with native vegetation and monitored during construction and post construction based on UTRCA and the cities specifications.

- **6D**: Develop a restoration plan to prescribe when and how disturbed areas will be restored. Plantings should consist of native trees, shrubs and seed mixes. Tree replacement should be at a 3:1 tree replacement ratio.

9.5 Erosion and Sediment Control

Effective erosion and sediment control (ESC) will be achieved throughout the project with careful planning and design, stringent construction supervision, monitoring of the site, and maintenance of control works throughout their operational life. ESC measures will include:

- **1E**: Develop an ESC plan to minimize the potential for erosion and construction-related sediment release into nearby natural features/water bodies and prepare ESC plan condition reports as part of the monitoring and maintenance plan.

- **2E**: Install ESC measures before ground breaking.

- **3E**: Monitor and maintain ESC measures as per specifications.

- **4E**: Delineate storage, stockpiling, and staging areas prior to construction and inspected.

- **5F**: Install sediment control fence along the channel margins to prevent the entry of sediment into the watercourse.

- **6E**: Avoid construction during high volume rain events or significant snow melts/thaws. Construction will resume once soils have stabilized to avoid risk of erosion, soil compaction, or the potential for sediment release into nearby natural features/watercourses.

- **7E**: Direct discharge from sediment clean out to a filter bag or taken offsite for disposal.

- **8E**: Implement construction monitoring to ensure erosion and sediment measures are in place and working effectively. ESC should be checked weekly and after major rain events (>10 mm) to ensure it is installed and functioning properly. Daily monitoring will be completed by the Contractor. Any deficiencies should be repaired immediately. A construction monitoring log should be maintained to ensure any deficiencies and corrective actions are documented.

- **9E**: Remove all temporary ESCs following construction once disturbed areas have stabilized.

9.6 Species at Risk

Terrestrial SAR species (i.e., plants, birds, snakes, and bats) identified in Table 14 in Section 6.7 are typically impacted by the loss of habitat and incidental encounters due to vegetation removal, site clearing activities, and construction activities. Aquatic SAR species (i.e., turtles, fish, and mussels) identified in Table 14 in Section 6.7 are all are associated with the Thames River and are typically impacted directly by in-water works through the destruction of habitat (which is not anticipated for the flood protection works at either site) or indirectly by near-water works (i.e., sedimentation, erosion, or other water quality issues arising from nearby construction machinery).

Impacts to both terrestrial and aquatic SAR can be mitigated through the implementation of the mitigations identified in Sections 9.1 to 9.5. In addition to these mitigation measures, the following are also recommended:

- Transplant Kentucky Coffee-trees (see Section 11.2 for details).

However, SAR habitat is protected under the ESA; therefore, at the detailed design stage it will be important to confirm potential occurrence (i.e., location of SAR and SAR habitat) as well as permitting report requirements under the ESA. Permitting and additional studies are discussed further in Section 11.

10 RESIDUAL IMPACTS AFTER MITIGATION

The construction of the floodwall and/or berm within the study area is anticipated to result in an isolated, temporary disturbance and loss of habitat while construction is taking place; however, the long-term impacts associated with this project are expected to create an overall net benefit once the new vegetation has reached maturity.

Within the Greenway study area, the northern portion of the site where the floodwall and/or berm is to be erected is already disturbed and will include minimal vegetation removal. The greatest risk to this portion of work will be the proximity to the Thames River (25 m). However, if mitigation measures are followed, there should be no impact to this system while construction works are occurring. The southwest portion of the property contains an off-leash dog park, a parking lot, and a small woodland. This section will require some vegetation removal of edge species adjacent to the Greenway WWTP in order to erect the proposed berm. This will result in short-term disturbance to the area; however, it has been recommended within the mitigation measures that a tree preservation plan and replanting plan be created for those areas disturbed. This should include a replacement of trees at a 3:1 ratio as well as, native seed mix. It is anticipated that the long-term effects of this project shall result in a net benefit for the area once the trees and vegetation reach maturity.

11 NEXT STEPS

11.1 Permitting

At the detailed design stage, potential requirements under the ESA and the City's tree protection bylaw will need to be confirmed. Specifically, the following:

- **UTRCA Permit:** any works with the regulation limit (under Ontario Regulation 157/06) will require a permit through the UTRCA.
- **ESA Permit:** under Section 17 (2) (c) of the ESA, 2007, it identifies permits for activities which may contravene the ESA. Permits related to habitat destruction would require an Overall Benefit Permit.
- **City of London Tree Bylaw Permit:** will be required for the removal of trees within the study area.
- **City of London Park Occupancy Permit:** depending on the footprint of disturbance a park occupancy permit may be required from the City's parks department.

11.2 Future Work

The impact assessment detailed within this EIS report is based on preliminary conceptual design details. Potential impacts and recommended mitigation should be revisited at the detailed design stage of the project as designs are finalized to ensure that negative impacts are minimized or eliminated through implementation of appropriate mitigation or compensation measures.

It is recommended that the following be completed in advance of finalizing construction documents to ensure requirements under the ESA are appropriately addressed and sufficient time is available to obtain the necessary permits. At the detailed design stage, the following additional studies are recommended:

- Conduct a tree inventory (by a certified arborist) within the area of disturbance to determine if any SAR trees (Kentucky Coffee-tree or Butternut) exist within the disturbance footprint.
    - If a Butternut is found, a Butternut health assessment is recommended on each specimen. If the Butternut is a pure species, no construction works are to occur within 25 m of Butternut. Any construction activities occurring within 25 m of the Butternut that could pose harm will be subject to an MECP Notice of Activity to register the project activities.
    - MECP should be consulted with regards to any potential requirements for the planted Kentucky Coffee-trees and discuss possible transplantation of candidate specimens.
- Consultation with MECP with regards to the candidate SAR bat maternity roost habitat. MECP will confirm if additional bat acoustic surveys should be completed to confirm the presence or absence of

potential SAR bats in an individual tree or forested area identified as potential maternity roosting habitat that will be impacted or removed. If SAR bats are present, approval for SAR bat habitat removal from the MECP will be required. Overall benefit permitting for SAR bats may include installation of compensation measures (i.e., bat boxes) to enhance bat roosting habitat adjacent to the facility where habitat is removed.

- Identified candidate SWH habitat and potential SAR habitat will need to be reviewed in more detail once the area of impact is confirmed for this project.

- Additional screening as required based on the future changes to species' listings or habitat regulations of the ESA.

12 CONCLUSION

The City retained Matrix to complete two Municipal Class EAs to address climate change resiliency measures at the Greenway WWTP and the Adelaide WWTP. The two facilities have been identified as vulnerable to severe flooding. The EAs will seek to identify a preferred flood protection approach to improve asset resilience, enhance treatment capabilities, and improve plant safety.

This report focused on the natural heritage features and functions of the Greenway WWTP, with the Adelaide WWTP to be discussed in a separate report. The purpose of the Environmental Impact Study (EIS) was to define and record the natural heritage features, discuss implications and constraints to the proposed short list of alternatives, and recommend mitigation measures to offset any potential negative impacts to protected features. The short list of alternatives for Greenway WWTP recommended developing a floodwall/berm.

Matrix combined information from the ecological field studies with relevant information from previous background studies to identify significant features within the study area. The results indicated a wide range of terrestrial and aquatic species and habitat features present or likely present within the study area. In the analysis of significance and function, several natural heritage features were identified, which included significant valleylands, significant woodlands and woodland, wetlands, SWH, fish and fish habitat, and SAR.

The most significant ecological functions identified within the Greenway study area included significant valleyland, fish and fish habitat, the woodland, as well as confirmed aquatic SAR (Eastern Spiny Softshell, Silver Shiner, and Black Redhorse). The confirmed avian SAR (Bank Swallow, Barn Swallow, and Chimney Swift) were observed foraging within the study area but did not have confirmed nesting sites within the study area; and therefore, were not anticipated to be directly impacted during construction activities. Furthermore, the confirmed SAR plant (Kentucky Coffee-tree) was identified as a planted species and, therefore, does not receive protection under the ESA. The major undertakings of the flood mitigation alternatives included the creation of a floodwall and/or berm along the northern and eastern potions of

the Greenway WWTP and extending slightly south into the outer edge of the current woodland. These construction activities, along with construction access, staging, and vegetation clearing are anticipated to have localized temporary effects to the natural features during construction; however, no long-term negative impacts are expected following the prescribed mitigation measures.

Any long-term effects associated with these projects are expected to improve the natural features through increased native plantings. Appropriate approvals should be obtained during the detailed design phase of this project to ensure the natural features and functions within the Greenway study area is adequately protected.

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APPENDIX A
Terms of Reference

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Appendix A

Environmental Impact Study
ISSUES SUMMARY CHECKLIST REPORT

Application Title:

Date Submitted:

Proponent:

Qualifications

Primary Consultant:

Key contact person:

Other consultant / field personnel:

- Hydrogeology / Hydrology:
- Biological – Flora:
- Biological – Fauna:
- Other:

Context for Background Information

Subwatershed:

Tributary Fact Sheet Number:

Planning / Policy Area:

Technical Advisory Review Team

- Ecologist Planner:
- Planner for File:
- EEPAC:
- Conservation Authority:
- Ministry of Natural Resources:
- Ministry of Municipal Affairs and Housing:
- Ministry of Agriculture and food:
- Other Review Groups (e.g., Community Associations , Field Naturalists):

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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.).

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

Soils (surface and subsurface)

Glacial geomorphology - landform type

Subwatershed

Topographic features

Ground water discharge

Shallow ground water/baseflow

Ground water discharge/aquifer

Aggregate resources

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1.2.2 Hydrology

Hydrological catchment boundary and of wetlands + determine the catchment areas of all wetlands

Surface drainage pattern

Watercourses (Permanent, Intermittent)

Stream order (Headwater, 1st, 2nd, 3rd or higher)

Agricultural Drains

Downstream receiving watercourse

Hazard Line (Map 6)

1.2.3 Natural Hazards

100 year Erosion Line

Floodline mapping

Max line mapping – UTRCA mapping + text based regulated areas

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 Sites

Rare Vegetation Communities

1.2.5 Flora

Flora (Inventory dates, Source)

Rare Flora (National, Provincial, Regional)

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1.2.6 Fauna

Fauna (Inventory dates; sources)

Breeding Birds

Migratory Birds

Amphibians

Reptiles

Mammals

Butterflies

Odonata

Other

Partners In Flight (PIF)

Rare Fauna

1.2.7 Wildlife Habitat + as per MNRF 2015 Criteria, as amended from time to time, and all applicable Official Plan policies and In-force London Plan policies

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

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Wildlife trees (snags, cavities, x-large trees > 65 cm DBH)

Forest Interior Birds

Area-sensitive birds

1.2.8 Aquatic Habitat

(SWS Aquatic Resource Management Reports)

Fish Communities

Fish spawning areas

Fish migration routes

Thermal refuge for fish

Benthic inventory

Substrate

Riparian habitat (extent and type)

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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)

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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 'S'. They also address the protection of environmental quality and ecological function with respect to water quality, fish habitat, groundwater recharge, headwaters and aquifers.

A component of a Subject Lands Status Report that is required to be included in the EIS is the evaluation of significance of all potential natural heritage features and areas recognized by In-force London Plan policies and/ or Official Plan policies.

A component of a Subject Lands Status Report that is required to be included in the EIS is the confirmation and mapping of boundaries of all natural heritage features and areas.

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

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Earth Science ANSI

2.4 Habitat of Species-At-Risk (SAR)

Endangered

Threatened

Vulnerable / Special Concern

2.5 Woodlands and Vegetation Patches

Significant Woodlands

Unevaluated Vegetation Patches and/ or other 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

Relationships between species and communities

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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

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4.0 ADDITIONAL COMPONENTS AND NOTES

- EIS to show and demonstrate conformity with the Provincial Policy Statement (2020), in-force London Plan (as of Nov. 2019) policies, and current Official Plan policies (1989), Environmental Management Guidelines (2006).

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APPENDIX B
Correspondence

DRAFT

From: Peter De Carvalho
To: Karen Reis
Cc: Robyn Leppington
Subject: FW: [External] RE: SAR Information Request - Central London Sites MECP
Date: September 14, 2021 11:13:21 AM
Attachments: image001.png
image002.png
image003.png

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

MATRIX SOLUTIONS INC.
Environment & Engineering
650 Woodlawn Rd W Unit 7B, Guelph, ON N1K 1B8
D 226.314.1926 **C** 226.332.4392
www.matrix-solutions.com

2019 Canada's Greenest Employers

From: Species at Risk (MECP) <SAROntario@ontario.ca>
Sent: August 27, 2021 4:40 PM
To: Peter De Carvalho <pdecarvalho@matrix-solutions.com>
Subject: [External] RE: SAR Information Request - Central London Sites

Hello Peter,

RE: Species at Risk Data Request – City of London Wastewater Treatment Plants

I apologize for the delay in response. The Ministry of the Environment, Conservation and Parks (MECP) understands that Matrix Solutions Inc. is conducting natural heritage studies for lands associated with the Greenway Wastewater Treatment Centre and the Adelaide Wastewater Treatment Plant in the City of London, as identified in the information provided.

An initial species at risk (SAR) information screening has been completed under the *Endangered Species Act, 2007* (ESA) by MECP's Species at Risk Branch (SARB) for the above-noted project location with respect to endangered and threatened species in Ontario. The following species at risk, in addition to the species identified in the Matrix memo, are known to occur in the general area of the project and should be considered in any assessment of potential impacts to SAR and/or habitat:

Greenway Wastewater Treatment Centre

- Red Mulberry (endangered) – receives species and general habitat protection.
- Round Pigtoe (endangered) – receives species and general habitat protection.
- Kentucky Coffee-tree (threatened) – receives species and general habitat protection.

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Adelaide Wastewater Treatment Plant

- Kentucky Coffee-tree (threatened) – receives species and general habitat protection.
- Red-headed Woodpecker – this species is currently listed as special concern but will be up-listed to endangered in 2022, which will trigger species and habitat protection.

Please note that this is an initial screening for endangered and threatened 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 Ontario's 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.

The position of SARB is based on the information that has been provided by you on behalf of the proponent. Should information not have been made available and considered in our review, or new information comes to light, or if on-site conditions and circumstances change, please contact SARB as soon as possible (SAROntario@ontario.ca) to discuss next steps.

Regards,

Kathryn Markham
Management Biologist
Permissions and Compliance Section, Species at Risk Branch
Ministry of the Environment, Conservation and Parks

From: Peter De Carvalho <pdecarvalho@matrix-solutions.com>
Sent: May 12, 2021 6:42 PM
To: Species at Risk (MECP) <SAROntario@ontario.ca>
Subject: SAR Information Request - Central London Sites

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

Hi there,

We're currently conducting a natural heritage background review for lands adjacent to the Thames River in London, Ontario. We've completed a background review using LIO, NHIC, iNaturalist, eBird, the OBBA, ORAA, and the Ontario Butterfly Atlas and carried out a preliminary desktop analysis based on the MNRF Natural Heritage Information Request Guide.

At this time we're requesting any additional SAR information from MECP records to evaluate constraints on and adjacent to these properties.

The two sites are the lands within 50 m of two wastewater treatment plants. The first is Greenway Wastewater Treatment Centre (109 Greenside Ave, London, ON N6J 2X5)

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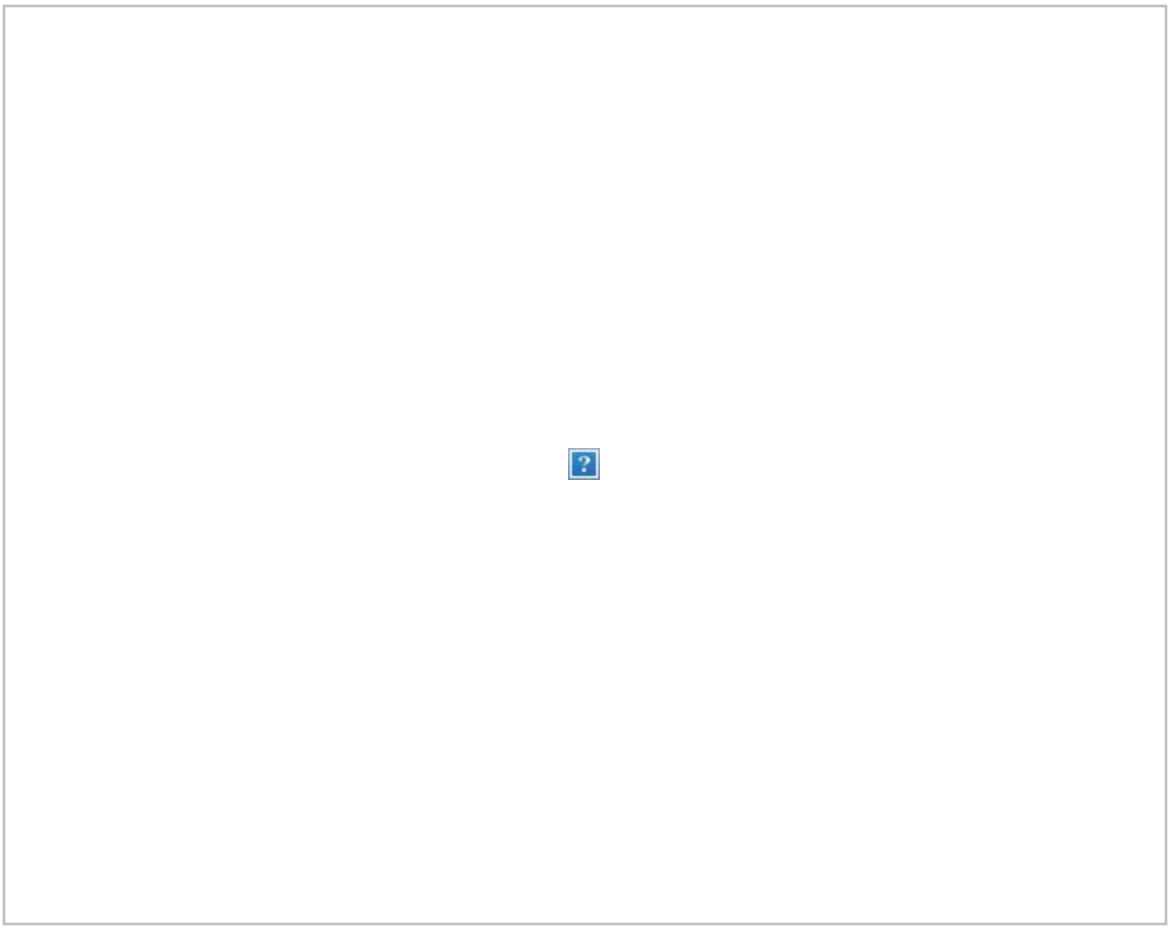
And the second is the Adelaide Wastewater Treatment Plant (1153 Adelaide St N #0B1, London, ON N5Y 2N4)



We have identified the following species as potentially present within our study areas:

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Common Name	Scientific Name	ESA	SARA
Birds			
Bank Swallow	Riparia riparia	THR	THR
Barn Swallow	Hirundo rustica	THR	THR
Bobolink	Dolichonyx oryzivorus	THR	THR
Chimney Swift	Chaetura pelagica	THR	THR
Common Nighthawk	Contopus virens	SC	SC
Eastern Meadowlark	Sturnella magna	THR	THR
Eastern Wood-pewee	Contopus virens	SC	SC
Wood Thrush	Hylocichla mustelina	SC	THR
Aquatic			
Black Redhorse	Moxostoma duquesnei	THR	THR
Lake Sturgeon	Acipenser fulvescens pop 3	END	THR
Silver Shiner	Notropis photogenis	THR	THR
Wavy-rayed Lampmussel	Lampsilis fasciola	THR	SC
Rayed Bean	Villosa fabalis	END	END
Spotted Sucker	Minytrema melanops	SC	SC
Reptiles			
Blanding's Turtle	emydoidea blandingii	END	END
Eastern Foxsnake	Pantherophis vulpinus	END	END
Eastern Hog-nosed Snake	Heterodon platirhinos	THR	THR
Northern Map Turtle	Graptemys geographica	SC	SC
Queensnake	Regina septemvittata	END	END
Snapping Turtle	Chelydra serpentina	SC	SC
Spiny Softshell	Apalone spinifera	END	END
Invertebrates			
Monarch	Danaus plexippus	SC	SC
Mammals			
American Badger	Taxidea taxus jacksoni	END	END
Flora			
Broad Beech Fern	Phegopteris hexagonoptera	SC	SC
Butternut	Juglans cinerea	END	END

Any information you can provide regarding the natural heritage of the area and potential presence of additional SAR, SCC, or SWH would be greatly appreciated.

Thanks so much for your time,

Peter

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

DRAFT

MATRIX SOLUTIONS INC.

Environment & Engineering

650 Woodlawn Rd W Unit 7B, Guelph, ON N1K 1B8

D 226.314.1926 **C** 226.332.4392

www.matrix-solutions.com

2019 Canada's Greenest Employers

DRAFT

From: Peter De Carvalho
To: Karen Reis
Cc: Robyn Leppington
Subject: FW: [External] FW: Natural Heritage/SWH Information Request - Central London Sites MNRF
Date: September 14, 2021 11:14:57 AM
Attachments: image001.png
image002.png
image003.png

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

MATRIX SOLUTIONS INC.
Environment & Engineering
650 Woodlawn Rd W Unit 7B, Guelph, ON N1K 1B8
D 226.314.1926 **C** 226.332.4392
www.matrix-solutions.com

2019 Canada's Greenest Employers

From: Webb, Jason (MNRF) <Jason.Webb@ontario.ca>
Sent: June 9, 2021 8:57 AM
To: Peter De Carvalho <pdecarvalho@matrix-solutions.com>
Subject: [External] FW: Natural Heritage/SWH Information Request - Central London Sites

Hello Peter,

Thank you for sending an email to the Ministry of Natural Resources and Forestry (MNRF) nrisc@ontario.ca email requesting background information for the wastewater treatment plants in London.

Please circulate any future related projects within the MNRF Aylmer District geography to MNRF.Ayl.Planners@ontario.ca.

As requested, please see the following information as it pertains to each site:

Greenway Wastewater Treatment Centre:

- In the event work needs to take place in the river, no in-water work should occur between **March 15 – July 15** to protect spawning fish
- The project is not located within proximity to a Provincially Significant Wetland Complex
- The project is not located within proximity to a provincially significant ANSI
- No known Significant Wildlife Habitat

Adelaide Wastewater Treatment Plant

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- In the event work needs to take place in the river, no in-water work should occur between **March 15 – July 15** to protect spawning fish
- The project is not located within proximity to a Provincially Significant Wetland Complex
- The project is not located within proximity to a provincially significant ANSI
- No Known Significant Wildlife Habitat

The Ministry of Environment, Conservation and Parks (MECP) has now assumed responsibility for the Endangered Species Act (ESA), including species at risk (SAR) in Ontario. All future correspondence related to ESA or SAR should be sent to SAROntario@ontario.ca to reach the MECP directly.

Please let me know directly if you have any additional questions or require clarification.

Thanks,

Jason Webb
Management Biologist
Ministry of Natural Resources and Forestry
Aylmer District
226-559-4906
Jason.webb@ontario.ca

Please Note: As part of providing accessible customer service, please let me know if you have any accommodation needs or require communication supports or alternate formats.

From: Peter De Carvalho <pdecarvalho@matrix-solutions.com>
Sent: Wednesday, May 12, 2021 6:47 PM
To: NRISC (MNRF) <NRISC@ontario.ca>
Subject: Natural Heritage/SWH Information Request - Central London Sites

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

Hi there,

We're currently conducting a natural heritage background review for lands adjacent to the Thames River in London, Ontario. We've completed a background review using LIO, NHIC, iNaturalist, eBird, the OBBA, ORAA, and the Ontario Butterfly Atlas and carried out a preliminary desktop analysis based on the MNRF Natural Heritage Information Request Guide.

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At this time we're requesting any additional natural heritage information (wetland assessments, SWH, other natural heritage features) from MNRF records to evaluate constraints on and adjacent to these properties.

The two sites are the lands within 50 m of two wastewater treatment plants. The first is Greenway Wastewater Treatment Centre (109 Greenside Ave, London, ON N6J 2X5)

And the second is the Adelaide Wastewater Treatment Plant (1153 Adelaide St N #0B1, London, ON N5Y 2N4)

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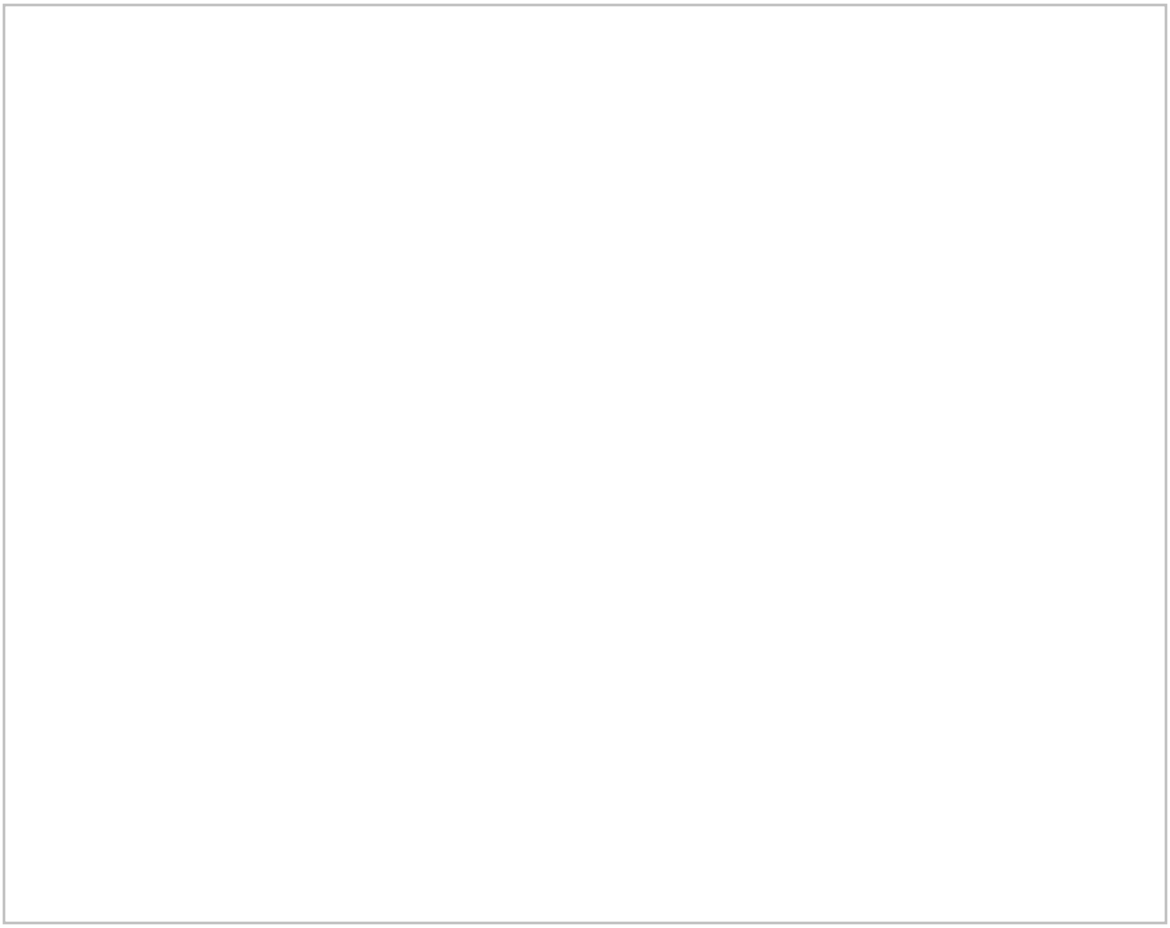

Any information you can provide for these sites would be greatly appreciated.

Thanks for your help,

Peter

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

MATRIX SOLUTIONS INC.
Environment & Engineering
650 Woodlawn Rd W Unit 7B, Guelph, ON N1K 1B8
D 226.314.1926 **C** 226.332.4392
www.matrix-solutions.com

2019 Canada's Greenest Employers

DRAFT

From:	Peter De Carvalho
To:	Karen Reis
Cc:	Robyn Leppington
Subject:	FW: [External] Information Request - Greenway and Adelaide WWTP, London UTRCA
Date:	September 14, 2021 11:14:33 AM
Attachments:	IMAGE.png IMAGE.png IMAGE.png Greenway - regulations mapping.pdf Greenway - mussel records.pdf Greenway - fish records.pdf Greenway - benthic records.pdf Adelaide WTF - regulations mapping.pdf Adelaide WTP - fish records.pdf Adelaide WTP - benthic records.pdf image002.jpg

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Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

MATRIX SOLUTIONS INC.
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650 Woodlawn Rd W Unit 7B, Guelph, ON N1K 1B8
D 226.314.1926 **C** 226.332.4392
www.matrix-solutions.com

2019 Canada's Greenest Employers

From: Cari Ramsey <ramseyc@thamesriver.on.ca>
Sent: June 1, 2021 12:44 PM
To: Peter De Carvalho <pdecarvalho@matrix-solutions.com>
Cc: Brent Verscheure <VerscheureB@thamesriver.on.ca>; Robyn Leppington <rleppington@matrix-solutions.com>
Subject: [External] Information Request - Greenway and Adelaide WWTP, London

Hi Peter;

Attached is the information we have for the two WWTPs noted above:

Greenway
1. fish, mussel, and benthic records are attached
2. regulations mapping attached
3. ESA are present within 1km of the subject property - MNRF should be contacted for most up to date information
4, SARA species are present within 1km of the subject property - DFO should be contacted for most up to date information
5. Please note that we have records of some species at risk snakes and turtle in the area. Please brief all staff/contractors to be aware of the potential presence of these species when working with heavy machinery to ensure they avoid any juveniles and adults that may be inhabitating the area
6. Watercourses in the area are warm water, therefore in-water work can be done between July 1 - March 15.

Adelaide

DRAFT

1. fish and benthic records attached. There are no mussel records for that area.
2. regulations mapping attached
3. ESA are present within 1km of the subject property - MNRF should be contacted for most up to date information
4, SARA species are present within 1km of the subject property - DFO should be contacted for most up to date information
5. Please note that we have records of some species at risk snakes and turtle in the area. Please brief all staff/contractors to be aware of the potential presence of these species when working with heavy machinery to ensure they avoid any juveniles and adults that may be inhabitating the area
6. Watercourses in the area are warm water, therefore in-water work can be done between July 1 - March 15.

If you have any additional information you need please let me know.

Thanks!
Cari

Cari Ramsey
Environmental Regulations Technician/ Health and Safety Specialist
UTRCA
1424 Clarke Side Road
London, ON
N5V 5B9
(519)451-2800 ext. 289
ramseyc@thamesriver.on.ca
>>> Brent Verscheure 5/13/2021 11:55 AM >>>
Thank you for your inquiry and data request, Peter.
UTRCA staff will compile data and provide to you at our earliest opportunity.

Please be patient as this data request may take up to 3 weeks.

Regards,

Brent Verscheure
Land Use Regulations Officer
1424 Clarke Rd, London, ON N5V 5B9
Tel: 519-451-2800 Ext. 318
Email:verscheureb@thamesriver.on.ca
Web:www.thamesriver.on.ca

All UTRCA offices and buildings are closed to the public to help protect the public and staff from COVID-19. I am working remotely during this time and will be monitoring all messages and emails. We apologize for any inconvenience this may cause.

>>> Peter De Carvalho <pdecarvalho@matrix-solutions.com> 5/12/2021 7:04 PM >>>
Mr. Verscheure,

We're currently conducting a natural heritage background review for lands adjacent to the Thames River in London, Ontario in the vicinity of the Adelaide and Greenway wastewater treatment plants.

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We've completed our preliminary desktop review and are now reaching out to request any available aquatic data (fish and mussel species, benthic invertebrates, water quality data *etc*.), terrestrial/wetland data (turtles, amphibians, vegetation assemblies, confirmed or candidate significant wildlife habitats, other records of species of conservation concern, *etc*.) and any information or data available for the Huron Street Woods to the south and west of the Adelaide site.

As mentioned, the two sites encompass the lands within the vicinity (appx 120 m) of two wastewater treatment plants. The first is Greenway Wastewater Treatment Centre (109 Greenside Ave, London, ON N6J 2X5)

And the second is the Adelaide Wastewater Treatment Plant (1153 Adelaide St N #0B1, London, ON N5Y 2N4)

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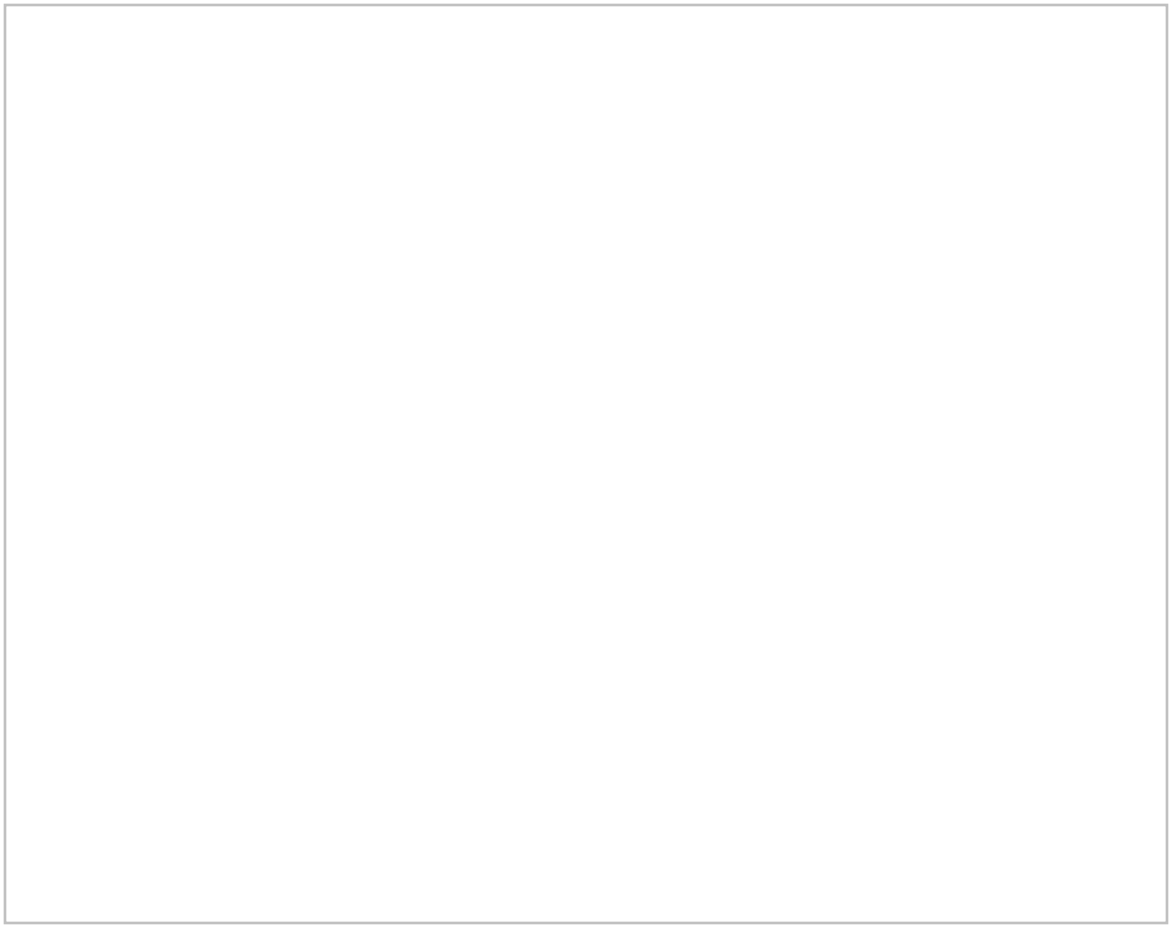

Any information you can provide for these sites would be greatly appreciated.

Thanks very much for your help,

Peter

Peter De Carvalho, M.Sc., EIT.
Restoration Specialist

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DRAFT

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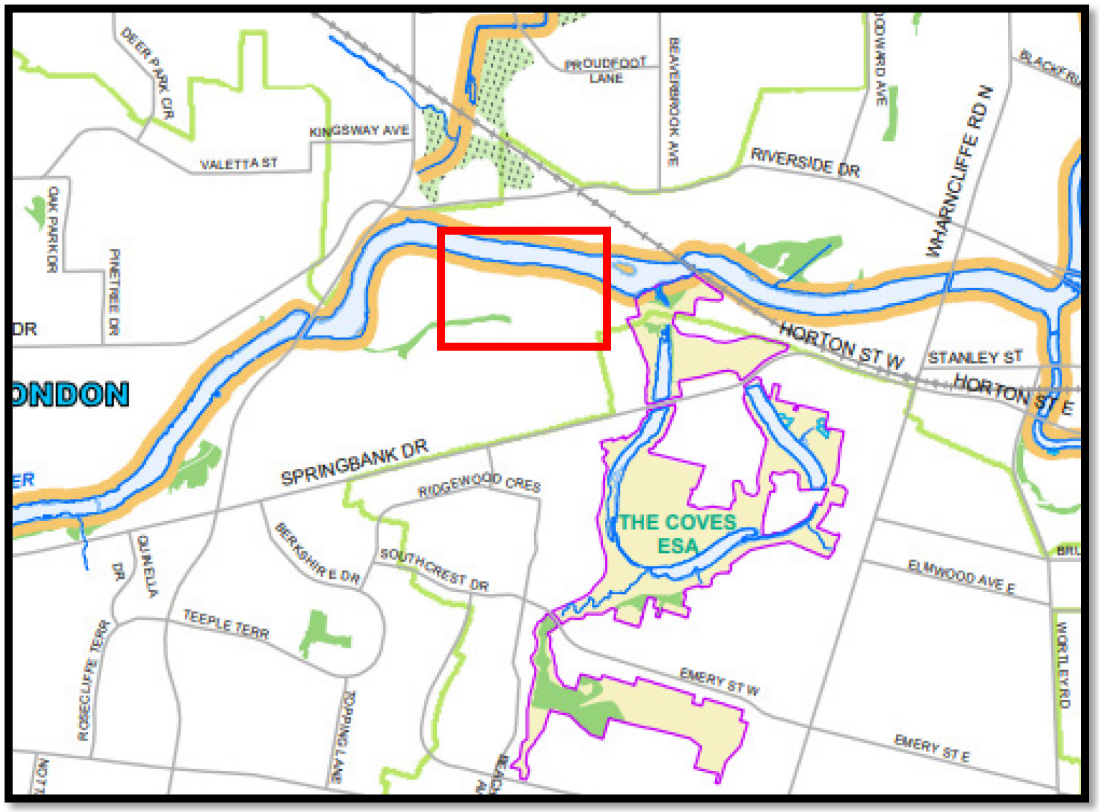
APPENDIX C
Background Data

APPENDIX C

CITY OF LONDON OFFICIAL PLAN MAPPING

Greenway Study Area
Map 5 – Natural Heritage



LEGEND

NATURAL HERITAGE SYSTEM

- Provincially Significant Wetlands
- Wetlands
- Unevaluated Wetlands
- Significant Woodlands
- Woodlands
- Significant Valleylands
- Valleylands
- Areas of Natural and Scientific Interest
- Environmentally Significant Areas (ESA) (NAME)
- Potential ESAs
- Upland Corridors
- Potential Naturalization Areas
- Unevaluated Vegetation Patches

BASE MAP FEATURES

- Streets (See Map 3)
- Railways
- Urban Growth Boundary
- Water Courses/Ponds
- Water Bodies
- Conservation Authority Boundary
- Subwatershed Boundary
- STONEY CREEK Subwatershed Name

DRAFT

TABLE C1 Natural Heritage Information Centre - Species Results for Greenway

OGF ID	Element Type	Common Name	Scientific Name	S-Rank	SARO Status	COSEWIC Status	ATLAS NAD83 IDENT
870202	NATURAL AREA	Thames River					17MH7658
870202	SPECIES	Silver Shiner	Notropis photogenis		THR	THR	17MH7658
870202	SPECIES	Mucket	Actinonaias ligamentina				17MH7658
870202	SPECIES	Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	Acipenser fulvescens pop. 3		THR	THR	17MH7658
870202	SPECIES	Hairy-fruited Sedge	Carex trichocarpa				17MH7658
870202	SPECIES	American Badger (Southwestern Ontario population)	Taxidea taxus jacksoni		END	END	17MH7658
870202	SPECIES	Spiny Softshell	Apalone spinifera		END	END	17MH7658
870202	SPECIES	Edible Valerian	Valeriana edulis				17MH7658
870202	SPECIES	Eastern Green-violet	Hybanthus concolor				17MH7658
870202	SPECIES	Eastern Stiff-leaved Goldenrod	Solidago rigida ssp. rigida				17MH7658
870202	SPECIES	Eastern Meadowlark	Sturnella magna		THR	THR	17MH7658
870202	SPECIES	Broad Beech Fern	Phegopteris hexagonoptera		SC	SC	17MH7658
870202	SPECIES	Northern Map Turtle	Graptemys geographica		SC	SC	17MH7658
870202	SPECIES	Snapping Turtle	Chelydra serpentina		SC	SC	17MH7658
870201	NATURAL AREA	Thames River					17MH7657
870201	SPECIES	Silver Shiner	Notropis photogenis		THR	THR	17MH7657
870201	SPECIES	Mucket	Actinonaias ligamentina				17MH7657
870201	SPECIES	Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	Acipenser fulvescens pop. 3		THR	THR	17MH7657
870201	SPECIES	American Badger (Southwestern Ontario population)	Taxidea taxus jacksoni		END	END	17MH7657
870201	SPECIES	Spiny Softshell	Apalone spinifera		END	END	17MH7657
870201	SPECIES	Edible Valerian	Valeriana edulis				17MH7657
870201	SPECIES	Eastern Stiff-leaved Goldenrod	Solidago rigida ssp. rigida				17MH7657
870201	SPECIES	Eastern Meadowlark	Sturnella magna		THR	THR	17MH7657
870201	SPECIES	Broad Beech Fern	Phegopteris hexagonoptera		SC	SC	17MH7657
870201	SPECIES	Northern Map Turtle	Graptemys geographica		SC	SC	17MH7657
870201	SPECIES	Snapping Turtle	Chelydra serpentina		SC	SC	17MH7657
870212	NATURAL AREA	Thames River					17MH7758
870212	SPECIES	Silver Shiner	Notropis photogenis		THR	THR	17MH7758
870212	SPECIES	Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	Acipenser fulvescens pop. 3		THR	THR	17MH7758
870212	SPECIES	Hairy-fruited Sedge	Carex trichocarpa				17MH7758
870212	SPECIES	Spiny Softshell	Apalone spinifera		END	END	17MH7758
870212	SPECIES	Edible Valerian	Valeriana edulis				17MH7758
870212	SPECIES	Midland Painted Turtle	Chrysemys picta marginata			SC	17MH7758
870212	SPECIES	Eastern Stiff-leaved Goldenrod	Solidago rigida ssp. rigida				17MH7758
870212	SPECIES	Eastern Meadowlark	Sturnella magna		THR	THR	17MH7758
870212	SPECIES	Broad Beech Fern	Phegopteris hexagonoptera		SC	SC	17MH7758
870212	SPECIES	Wood Thrush	Hylocichla mustelina		SC	THR	17MH7758
870212	SPECIES	Northern Map Turtle	Graptemys geographica		SC	SC	17MH7758
870212	SPECIES	Snapping Turtle	Chelydra serpentina		SC	SC	17MH7758
870211	NATURAL AREA	THE COVES					17MH7757
870211	SPECIES	Hairy-fruited Sedge	Carex trichocarpa				17MH7757
870211	SPECIES	Chinese Hemlock-parsley	Conioselinum chinense				17MH7757
870211	SPECIES	Spiny Softshell	Apalone spinifera		END	END	17MH7757
870211	SPECIES	Edible Valerian	Valeriana edulis				17MH7757
870211	SPECIES	Midland Painted Turtle	Chrysemys picta marginata			SC	17MH7757
870211	SPECIES	Eastern Stiff-leaved Goldenrod	Solidago rigida ssp. rigida				17MH7757
870211	SPECIES	Chimney Swift	Chaetura pelagica		THR	THR	17MH7757
870211	SPECIES	Eastern Meadowlark	Sturnella magna		THR	THR	17MH7757
870211	SPECIES	Broad Beech Fern	Phegopteris hexagonoptera		SC	SC	17MH7757
870211	SPECIES	Wood Thrush	Hylocichla mustelina		SC	THR	17MH7757
870211	SPECIES	Butternut	Juglans cinerea		END	END	17MH7757
870211	RESTRICTED SPECIES	Restricted Species	Restricted Species				17MH7757

OGF - Ontario Geospacial Feature
SARO - Species at Risk in Ontario
COSEWIC - Committee on the Status of Endangered Wildlife in Canada
THR - threatened
END - endangered
SC - special concern

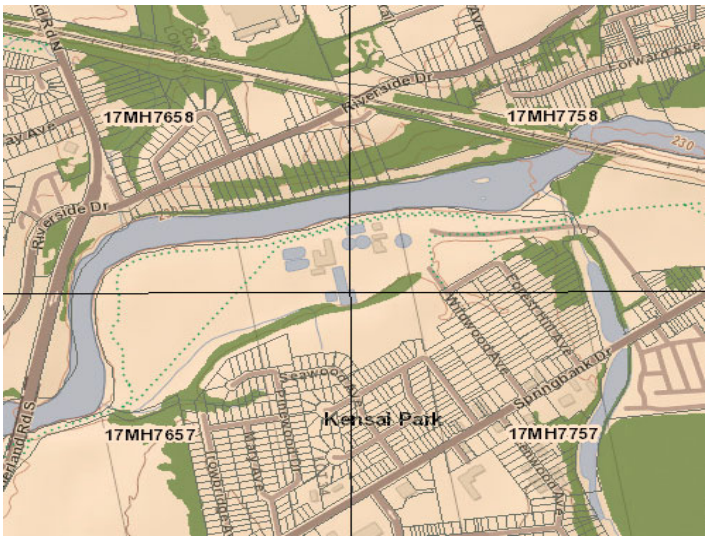


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TABLE C2 Ontario Reptile and Amphibian Atlas - Species Results for 17MH75

Species No.	Common Name	No. of Records	Earliest Year	Latest Year
1	Blanding's Turtle	1	1965	1965
3	Midland Painted Turtle	30	1964	2019
4	Northern Map Turtle	40	1988	2018
5	Red-eared Slider	3	2011	2017
6	Snapping Turtle	29	1965	2019
10	Dekay's Brownsnake	7	1964	2013
11	Eastern Foxsnake	1	2011	2011
12	Eastern Gartersnake	36	1929	2018
13	Eastern Hog-nosed Snake	9	1955	2017
18	Milksnake	12	1964	2019
19	Northern Watersnake	2	1990	1990
20	Queensnake	1	1990	1990
24	Smooth Greensnake	2	1957	1964
25	American Bullfrog	3	1996	2013
27	Gray Treefrog	42	1956	2018
28	Green Frog	80	1956	2018
30	Northern Leopard Frog	26	1956	2017
31	Pickerel Frog	3	1956	2013
32	Spring Peeper	114	1955	2017
33	Western Chorus Frog	21	1996	2017
34	Wood Frog	20	1929	2015
35	American Toad	88	1956	2019
40	Red-spotted Newt	5	1955	2018
41	Eastern Red-backed Salamander	22	1929	2015
42	Four-toed Salamander	1	1935	1935
48	Spotted Salamander	4	1954	2018

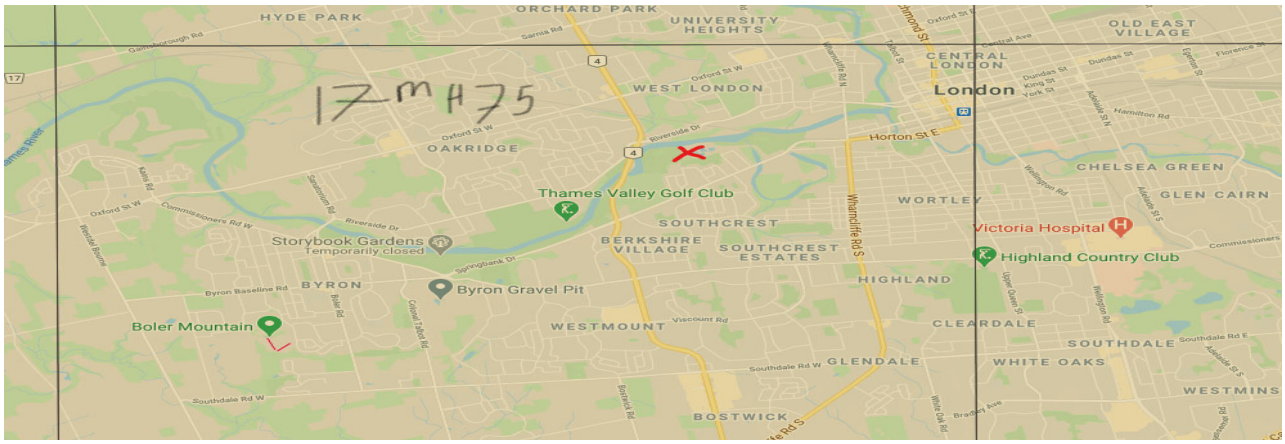

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TABLE C3 Ontario Butterfly Atlas - Species Results for 17MH75

Species No.	Common Name	Scientific Name	No. of Records	Earliest in Year (Adults)	Latest in Year (Adults)	Earliest Year	Latest Year
88	Acadian Hairstreak	Satyrium acadica	1	10-Jul	10-Jul	1910	1910
8	Sleepy Duskywing	Erynnis brizo	1	24-May	24-May	1969	1969
130	Silvery Checkerspot	Chlosyne nycteis	1	06-Jun	06-Jun	1990	1990
63	Mustard White	Pieris oleracea	1	06-Jun	06-Jun	2015	2015
124	Silver-bordered Fritillary	Boloria selene	1	06-Jun	06-Jun	2015	2015
152	Hackberry Emperor	Asterocampa celtis	1	25-Jul	25-Jul	2015	2015
33	Long Dash Skipper	Polites mystic	1	27-Jun	27-Jun	2016	2016
155	Eyed Brown	Lethe eurydice	1	27-Jun	27-Jun	2016	2016
104	Gray Hairstreak	Strymon melinus	1	21-Oct	21-Oct	2017	2017
70	Orange Sulphur	Colias eurytheme	1	28-Jul	28-Jul	2018	2018
141	Gray Comma	Polygonia progne	1	12-Jul	12-Jul	2018	2018
36	Little Glassywing	Pompeius verna	1	08-Jul	08-Jul	2019	2019
110	Summer Azure	Celastrina neglecta	1	03-Aug	03-Aug	2019	2019
7	Dreamy Duskywing	Erynnis icelus	2	24-May	23-Jun	1907	1969
125	Meadow Fritillary	Boloria bellona	2	22-May	01-Jul	1965	2014
144	Milbert's Tortoiseshell	Aglais milberti	2	27-Jun	07-Sep	1964	2016
40	Hobomok Skipper	Poanes hobomok	2	02-Jun	03-Jun	1906	2018
60	Spicebush Swallowtail	Papilio troilus	2	19-Aug	19-Aug	2018	2018
38	Delaware Skipper	Anatrytone logan	2	01-Jul	08-Jul	2014	2019
148	Common Buckeye	Junonia coenia	2	12-Jul	28-Oct	2012	2019
145	American Lady	Vanessa virginiensis	2	18-Apr	16-Sep	2016	2019
154	Northern Pearly-Eye	Lethe anthedon	2	02-Jul	05-Jul	2016	2019
117	American Snout	Libytheana carinenta	2	05-Jul	28-Jul	2017	2019
15	Wild Indigo Duskywing	Erynnis baptisiae	2	31-Jul	02-Sep	2018	2019
156	Appalachian Brown	Lethe appalachia	2	17-Jun	29-Jun	2018	2019
9	Juvenal's Duskywing	Erynnis juvenalis	3	23-May	27-May	1908	1975
153	Tawny Emperor	Asterocampa clyton	3	01-Jul	09-Jul	1968	2014
31	Tawny-edged Skipper	Polites themistocles	3	03-Jun	10-Jul	2014	2019
35	Northern Broken-Dash	Wallengrenia egeremet	3	01-Jul	28-Jul	2014	2019
119	Great Spangled Fritillary	Speyeria cybele	3	29-Jun	10-Jul	2014	2019
23	Least Skipper	Ancyloxypha numitor	3	24-Jun	10-Aug	2016	2019
159	Common Wood-Nymph	Cercyonis pegala	3	05-Jul	15-Jul	2016	2019
47	Dun Skipper	Euphyes vestris	4	01-Jul	09-Aug	2014	2018
135	Baltimore Checkerspot	Euphydryas phaeton	4	27-Jun	07-Jul	1968	2019
91	Banded Hairstreak	Satyrium calanus	4	14-Jul	25-Jul	1869	2019
136	Question Mark	Polygonia interrogationis	5	01-Jul	18-Aug	2014	2019
132	Pearl Crescent	Phyciodes tharos	6	19-Jun	24-Aug	2013	2019
151	Viceroy	Limenitis archippus	6	29-Jun	15-Sep	2016	2019
82	American Copper	Lycaena phlaeas	7	31-May	17-Sep	1908	1920
58	Eastern Tiger Swallowtail	Papilio glaucus	7	06-Jun	25-Aug	2012	2019
146	Painted Lady	Vanessa cardui	8	18-Apr	09-Oct	2012	2019
150	Red-spotted Purple	Limenitis arthemis astyanax	8	01-Jul	14-Aug	1911	2019
25	European Skipper	Thymelicus lineola	9	22-Jun	10-Jul	2014	2019
157	Little Wood-Satyr	Megisto cymela	9	06-Jun	31-Jul	2014	2019
1	Silver-spotted Skipper	Epargyreus clarus	9	05-Jul	22-Sep	2017	2019
30	Peck's Skipper	Polites peckius	10	28-Jul	04-Sep	2012	2019
107	Eastern Tailed Blue	Cupido comyntas	11	01-Jun	08-Sep	1964	2019
69	Clouded Sulphur	Colias philodice	11	10-Jul	12-Oct	2014	2019
57	Eastern Giant Swallowtail	Papilio cresphontes	11	28-Jul	17-Sep	1893	2019
111	Azure sp.	Celastrina sp.	12	19-Apr	29-Aug	1963	2019
143	Mourning Cloak	Nymphalis antiopa	12	27-Mar	21-Oct	1985	2019
158	Common Ringlet	Coenonympha tullia	12	02-Jun	07-Sep	2015	2019
147	Red Admiral	Vanessa atalanta	15	10-Apr	22-Sep	2012	2019
133	Northern Crescent	Phyciodes cocyta	16	16-Jun	13-Sep	2014	2019
55	Black Swallowtail	Papilio polyxenes	16	15-May	28-Aug	2016	2019
137	Eastern Comma	Polygonia comma	17	05-Apr	30-Oct	1967	2019
96	Brown Elfin	Callophrys augustinus	21	23-Apr	06-Jun	1908	2014
85	Bog Copper	Lycaena epixanthe	23	08-Jun	24-Sep	1910	2019
167	Monarch	Danaus plexippus	29	25-May	09-Oct	2012	2019
65	Cabbage White	Pieris rapae	41	27-Mar	17-Sep	1999	2019

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TABLE C4 Ontario Breeding Bird Atlas - Species List for Square 17MH75

Region	Square	Species	Breeding Evidence			
			Max BE	Categ	#Sq	Atlasser Name
4	17MH75	Canada Goose	FY	CONF	1	Betsy Baldwin
4	17MH75	Wood Duck	FY	CONF	1	Betsy Baldwin
4	17MH75	Mallard	FY	CONF	1	2 atlassers
4	17MH75	Hooded Merganser	FY	CONF	1	Peter A Read
4	17MH75	Ruffed Grouse	S	POSS	1	Betsy Baldwin
4	17MH75	Wild Turkey	FY	CONF	1	Brad T. McLeod
4	17MH75	Great Blue Heron	H	POSS	1	Dave Martin
4	17MH75	Green Heron	FY	CONF	1	Betsy Baldwin
4	17MH75	Turkey Vulture	FY	CONF	1	Betsy Baldwin
4	17MH75	Sharp-shinned Hawk	AE	CONF	1	Betsy Baldwin
4	17MH75	Cooper's Hawk	AE	CONF	1	Betsy Baldwin
4	17MH75	Red-tailed Hawk	NY	CONF	1	Betsy Baldwin
4	17MH75	American Kestrel	D	PROB	1	Betsy Baldwin
4	17MH75	Virginia Rail	P	PROB	1	Betsy Baldwin
4	17MH75	Sora	T	PROB	1	Betsy Baldwin
4	17MH75	Killdeer	NE	CONF	1	Betsy Baldwin
4	17MH75	Rock Pigeon	AE	CONF	1	Betsy Baldwin
4	17MH75	Spotted Sandpiper	P	PROB	1	Betsy Baldwin
4	17MH75	American Woodcock	H	POSS	1	Betsy Baldwin
4	17MH75	Mourning Dove	FY	CONF	1	Betsy Baldwin
4	17MH75	Yellow-billed Cuckoo	H	POSS	1	Betsy Baldwin
4	17MH75	Black-billed Cuckoo	S	POSS	1	EarthQuest Canada
4	17MH75	Eastern Screech-Owl	FY	CONF	1	EarthQuest Canada
4	17MH75	Great Horned Owl	NY	CONF	1	Betsy Baldwin
4	17MH75	Common Nighthawk	P	PROB	1	Betsy Baldwin
4	17MH75	Chimney Swift	AE	CONF	1	Betsy Baldwin
4	17MH75	Ruby-throated Hummingbird	T	PROB	1	Betsy Baldwin
4	17MH75	Belted Kingfisher	T	PROB	1	2 atlassers
4	17MH75	Red-bellied Woodpecker	CF	CONF	1	Betsy Baldwin
4	17MH75	Yellow-bellied Sapsucker	D	PROB	1	Betsy Baldwin
4	17MH75	Downy Woodpecker	NY	CONF	1	EarthQuest Canada
4	17MH75	Hairy Woodpecker	FY	CONF	1	Betsy Baldwin
4	17MH75	Northern Flicker	NY	CONF	1	EarthQuest Canada
4	17MH75	Eastern Wood-Pewee	S	POSS	1	3 atlassers
4	17MH75	Willow Flycatcher	S	POSS	1	Dave Martin
4	17MH75	Least Flycatcher	S	POSS	1	Betsy Baldwin
4	17MH75	Eastern Phoebe	NY	CONF	1	Betsy Baldwin
4	17MH75	Great Crested Flycatcher	FY	CONF	1	Betsy Baldwin
4	17MH75	Eastern Kingbird	FY	CONF	1	Betsy Baldwin
4	17MH75	Warbling Vireo	CF	CONF	1	Betsy Baldwin
4	17MH75	Red-eyed Vireo	NU	CONF	1	Betsy Baldwin
4	17MH75	Blue Jay	CF	CONF	1	EarthQuest Canada
4	17MH75	American Crow	NY	CONF	1	Betsy Baldwin
4	17MH75	Horned Lark	T	PROB	1	Dave Martin
4	17MH75	Purple Martin	H	POSS	1	Betsy Baldwin
4	17MH75	Tree Swallow	CF	CONF	1	Betsy Baldwin
4	17MH75	Northern Rough-winged Swallow	CF	CONF	1	Betsy Baldwin
4	17MH75	Bank Swallow	AE	CONF	1	Betsy Baldwin
4	17MH75	Cliff Swallow	AE	CONF	1	Betsy Baldwin
4	17MH75	Barn Swallow	NE	CONF	1	Ryan Zimmerling
4	17MH75	Black-capped Chickadee	NY	CONF	1	Betsy Baldwin
4	17MH75	Red-breasted Nuthatch	CF	CONF	1	Betsy Baldwin
4	17MH75	White-breasted Nuthatch	FY	CONF	1	Betsy Baldwin
4	17MH75	Carolina Wren	FY	CONF	1	Betsy Baldwin
4	17MH75	House Wren	NE	CONF	1	Betsy Baldwin
4	17MH75	Blue-gray Gnatcatcher	AE	CONF	1	Betsy Baldwin
4	17MH75	Eastern Bluebird	NY	CONF	1	Betsy Baldwin
4	17MH75	Veery	S	POSS	1	Betsy Baldwin
4	17MH75	Wood Thrush	T	PROB	1	Betsy Baldwin
4	17MH75	American Robin	NY	CONF	1	Betsy Baldwin
4	17MH75	Gray Catbird	AE	CONF	1	Betsy Baldwin
4	17MH75	Brown Thrasher	NY	CONF	1	Betsy Baldwin

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4	17MH75	European Starling	NY	CONF	1	Betsy Baldwin
4	17MH75	Cedar Waxwing	CF	CONF	1	Betsy Baldwin
4	17MH75	Blue-winged Warbler	T	PROB	1	Betsy Baldwin
4	17MH75	Yellow Warbler	CF	CONF	1	Betsy Baldwin
4	17MH75	Chestnut-sided Warbler	H	POSS	1	Betsy Baldwin
4	17MH75	Pine Warbler	T	PROB	1	Betsy Baldwin
4	17MH75	American Redstart	S	POSS	1	Betsy Baldwin
4	17MH75	Common Yellowthroat	CF	CONF	1	Betsy Baldwin
4	17MH75	Eastern Towhee	T	PROB	1	Betsy Baldwin
4	17MH75	Chipping Sparrow	CF	CONF	1	Betsy Baldwin
4	17MH75	Field Sparrow	B	PROB	1	Betsy Baldwin
4	17MH75	Vesper Sparrow	P	PROB	1	Betsy Baldwin
4	17MH75	Savannah Sparrow	CF	CONF	1	Betsy Baldwin
4	17MH75	Song Sparrow	NE	CONF	1	EarthQuest Canada
4	17MH75	Swamp Sparrow	S	POSS	1	Betsy Baldwin
4	17MH75	Scarlet Tanager	S	POSS	1	Betsy Baldwin
4	17MH75	Northern Cardinal	FY	CONF	1	Betsy Baldwin
4	17MH75	Rose-breasted Grosbeak	FY	CONF	1	Betsy Baldwin
4	17MH75	Indigo Bunting	FY	CONF	1	Betsy Baldwin
4	17MH75	Bobolink	T	PROB	1	Betsy Baldwin
4	17MH75	Red-winged Blackbird	NE	CONF	1	Betsy Baldwin
4	17MH75	Eastern Meadowlark	DD	CONF	1	Betsy Baldwin
4	17MH75	Common Grackle	CF	CONF	1	2 atlassers
4	17MH75	Brown-headed Cowbird	FY	CONF	1	Betsy Baldwin
4	17MH75	Orchard Oriole	CF	CONF	1	Betsy Baldwin
4	17MH75	Baltimore Oriole	CF	CONF	1	EarthQuest Canada
4	17MH75	House Finch	FY	CONF	1	Betsy Baldwin
4	17MH75	American Goldfinch	NE	CONF	1	EarthQuest Canada
4	17MH75	House Sparrow	NY	CONF	1	Ryan Zimmerling

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FIGURE C1 Fisheries and Oceans Canada - Species at Risk Results (Greenway)

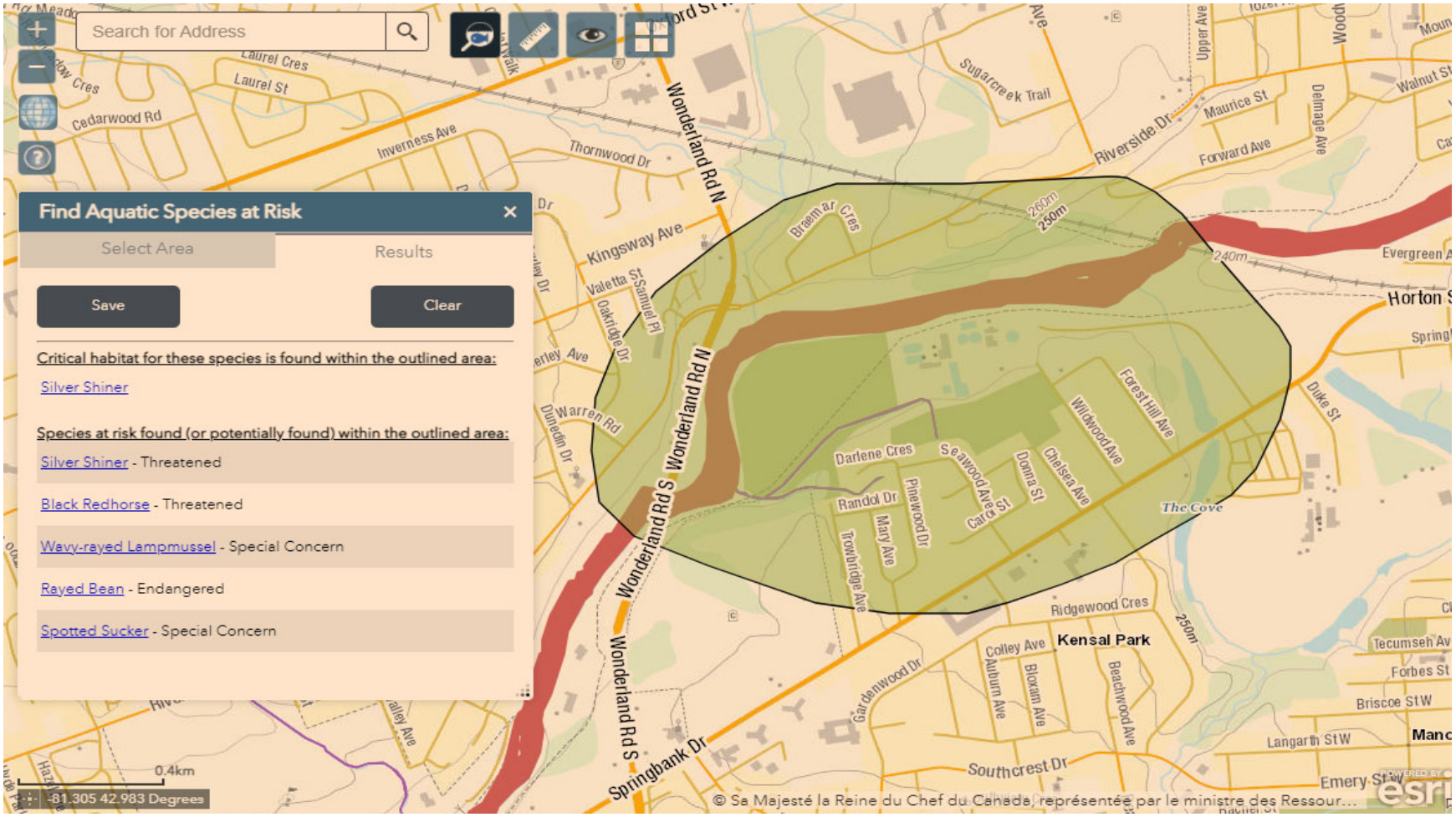

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TABLE C5 Ontario Mammal Atlas Results

Common Name	Scientific Name	Provincial (S-rank)	National (SARA)	Provincial (ESA)
American Badger (Southwestern Ontario Population)	*Taxidea taxus jacksoni*	S1	END	END
Beaver	*Castor canadensis*	S5		
Big Brown Bat	*Eptesicus fuscus*	S4		
Coyote	*Canis latrans*	S5		
Deer Mouse	*Peromyscus maniculatus*	S5		
Eastern Chipmunk	*Tamias striatus*	S5		
Eastern Cottontail	*Sylvilagus floridanus*	S5		
Eastern Gray Squirrel	*Sciurus carolinensis*	S5		
Eastern Small-footed *Myotis*	*Myotis leibii*	S2S3	END	END
Eastern Red Bat	*Lasiurus borealis*	S4		
Ermine	*Mustela erminea*	S5		
Hairy-tailed Mole	*Parascalops breweri*	S4		
Hoary Bat	*Lasiurus cinereus*	S4		
House Mouse	*Mus musculus*	SNA		
Little Brown *Myotis*	*Myotis lucifugus*	S4	END	END
Long-tailed weasel	*Mustela frenata*	S4		
Masked Shrew	*Sorex cinereus*	S5		
Meadow Jumping Mouse	*Zapus hudsonicus*	S5		
Meadow Vole	*Microtus pennsylvanicus*	S5		
Mink	*Mustela vison*	S4		
Muskrat	*Ondatra zibethicus*	S5		
Northern *Myotis*	*Myotis septentrionalis*	S3	END	END
Northern Short-tailed Shrew	*Blarina brevicauda*	S5		
Norway Rat	*Rattus norvegicus*	SNA		
Porcupine	*Erethizon dorsatum*	S5		
Raccoon	*Procyon lotor*	S5		
Red Fox	*Vulpes vulpes*	S5		
Red Squirrel	*Tamiasciurus hudsonicus*	S5		
Silver-haired Bat	*Lasionycteris noctivagans*	S4		
Smoky Shrew	*Sorex fumeus*	S5		
Snowshoe Hare	*Lepus americanus*	S5		
Southern Flying Squirrel	*Glaucomys volans*	S4		
Star-nosed Mole	*Condylura cristata*	S5		
Striped Skunk	*Mephitis mephitis*	S5		
Tricolored Bat	*Perimyotis subflavus*	S3?	END	END
Virginia Opposum	*Didelphis virginiana*	S4		
White-footed Mouse	*Peromyscus leucopus*	S5		
White-tailed Deer	*Odocoileus virginianus*	S5		
Woodchuck	*Marmota monax*	S5		
Woodland Jumping Mouse	*Napaeozapus insignis*	S5		

SARA - *Species at Risk Act*
ESA - *Endangered Species Act*
END - endangered

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APPENDIX D
Flora Inventory Results

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TABLE D1 Greenway Wastewater Treatment Centre - Flora Results 2021

Tree/Shrub/Herb/Grass	Scientific Name	Common Name	ESA	SARA	S-rank	CUW1	CUW1/CUT1	CUT/CUM	CUT1	CUH1/BBO1	CUH1	FOD7-4	D
Tree	*Fagus grandifolia*	American Beech	-	-	S4							x	
Tree	*Ulmus americana*	American Elm	-	-	S5					x		x	
Tree	*Sorbus americana*	American Mountain-ash	-	-	S5		x						
Tree	*Acer ginnala*	Amur Mapl	-	-	SNA							x	
Graminoid	*Poa annua*	Annual Bluegrass	-	-	SNA	x	x	x	x	x		x	x
Herb	*Erigeron annuus*	Annual Fleabane	-	-	S5	x	x	x		x		x	
Tree	*Tilia americana*	Basswood	-	-	S5		x			x		x	
Tree	*Cary cordiformis*	Bitternut Hickory	-	-	S5							x	
Tree	*Prunus serotina*	Black Cherry	-	-	SNR		x					x	
Herb	*Medicago lupulina*	Black medic	-	-	SNA	x	x	x		x		x	x
Herb	*Rubus occidentalis*	Black Raspberry	-	-	S5	x	x			x	x	x	
Tree	*Picea mariana*	Black Spruce	-	-	S5		x						
Tree	*Juglans nigra*	Black Walnut	-	-	S4?	x	x			x		x	
Herb	*Solidago flexicaulis*	Broadleaf Goldenrod	-	-	S5							x	
Herb	*Cirsium vulgare*	Bull Thistle	-	-	SNA		x						x
Tree	*Quercus macrocarpa*	Bur Oak	-	-	S5		x			x		x	
Herb	*Linaria vulgaris*	Butter-and-eggs	-	-	SNA	x	x	x		x		x	x
Herb	*Solidago canadensis*	Canada Goldenrod	-	-	SNR	x	x	x	x	x		x	
Tree	*Prunus nigra*	Canada Plum	-	-	S4							x	
Herb	*Cirsium arvense*	Canada Thistle	-	-	SNA	x	x	x	x	x			x
Graminoid	*Elymus canadensis*	Canada Wildrye	-	-	S5		x						
Herb	*Laportea canadensis*	Canada Wood Nettle	-	-	S5					x		x	
Herb	*Scrophularia marilandica*	Carpenter's Square Figwort	-	-	S4					x		x	
Tree	*Prunus virginiana*	Chokecherry	-	-	S5					x		x	
Shrub	*Solanum dulcamara*	Climbing Nightshade	-	-	SNA	x	x	x		x	x	x	
Tree	*Malus pumila*	Common Apple	-	-	SNA							x	
Herb	*Arctium minus*	Common Burdock	-	-	SNA	x	x	x	x	x		x	
Herb	*Taraxacum officinale*	Common Dandelion	-	-	SNA	x	x	x	x	x		x	x
Shrub	*Sambucus nigra*	Common Elderberry	-	-	SNA				x				
Tree	*Celtis occidentalis*	Common Hackberry	-	-	S4	x	x			x		x	
Tree	*Syringa vulgaris*	Common Lilac	-	-	SNA	x							
Herb	*Asclepias syriaca*	Common Milkweed	-	-	S5		x	x					
Herb	*Leonurus cardiaca*	Common Motherwort	-	-	SNA		x					x	
Herb	*Verbascum thapsus*	Common Mullein	-	-	SNA		x	x					x
Herb	*Plantago major*	Common Plantain	-	-	SNA	x	x	x	x	x		x	x
Herb	*Ambrosia artemisiifolia*	Common Ragweed	-	-	S5		x		x	x		x	x
Herb	*Tanacetum vulgare*	Common Tansy	-	-	SNA		x	x		x			
Herb	*Dipsacus fullonum*	Common Teasel	-	-	SNA		x	x	x	x			x
Tree	*Salix fragilis*	Crack Willow	-	-	SNA	x	x			x			
Herb	*Campanula rapunculoides*	Creeping Bellflower	-	-	SNA	x	x	x				x	
Herb	*Rumex crispus*	Curled Dock	-	-	SNA	x				x		x	
Herb	*Rudbeckia laciniata*	Cut-leaved Coneflower	-	-	S5	x						x	
Tree	*Populus deltoides*	Eastern Cottonwood	-	-	S5		x			x		x	
Tree	*Thuja occidentalis*	Eastern White Cedar	-	-	S5		x				x	x	
Tree	*Pinus strobus*	Eastern White Pine	-	-	S5	x							
Herb	*Circaea Lutetiana*	Enchanter's Nightshade	-	-	S5		x					x	
Herb	*Plantago lanceolata*	English Plantain	-	-	SNA		x	x	x				x
Shrub	*Rhamnus cathartica*	European Buckthorn	-	-	SNA	x	x	x	x	x	x	x	x
Shrub	*Ligustrum vulgare*	European Privet	-	-	SNA		x	x	x			x	x
Shrub	*Rhus aromatica*	Fragrant Sumac	-	-	S4	x	x	x		x			
Herb	*Lotus corniculatus*	Garden Bird's-foot Trefoil	-	-	SNA	x	x	x	x	x		x	x
Herb	*Alliaria petiolata*	Garlic Mustard	-	-	SNA	x	x	x		x		x	
Herb	*Aegopodium podagraria*	Goutweed	-	-	SNA		x			x		x	

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Tree/Shrub/Herb/Grass	Scientific Name	Common Name	ESA	SARA	S-rank	CUW1	CUW1/CUT1	CUT/CUM	CUT1	CUH1/BBO1	CUH1	FOD7-4	D
Herb	*Ambrosia trifida*	Great Ragweed	-	-	S5				x	x		x	
Herb	*Chelidonium majus*	Greater Celandine	-	-	SNA							x	
Tree	*Fraxinus pennsylvanica*	Green Ash	-	-	S4	x	x			x		x	
Graminoid	*Setaria viridis*	Green Foxtail	-	-	SNA	x	x	x	x	x		x	x
Shrub	*Cornus racemosa*	Grey Dogwood	-	-	S5	x	x	x		x		x	
Herb	*Glechoma hederacea*	Ground-ivy	-	-	SNA	x	x	x	x	x		x	x
Herb	*Impatiens glandulifera*	Himalayan balsam	-	-	SNA							x	
Shrub	*Reynoutria japonica*	Japanese Knotweed	-	-	SNA							x	
Graminoid	*Poa pratensis*	Kentucky Bluegrass	-	-	S5	x	x	x	x	x		x	
Tree	*Gymnocladus dioicus*	Kentucky coffeetree	THR	THR	S2		x	x					
Herb	*Ranunculus ficaria*	Lesser Calendine	-	-	SNA							x	
Herb	*Maianthemum canadense*	Lily of the Valley	-	-	S5							x	
Tree	*Tilia cordata*	Little-leaved Linden	-	-	SNA	x	x			x		x	
Tree	*Acer negundo*	Manitoba Maple	-	-	S5	x	x		x	x	x	x	x
Shrub	*Rosa multiflora*	Multiflora Rose	-	-	SNA					x		x	
Tree	*Catalpa speciosa*	Northern Catalpa	-	-	SNA					x		x	
Tree	*Quercus rubra*	Northern Red Oak	-	-	S5		x					x	
Tree	*Acer Platanoides*	Norway Maple	-	-	SNA		x					x	
Tree	*Picea abies*	Norway Spruce	-	-	SNA							x	
Herb	*Hieracium aurantiacum*	Orange Hawkweed	-	-	SNA		x			x			x
Graminoid	*Dactylis glomerata*	Orchard Grass	-	-	SNA	x	x	x	x			x	x
Tree	*Betula papyrifera*	Paper Birch	-	-	SNR		x			x			
Herb	*Hypericum perforatum*	Perforated St. John's Wort	-	-	SNA	x	x	x	x	x		x	x
Graminoid	*Elymus repens*	Quackgrass	-	-	SNA	x	x	x	x	x			x
Herb	*Trifolium pratense*	Red Clover	-	-	SNA	x	x	x	x	x		x	x
Graminoid	*Festuca rubra*	Red Fescue	-	-	SNA								x
Tree	*Acer rubrum*	Red Maple	-	-	S5		x			x		x	
Tree	*Pinus resinosa*	Red Pine	-	-	S5	x						x	
Graminoid	*Phalaris arundinacea*	Reed Canarygrass	-	-	S5	x			x			x	
Herb	*Vitis riparia*	Riverbank Grape	-	-	S5	x	x	x	x	x	x	x	x
Shrub	*Eleagnus angustifolia*	Russian Olive	-	-	SNA	x							
Tree	*Pinus sylvestris*	Scotch Pine	-	-	SNA	x						x	
Herb	*Prunella vulgaris*	Self-heal	-	-	S5							x	x
Tree	*Acer saccharinum*	Silver Maple	-	-	S5		x			x		x	
Herb	*Galium mollugo*	Smooth Bedstraw	-	-	SNA	x	x	x		x		x	
Herb	*Bromus inermis*	Smooth Brome	-	-	SNA	x	x	x		x		x	
Graminoid	*Digitaria ischaemum*	Smooth Crabgrass	-	-	SNA		x	x	x				
Herb	*Saponaria officinalis*	Soapwort	-	-	SNA		x					x	
Herb	*Sonchus sp.*	Sow Thistle	-	-	SNA	x						x	x
Herb	*Impatiens capensis*	Spotted Jewelweed	-	-	S5					x		x	
Shrub	*Rhus typhina*	Staghorn Sumac	-	-	S5		x	x	x	x		x	
Herb	*Hackelia virginiana*	Stickseed	-	-	S5							x	
Herb	*Urtica dioica*	Stinging Nettle	-	-	S5		x	x		x		x	
Tree	*Acer saccharum*	Sugar Maple	-	-	S5	x	x		x	x		x	
Tree	*Prunus avium*	Sweet Cherry	-	-	SNA					x		x	
Tree	*Acer pseudoplatanus*	Sycamore	-	-	SNA		x						
Herb	*Solidago altissima*	Tall Goldenrod	-	-	S5	x	x	x	x	x		x	
Tree	*Larix laricina*	Tamarack	-	-	S5	x				x		x	
Shrub	*Lonicera tatarica*	Tatarian Honeysuckle	-	-	SNA	x	x	x		x	x	x	
Tree	*Gleditsia triacanthos var. inermis*	Thornless Honey Locust	-	-	SNR		x			x		x	
Herb	*Phleum pratense*	Timothy	-	-	SNA	x		x	x	x			x
Herb	*Vicia cracca*	Tufted Vetch	-	-	SNA		x						x
Tree	*Liriodendron tulipifera*	Tulip Tree	-	-	S4	x	x						
Herb	*Oxalis stricta*	Upright Yellow Wood-sorrel	-	-	SNA	x	x	x	x	x		x	

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Tree/Shrub/Herb/Grass	Scientific Name	Common Name	ESA	SARA	S-rank	CUW1	CUW1/CUT1	CUT/CUM	CUT1	CUH1/BBO1	CUH1	FOD7-4	D
Shrub	*Parthenocissus quinquefolia*	Virginia Creeper	-	-	S4?	x	x	x		x	x	x	
Tree	*Fraxinus americana*	White Ash	-	-	S4		x					x	
Herb	*Trifolium repens*	White Clover	-	-	SNA	x	x	x	x	x		x	x
Tree	*Morus alba*	White Mulberry	-	-	SNA	x	x			x		x	
Herb	*Ageratina altissima*	White Snakeroot	-	-	S5		x			x		x	
Herb	*Verbena urticifolia*	White Vergain	-	-	S5		x		x	x		x	
Herb	*Oxalis montana*	White Wood-sorrel			S5							x	
Herb	*Daucus carota*	Wild Carrot	-	-	SNA	x	x	x	x	x		x	x
Herb	*Cichorium intybus*	Wild Chicory	-	-	SNA	x	x	x	x	x		x	x
Herb	*Geum aleppicum*	Yellow Avens	-	-	S5		x		x			x	
Tree	*Betula alleghaniensis*	Yellow Birch	-	-	S5		x						
Herb	*Lysimachia terrestris*	Yellow Loosestrife	-	-	S5					x			
Herb	*Barbarea vulgaris*	Yellow Rocket	-	-	SNA							x	

ESA - *Endangered Species Act*
SARA - *Species at Risk Act*

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APPENDIX E
Breeding Bird Survey Results

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TABLE E1 Breeding Bird Summary Results for Greenway Wastewater Treatment Centre

Visit Number	Date	Weather
Visit 1:	June 4, 2021	17-18°C, 0 wind, 90-100% cloud cover, no precipitation
Visit 2:	June 24, 2021	18-20°C, 2-3 South wind, 0-40% cloud cover, no precipitation

Species		ESA Status	SARA Status	Visit 1: June 4, 2021						Visit 1: June 24, 2021						Highest Breeding Evidence						Comments
Common Name	Scientific Name			BBS-1	BBS-2	BBS-3	BBS-4	BBS-5	BBS-6	BBS-1	BBS-2	BBS-3	BBS-4	BBS-5	BBS-6	BBS-1	BBS-2	BBS-3	BBS-4	BBS-5	BBS-6	
American Goldfinch	*Spinus tristis*				P:H 1 P:S 1	O:X 1	P:S 1	P:H 4			PR:P 3 P:S	P:H 1			P:S 2 PR:P		Probable	Possible	Possible	Possible	Probable	
American Redstart	*Setophaga ruticilla*																					
American Robin	*Turdus migratorius*				P:S 3	P:S 4	P:S 2	P:S 2		P:S 3	P:S 4 C:FY	P:S 7 PR:A C:FY	P:S 4	P:S 1	P:H 1	Possible	Confirmed	Confirmed	Possible	Possible	Possible	
Bank Swallow	*Riparia riparia*	Threatened	Threatened					O:X 1												Observed		BBS-5 Visit 1: Foraging.
Baltimore Oriole	*Icterus galbula*				P:H 1	P:S 1											Possible	Possible				
Barn Swallow	*Hirundo rustica*	Threatened	Threatened				O:X 2	O:X 4						O:X 2					Observed	Observed		BBS-4 Visit 1: Foraging over WWTP BBS-5 Visit 1: Foraging, no visible nesting habitat/structures. BBS-5 Visit 2: Foraging over playing fields.
Black-capped Chickadee	*Poecile atricapillus*				P:S 1	P:H 2						P:S 2					Possible	Possible				
Brown-headed Cowbird	*Molothrus ater*							P:S 2 PR:P			P:S 1						Possible			Probable		
Blue Jay	*Cyanocitta cristata*													P:H 2 PR:A						Probable		
Canada Goose	*Branta canadensis*																					
Cedar Waxwing	*Bombycilla cedrorum*				4						PR:P 2						Probable					
Chimney Swift	*Chaetura pelagica*	Threatened	Threatened				O:X 3	O:X 2											Observed	Observed		BBS-3 Visit 1: Flyover. BBS-4 Visit 1: Foraging over WWTP BBS-5 Visit 1: Foraging.
Common Grackle	*Quiscalus quiscula*			P:H 4 C:FY	C:FY 6				P:H 2				P:H 1			Confirmed	Confirmed		Possible		Possible	
Downy Woodpecker	*Picoides pubescens*										PR:P 2	P:H 1					Probable	Possible				
Eastern Kingbird	*Tyrannus tyrannus*										P:H 1						Possible					
European Starling	*Sturnus vulgaris*				C:FY 3	P:S 1	C:FY 9	C:FY 15			C:FY 9		P:H 1				Confirmed	Possible	Confirmed	Confirmed		
Great Blue Heron	*Ardea herodias*																					BBS-6 Visit 1: Flyover toward vines.
Great Crested Flycatcher	*Myiarchus crinitus*													P:H 1						Possible		
Gray Catbird	*Dumetella carolinensis*					P:S 1			P:H 1						PR:A 1			Possible			Probable	
Hairy Woodpecker	*Picoides villosus*																					
House Finch	*Haemorhous mexicanus*																					
House Sparrow	*Passer domesticus*																					
House Wren	*Troglodytes aedon*						P:S 1		P:S 1										Possible		Possible	
Indigo Bunting	*Passerina cyanea*						P:S 1				P:S 1						Possible		Possible			
Killdeer	*Charadrius vociferus*						P:H 1			P:H 2			P:H 2		O:X 2	Possible			Possible		Observed	BBS-6 Visit 2: River bank.
Mallard	*Anas platyrhynchos*				O:X 2												Observed					
Mourning Dove	*Zenaida macroura*			P:H 4			P:S 1						P:H 1			Possible			Possible			
Northern Cardinal	*Cardinalis cardinalis*			P:S 1	P:S 1			P:S 1	P:S 1	P:S 1	P:S 1	P:S 1	P:S 1		P:H 1	Possible	Possible	Possible	Possible	Possible	Possible	
Northern Flicker	*Colaptes auratus*						P:S 1												Possible			
Northern Gannet	*Morus bassanus*						P:S 1												Possible			
Northern Pintail	*Anas acuta*																					
Osprey	*Pandion haliaetus*									C:NY 1						Confirmed						BBS-1 Visit 1: Platform.
Rose-breasted Grosbeak	*Pheucticus ludovicianus*																					
Red-breasted Nuthatch	*Sitta canadensis*				P:S 1												Possible					
Red-bellied Woodpecker	*Melanerpes carolinus*							P:H 1	P:H 1		P:H 1			P:H 1	P:H 1		Posible			Possible	Possible	
Red-eyed Vireo	*Vireo olivaceus*					P:S 1												Possible				
Rock Pigeon	*Columba livia*				O:X 1					O:X 12						Observed	Observed					BBS-1 Visit 1: Flyby.
Red-tailed Hawk	*Buteo jamaicensis*													P:H 1						Possible		
Red-winged Blackbird	*Agelaius phoeniceus*			P:S 2	P:S 2	P:S 2	P:S 2		P:S 3	P:S 2	P:S 3	P:H 2 P:S	P:S 3	P:S 4 PR:A		Possible	Possible	Possible	Possible	Probable	Possible	
Song Sparrow	*Melospiza melodia*			P:S 1	P:S 2			P:S 2	P:S 1		P:S 1	P:S 1		P:S 2	P:S 3 PR:A	Possible	Possible	Possible		Possible	Probable	
Spotted Sandpiper	*Actitis macularius*														P:H 1						Possible	
Warbling Vireo	*Vireo gilvus*			P:S 1	P:S 1			P:S 1			P:S 1			P:S 1		Possible	Possible			Possible		
Willow Flycatcher	*Empidonax traillii*																					
Yellow Warbler	*Setophaga petechia*			P:S 3 PR:P	P:S 1	P:S 1	P:S 1	P:S 2	P:S 2	P:S 1	P:S 2			P:S 1	P:S 3 PR:A C:CF	Probable	Possible	Possible	Possible	Possible	Confirmed	

	BBS-1	BBS-2	BBS-3	BBS-4	BBS-5	BBS-6
Easting	477227	476689	476807	477108	477688	477486
Northing	4758128	4758088	4757941	4757986	4758317	4758285

Breeding Codes

Observed
O:X - Species observed during breeding season but no breeding evidence

Possible Breeding
P:S - Singing male present, or breeding calls hears, inits breeding season in suitable nesting habitat
P:H - species observed during breeding season in suitable habitat

Probable Breeding
PR:P - Pair observed in their breeding season in suitable nesting habitat
PR:T - Permanent territory presumed through territorial behaviour on both visits
PR:D - Courtship or display between a male and a female or 2 males, including courship,feeding or copulation
PR:V - Visiting probable nest site
PR:A - Agitated behaviour or anxiety calls of an adult
PR:B - Brood patch on adult female or cloacal protuberance on adult male
PR:N - Nest-building or exacation of nest hole

Confirmed Breeding
C:DD - Distraction display
C:NU - Used nest or eggshells found
C:FY - Recently fledged young or downy young, including young incapable of sustained flight
C:AE - Adult leaving or entering nest site
C:FS - Adult carrying fecal sac
C:CF - Adult carrying food for young
C:NE - Nest containing eggs
C:NY - Nest with young (seen or heard)

Note: use lower case if observed outside breeding bird survey time for point count

ESA - *Endangered Species Act*
SARA - *Species at Risk Act*

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APPENDIX F
Significant Wildlife Habitat Assessment

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TABLE F1 Seasonal Concentration Areas of Animals

Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
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 grains in the Long Point, Rondeau, Lk. 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. <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 • Sites documented through waterfowl planning processes (e.g., 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” • 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). • SWH MIST Index #7 provides development effects and mitigation measures.	• None - No evidence of spring flooding within the area
Waterfowl Stopover and Staging Areas (Aquatic) **<u>Rationale:</u>** Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	• Canada Goose • Cackling Goose • Snow Goose • American Black Duck • Northern Pintail • Northern Shoveler • American Wigeon • Gadwall • Green-winged Teal • Blue-winged Teal • Hooded Merganser • Common Merganser • Lesser Scaup • Greater Scaup • Long-tailed Duck • Surf Scoter • White-winged Scoter • Black Scoter • Ring-necked duck	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH; however, a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water) <u>Information Sources</u> • Environment Canada • Naturalist clubs often are aware of staging/stopover areas. • OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging. • Sites documented through waterfowl planning processes (e.g., EHJV implementation plan)	Studies carried out and verified presence of: • Aggregations of 100 or more of listed species for 7 days, results in >700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH • The combined area of the ELC ecosites and a 100 m radius area is the SWH • Wetland area and shorelines associated with sites identified within the SWHTG Appendix K are significant wildlife habitat. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from	• None – candidate ELC ecosite codes were not on site. Area did not contain. Ponds, marshes, lakes, bays, coastal inlets

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
	• Common Goldeneye • Bufflehead • Redhead • Ruddy Duck • Red-breasted Merganser • Brant • Canvasback		• Ducks Unlimited projects • Element occurrence specification by Nature Serve: http://www.natureserve.org • NHIC Waterfowl Concentration Area	past surveys with species numbers and dates recorded). • SWH MIST [cxlix] Index #7 provides development effects and mitigation measures.	
Shorebird Migratory Stopover Area **<u>Rationale:</u>** High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	• 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	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	• Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. • Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. • Sewage treatment ponds and storm water ponds do not qualify as a SWH. <u>Information Sources</u> • Western hemisphere shorebird reserve network. • Canadian Wildlife Service (CWS) Ontario Shorebird Survey • Bird Studies Canada • Ontario Nature • Local birders and naturalist clubs • NHIC Shorebird Migratory Concentration Area	Studies confirming: • Presence of 3 or more of listed species and >1000© shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (<24hrs) during spring migration, any site with >100© Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100 m radius area [cxlviii] • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" [ccxi] • SWH MIST [cxlix] Index #8 provides development effects and mitigation measures.	• Candidate – Patchy BBO1 ecosites are present adjacent to the Thames River.
Raptor Wintering Area **<u>Rationale:</u>** Sites used by multiple species, a high number of individuals and used annually are most significant	• Rough-legged Hawk • Red-tailed Hawk • Northern Harrier • American Kestrel • Snowy Owl **<u>Special Concern:</u>** • Short-eared Owl • Bald Eagle	<u>Hawks/Owls:</u> Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM; CUT; CUS; CUW. <u>Bald Eagle:</u> Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).	• The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Raptor wintering (hawk/owl) sites need to be >20 ha[cxlviii, cxlix] with a combination of forest and upland.[xvi, xvii, xviii, xix, xx, xxi.] • Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15 ha) with adjacent woodlands[cxlix] • Field area of the habitat is to be wind swept with limited snow depth or accumulation. • Eagle sites have open water and large trees and snags available for roosting[cxlix]	Studies confirm the use of these habitats by: • 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)[cxlix] for a minimum of 20 days by the above number of birds©. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area© • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWH MIST[cxlix] Index #10 and #11 provides development effects and mitigation measures.	None- Study area did not contain a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. •

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			Information Sources: • OMNRF Ecologist or Biologist • Naturalist clubs • NHIC Raptor Winter Concentration Area • Data from Bird Studies Canada • Results of Christmas Bird Counts • Reports and other information available from Conservation Authorities.		
Bat Hibernacula **Rationale:** Bat hibernacula are rare habitats in all Ontario landscapes.	• Big Brown Bat • Tri-coloured Bat	Bat Hibernacula may be found in these ecosites: CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as SWH • The locations of bat hibernacula are relatively poorly known. Information Sources • OMNRF for possible locations and contact for local experts • NHIC Bat Hibernaculum • Ministry of Northern Development and Mines for location of mine shafts. • Clubs that explore caves (e.g. Sierra Club) • University Biology Departments with bat experts.	• All sites with confirmed hibernating bats are SWH(E). • The area includes 200 m radius around the entrance of the hibernaculum[cxlviii, ccvii, (E)] for most development types and 1000 m for wind farms[ccv]. • Studies are to be conducted during the peak swarming period (Aug.–Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects"[ccv]. • SWH MIST[cxlix] Index #1 provides development effects and mitigation measures.	• None – Study area did not contain Hibernacula ecosites.
Bat Maternity Colonies **Rationale:** Known locations of forested bat maternity colonies are extremely rare in all Ontario landscapes.	• Big Brown Bat • Silver-haired Bat	Maternity colonies considered SWH are found in forested Ecosites. All ELC Ecosites in ELC Community Series: FOD FOM SWD SWM	• Maternity colonies can be found in tree cavities, vegetation and often in buildings[xxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario[xxii]. • Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx, ccv] with >10/ha large diameter (>25 cm dbh) wildlife trees • 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, lxiv] Information Sources • OMNRF for possible locations and contact for local experts	• Maternity Colonies with confirmed use by: • >10 Big Brown Bats(E) • >5 Adult Female Silver-haired Bats(E) • The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies(E). • Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects"[ccv]. • SWH MIST[cxlix] Index #12 provides development effects and mitigation measures.	• None– an assessment was completed on the number of snag trees per hectare, and the study area did not meet the threshold for bat maternity roosting habitat.

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			• University Biology Departments with bat experts.		
Turtle Wintering Areas **Rationale:** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	• Midland Painted Turtle **Special Concern:** • Northern Map Turtle • Snapping Turtle	Snapping and Midland Painted Turtles; ELC Community Classes; SW, MA, OA and SA, ELC Community Series; FEO and BOO Northern Map Turtle; Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	• For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen[cix, cx, cxi, cxii] • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH. Information Sources • EIS studies carried out by Conservation Authorities. • Field Naturalists Clubs • OMNRF Ecologist or Biologist • NHIC	• Presence of 5 over-wintering Midland Painted Turtles is significant(E). • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant(E). • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept.–Oct.) or spring (Mar.–May)[cvii]. • Congregation of turtles is more common where wintering areas are limited and therefore significant.[cix, cxcxi, cxii] • SWH MIST[cxlix] Index #28 provides development effects and mitigation measures for turtle wintering habitat.	• Candidate – Thames River contains open water areas with deep pools.
Reptile Hibernaculum **Rationale:** Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	**Snakes:** • Eastern Gartersnake • Northern Watersnake • Northern Red-bellied Snake • Northern Brownsnake • Smooth Green Snake • Northern Ring-necked Snake **Special Concern:** • Milksnake • Eastern Ribbonsnake	For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator.	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line.[xliv, l, li, lii, 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. Information Sources • In spring, local residents or landowners may have observed the emergence of	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (e.g. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct)(E) • 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	• None – Features such as fractured bedrock, old foundations, caves, alvars, rock barrens not present.

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			snakes on their property (e.g. old dug wells). • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs • University herpetologists • NHIC	which the hibernacula is located plus a 30 m radius area is the SWH[E] • SWH MIST[cxlix] Index #13 provides development effects and mitigation measures for snake hibernacula.	
Colonially-Nesting Bird Breeding Habitat (Bank and Cliff) **<u>Rationale:</u>** Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are declining in Ontario.	• Cliff Swallow • Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles Cliff faces, bridge abutments, silos, barns. Habitat found in the following ecosites: CUM1 CUT1 CUS1 BLO1 BLS1 BLT1 CLO1 CLS1 CLT1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil, or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation. <u>Information Sources</u> • Reports and other information available from Conservation Authorities. • Ontario Breeding Bird Atlas • Bird Studies Canada; *NatureCounts* http://www.birdscanada.org/birdmon/ • Field Naturalist Clubs	Studies confirming: • Presence of 1 or more nesting sites with 8[cxlix] or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50 m 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] • SWH MIST[cxlix] Index #4 provides development effects and mitigation measures	• None- Study area does not contain exposed banks that would support colonially nesting birds.
Colonially-Nesting Bird Breeding Habitat (Tree/Shrubs) **<u>Rationale:</u>** Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	• Great Blue Heron • Black-crowned Night-Heron • Great Egret • Green Heron	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree. <u>Information Sources</u> • Ontario Breeding Bird Atlas,[ccv] colonial nest records. • Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNRF). • NHIC Mixed Wader Nesting Colony • Aerial photographs can help identify large heronries. • Reports and other information available from Conservation Authorities. • MNRF District Offices. • Field Naturalist Clubs.	Studies confirming: • Presence of 2[E] or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300 m radius or extent of the Forest Ecosite containing the colony or any island <15.0 ha with a colony is the SWH.[cc, ccvii] • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells • SWH MIST[cxlix] Index #5 provides development effects and mitigation measures.	• None- the study area did not contain any of the candidate ecosites

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
Colonially-Nesting Bird Breeding Habitat (Ground) **Rationale:** Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	• Herring Gull • Great Black-backed Gull • Little Gull • Ring-billed Gull • Common Tern • Caspian Tern • Brewer's Blackbird	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird) MAM1–6 MAS1–3 CUM CUT CUS	• 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. Information Sources • Ontario Breeding Bird Atlas, rare/colonial species records • Canadian Wildlife Service • Reports and other information available from Conservation Authorities. • NHIC Colonial Waterbird Nesting Area • MNRF District Offices • Field Naturalist Clubs	Studies confirming: • Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern(E). • Presence of 5 or more pairs for Brewer's Blackbird(E). • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant(E). • The edge of the colony and a minimum 150 m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0 ha 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] • SWH MIST[cxlix] Index #6 provides development effects and mitigation measures.	• None- does not contain rocky islands or peninsulas. Suitable habitat may be present within nearby sections of the Thames River.
Migratory Butterfly Stopover Areas **Rationale:** Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	• Painted Lady • Red Admiral Special Concern • Monarch	Combination of ELC Community Series; need to have present one Community Series from each landclass: Field: CUM CUT CUS Forest: FOC FOD FOM CUP Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.	A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Erie or Lake Ontario[cxlix]. • The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south.[xxxii, xxxiii, xxxiv, xxxv, xxxvi] • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat. [cxlviii, cxlix] • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes.[xxxvii, xxxviii, xxxix, xl, xli] Information Sources • MNRF District Offices • NHIC • Agriculture Canada in Ottawa may have list of butterfly experts. • Field Naturalist Clubs	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)[xliii]. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100–500/day[xxxvii], significant variation can occur between years and multiple years of sampling should occur.[xl, xlii] • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 **or** >3000 with the presence of Painted Ladies or Red Admirals is to be considered significant. (E) • SWH MIST[cxlix] Index #16 provides development effects and mitigation measures.	• None- the study area is not within 5km from Lake Erie

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Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			• Toronto Entomologists Association • Conservation Authorities		
Landbird Migratory Stopover Areas **<u>Rationale</u>:** Sites with a high diversity of species as well as high numbers are most significant.	All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1 All migrant raptors species: Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	Woodlots >5 ha[E] in size and within 5 km[iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv] of Lake Erie and Lake Ontario. If woodlands are rare in an area of shoreline, woodland fragments 2–5 ha can be considered for this habitat[E] • If multiple woodlands are located along the shoreline those Woodlands <2 km from Lake Erie and Lake Ontario are more significant[cxlix] • Sites have a variety of habitats; forest, grassland and wetland complexes[cxlix] • The largest sites are more significant[cxlix] • Woodlots and forest fragments are important habitats to migrating birds,[ccxviii] these features located along the shore and located within 5km of Lake Erie and Lake Ontario are Candidate SWH.[cxlviii] <u>Information Sources</u> • Bird Studies Canada • Ontario Nature • Local birders and field naturalist clubs • Ontario Important Bird Areas (IBA) Program	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[E]. 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 to Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWH MIST[cxlix] Index #9 provides development effects and mitigation measures.	• None – the study area is not within 5km from Lake Erie.
Deer Winter Congregation Areas **<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]	White-tailed Deer	All Forested Ecosites with these ELC Community Series: FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50 ha may also be used.	• Woodlots >100 ha in size or if large woodlots are rare in a planning area woodlots >50 ha[E] • 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.[cxlviii] • Large woodlots > 100 ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1–1.5 deer/ha.[ccxxiv] • Woodlots with high densities of deer due to artificial feeding are not significant[E]. <u>Information Sources</u> • MNRF District Offices • LIO/NRVIS	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF.[cxlviii] • Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF.[E] • Studies should be completed during winter (Jan/Feb) when >20 cm of snow is on the ground using aerial survey techniques,[ccxxiv] ground or road surveys, or a pellet count deer density survey.[ccxxv] • SWH MIST[cxlix] Index #2 provides development effects and mitigation measures.	• None- the study area does not contain woodlots >50ha

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TABLE F2 Rare Vegetation Communities

Rare Vegetation Community	Candidate SWH			Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources		
Cliffs and Talus Slopes **Rationale:** Cliffs and Talus Slopes are extremely rare habitats in Ontario.	Any ELC Ecosite within Community Series: TAO CLO TAS CLS TAT CLT	A Cliff is vertical to near vertical bedrock >3 m in height. A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris	Most cliff and talus slopes occur along the Niagara Escarpment. Information Sources • The Niagara Escarpment Commission has detailed information on location of these habitats. • OMNRF Districts • NHIC has location information available on their website • Field Naturalist Clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes[lxxviii] • SWH MIST[cxlix] Index #21 provides development effects and mitigation measures.	• None- the study area does not contain any of the candidate ecosites.
Sand Barren **Rationale:** Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry	ELC Ecosites: SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always ≤ 60%.	Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered, but less than 60%.	A sand barren area >0.5 ha in size[Ⓔ]. Information Sources • OMNRF Districts • NHIC has location information available on their website. • Field Naturalist Clubs • Conservation Authorities	• Confirm any ELC Vegetation Type for Sand Barrens[lxxviii] • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.)[Ⓔ]. • SWH MIST[cxlix] Index #20 provides development effects and mitigation measures.	• None- the study area does not contain any of the candidate ecosites.
Alvar **Rationale:** Alvars are extremely rare habitats in Ecoregion 7E.	ALO1 ALS1 ALT1 FOC1 FOC2 CUM2 CUS2 CUT2-1 CUW2 **Five Alvar Indicator Species:** *1) Carex crawei* *2) Panicum philadelphicum* *3) Eleocharis compressa* *4) Scutellaria parvula* *5) Trichostema brachiatum* These indicator species are very specific to Alvars within Ecoregion 7E[Ⓔcxlix]	An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover.[lxxviii]	An Alvar site > 0.5 ha in size.[lxxv] Alvar is particularly rare in Ecoregion 7E where the only known sites are found in the western islands of Lake Erie.[cxcix] Information Sources • Alvars of Ontario (2000), Federation of Ontario Naturalists[lxxvi] • Ontario Nature – Conserving Great Lakes Alvars[ccviii] • NHIC has location information available on their website. • OMNRF Staff • Field Naturalist Clubs • Conservation Authorities	• Field studies that identify four of the five[Ⓔ] **Alvar Indicator Species**[lxxv, cxlix] at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses[lxxv] • SWH MIST[cxlix] Index #17 provides development effects and mitigation measures.	• None- the study area does not contain any of the candidate ecosites.
Old Growth Forest **Rationale**: Due to historic logging practices and land clearance for agriculture, old	Forest Community Series: FOD FOC FOM SWD	Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.	Woodland area is >0.5 ha.[Ⓔ] Information Sources	Field Studies will determine: • If dominant trees species of the forest are >140 years old, then the area containing	• None- The forest community did not contain a dominate tree community > 140 years.

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Rare Vegetation Community	Candidate SWH			Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources		
growth forest is rare in Ecoregion 7E.	SWC SWM		• OMNRF Forest Resource Inventory mapping • OMNRF Districts • Field Naturalist Clubs • Conservation Authorities • Sustainable Forestry License (SFL) companies will possibly know locations through field operations. • Municipal forestry departments	these trees is Significant Wildlife Habitat[cxlviii] • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities[cxlviii] (cut stumps will not be present) • The area of forest ecosites combined or an ecoelement 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[lxxviii] • SWH MIST[cxlix] Index #23 provides development effects and mitigation measures.	
Savannah **Rationale:** Savannahs are extremely rare habitats in Ontario.	TPS1 TPS2 TPW1 TPW2 CUS2	A Savannah is a tallgrass prairie habitat that has tree cover between 25–60%[lxxix, lxxx, lxxxi, lxxxii, lxxxiii] 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).	No minimum size to site.[E] Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • NHIC has location data available on their website. • OMNRF Districts • Field Naturalists Clubs • Conservation Authorities	Field studies confirm one or more of the Savannah indicator species listed in [cxlix] Appendix N should be present[E]. Note: Savannah plant spp. list from Ecoregion 7E should be used.[cxlviii] • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWH MIST[cxlix] Index #18 provides development effects and mitigation measures.	• None- the study area does not contain any of the candidate ecosites.
Tallgrass Prairie **Rationale:** Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover[lxxix, lxxx, lxxxi, lxxxii, lxxxiii] 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).	No minimum size to site.[E] Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. Information Sources • OMNRF Districts • NHIC has location information available on their website. • Field Naturalists Clubs • Conservation Authorities	Field studies confirm one or more of the Prairie indicator species listed in [cxlix] Appendix N should be present.[E] Note: Prairie plant spp. list from Ecoregion 7E should be used[cxlviii] • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWH MIST[cxlix] Index #19 provides development effects and mitigation measures.	• None- the study area does not contain any of the candidate ecosites.
Other Rare Vegetation Communities **Rationale:** Plant communities that often contain rare	Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG.[cxlviii] Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.	ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in Appendix M.[cxlviii] The OMNRF/NHIC will have up to date listing for rare vegetation communities.	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG.[cxlviii] • Area of the ELC Vegetation Type polygon is the SWH.	• None – no rare vegetation communities as listed for Middlesex County on Appendix M of the SWHTG present.

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Rare Vegetation Community	Candidate SWH			Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
	ELC Ecosite Codes	Habitat Description	Detailed Information and Sources		
species which depend on the habitat for survival.			Information Sources • NHIC has location information available on their website. • OMNRF Districts • Field Naturalists Clubs • Conservation Authorities	• SWH MIST[cxlix] Index #37 provides development effects and mitigation measures.	

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TABLE F3 Specialized Habitat of Wildlife considered SWH

Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
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 120 m from a wetland (> 0.5 ha) or a wetland (>0.5 ha) and any small wetlands (0.5 ha) within 120 m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. • Upland areas should be at least 120 m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40 cm dbh) in woodlands for cavity nest sites. <u>Information Sources</u> • Ducks Unlimited staff may know the locations of particularly productive nesting sites. • OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat. • Reports and other information available from Conservation Authorities.	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or; • Presence of 10 or more nesting pairs for listed species including Mallards.[E] • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April–June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m[cxlviii] from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWH MIST[cxlix] Index #25 provides development effects and mitigation measures.	• None- There are no wetland communities within the study area
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat **Rationale:** 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.	Osprey **Special Concern** Bald Eagle	ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands	Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy. • Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms). <u>Information Sources</u> • NHIC compiles all known nesting sites for Bald Eagles in Ontario. • MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat. • Nature Counts, Ontario Nest Records Scheme data.	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area.[cxlviii] • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH[ccvii], maintaining undisturbed shorelines with large trees within this area is important.[cxlviii] • For a Bald Eagle the active nest and a 400–800 m radius around the nest is the SWH.[cvi, ccvii] Area of the habitat from 400–800 m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat.[cvi] • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for ≥ 3 years or	• None – no suitable ecosites are present adjacent to lakes, ponds, river or wetlands within the study area.

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Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			• OMNRF District • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented. • Reports and other information available from Conservation Authorities. • Field Naturalists clubs	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 early March to mid-August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWH MIST[cxlix] Index #26 provides development effects and mitigation measures.	
Woodland Raptor Nesting Habitat **<u>Rationale:</u>** Nests sites for these species are rarely identified; these area sensitive habitats are often used annually by these species.	• Northern Goshawk • Cooper's Hawk • Sharp-shinned Hawk • Red-shouldered Hawk • Barred Owl • Broad-winged Hawk	May be found in all forested ELC Ecosites. May also be found in SWC, SWM, SWD, and CUP3	All natural or conifer plantation woodland/forest stands >30 ha with >4 ha of interior habitat.[lxxxviiii, lxxxix, xc, xci, xciii, xciv, xcv,xcvi, cxxxiii] Interior habitat determined with a 200 m buffer.[cxlviii] • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest. <u>Information Sources</u> • OMNRF Districts • Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented. • Check data from Bird Studies Canada. • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of 1 or more active nests from species list is considered significant.[cxlviii] • Red-shouldered Hawk and Northern Goshawk – A 400 m radius around the nest or 28 ha area of habitat is the SWH[ccvii] (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest) • Barred Owl—A 200 m radius around the nest is the SWH.[ccvii] • Broad-winged Hawk and Coopers Hawk—A 100 m radius around the nest is the SWH.[ccvii] • Sharp-Shinned Hawk—A 50 m 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. • SWH MIST[cxlix] Index #27 provides development effects and mitigation measures.	• None- the study area does not contain woodlands >30ha
Turtle Nesting Areas **<u>Rationale:</u>** These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	• Midland Painted Turtle <u>Special Concern</u> • Northern Map Turtle • Snapping Turtle	Exposed mineral soil (sand or gravel) areas adjacent (<100 m)[cxlviii] or within the following ELC Ecosites: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 BOO1 FEO1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of	Studies confirm: • 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 turtles nest, plus a radius of 30–100 m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH.[cxlviii]	• Candidate – The Thames River shoreline within the study area contains sand and gravel soil for nesting. • Known nesting sites further upstream in the Thames

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Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			marshes, lakes, and rivers are most frequently used. <u>Information Sources</u> • Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels). • Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them. • NHIC • Field Naturalist Clubs	• Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30–100 m area of habitat.[cxlix] • 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. • SWH MIST[cxlix] Index #28 provides development effects and mitigation measures for turtle nesting habitat.	
Seeps and Springs **<u>Rationale:</u>** 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 groundwater comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs.	• Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system.[cxvii, cxlix] • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species.[cxix, cxx, cxxi, cxxii, cxiii, cxiv] <u>Information Sources</u> • Topographical Map • Thermography • Hydrological surveys conducted by Conservation Authorities and MOE • Field Naturalists Clubs and landowners • Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped	Field Studies confirm: • Presence of a site with two or more[E] seeps/springs should be considered SWH. • The area of an 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 the habitat.[cxlviii] • SWH MIST[cxlix] Index #30 provides development effects and mitigation measures	• None- the study area does not contain any springs or seeps
Amphibian Breeding Habitat (Woodland) **<u>Rationale:</u>** These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations	• Eastern Newt • Blue-spotted Salamander • Spotted Salamander • Gray Treefrog • Spring Peeper • Western Chorus Frog • Wood Frog	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians.	• Presence of a wetland, pond or woodland pool (including vernal pools) >500 m^2 (about 25 m diameter) within or adjacent (within 120 m) to a woodland (no minimum size).[clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx] Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat.[cxlviii]	Studies confirm; • Presence of breeding population of one or more of the listed newt/salamander species or two or more of the listed frog species with at least 20 individuals (adults or eggs masses) or two or more of the listed frog species with Call Level Codes of 3.[E] • 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.	• None- The topography of the FOD ecosite on the study area does not likely support vernal pooling.

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Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • OMNRF Districts and wetland evaluations • Field Naturalist clubs • Canadian Wildlife Service Amphibian Road Call Survey • Ontario Vernal Pool Association: http://www.ontariovernalpools.org	• The habitat is the wetland area plus a 230 m radius of woodland area.[lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi] If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • SWH MIST[cxlix] Index #14 provides development effects and mitigation measures.	
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 (>120 m) from woodland ecosites; however, larger wetlands containing predominantly aquatic species (e.g. Bullfrog) may be adjacent to woodlands	• Wetlands >500 m^2 (about 25 m diameter),[ccvii] supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats.[clxxxii] • 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. Information Sources • Ontario Herpetofaunal Summary Atlas (or other similar atlases) • Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count. • OMNRF Districts and wetland evaluations. • Reports and other information available from Conservation Authorities.	Studies confirm: • Presence of breeding population of one or more of the listed newt/salamander species or two or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or two or more of the listed frog/toad species with Call Level Codes of 3. Ⓔ **or;** Wetland with confirmed breeding Bullfrogs are significant.Ⓔ • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys[cviii] will be required during the spring (March–June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWH MIST[cxlix] Index #15 provides development effects and mitigation measures.	• None- the study area does not contain wetland habitat.
Woodland Area-Sensitive Bird Breeding Habitat **Rationale:** Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area	• Yellow-bellied Sapsucker • Red-breasted Nuthatch • Veery • Blue-headed Vireo • Northern Parula • Black-throated Green Warbler	All Ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha.[cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxxv, cxxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvi, clvii, clviii, clix] • Interior forest habitat is at least 200 m from forest edge habitat.	Studies confirm: • Presence of nesting or breeding pairs of three or more of the listed wildlife species.Ⓔ • Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH.Ⓔ	• None- the study area does not contain any woodlands >30ha

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Specialized Wildlife Habitat	Wildlife Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
sensitive interior forest song birds.	• Blackburnian Warbler • Black-throated Blue Warbler • Ovenbird • Scarlet Tanager • Winter Wren • Pileated Woodpecker **Special Concern:** • Cerulean Warbler • Canada Warbler		<u>Information Sources</u> • Local birder clubs. • Canadian Wildlife Service (CWS) for the location of forest bird monitoring. • Bird Studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to determine what forests were of greatest value to interior species • Reports and other information available from Conservation Authorities.	• Conduct field investigations in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi] • SWH MIST[cxlix] Index #34 provides development effects and mitigation measures.	

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TABLE F3 Habitat of Species of conservation Concern considered SWH

Wildlife Habitat	Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
Marsh Breeding Bird Habitat **Rationale:** Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	• American Bittern • Virginia Rail • Sora • Common Moorhen • American Coot • Pied-billed Grebe • Marsh Wren • Sedge Wren • Common Loon • Green Heron • Trumpeter Swan **Special Concern:** • Black Tern • Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	• Nesting occurs in wetlands. • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present.[cxxiv] • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. Information Sources • OMNRF District and wetland evaluations. • Field Naturalist clubs • NHIC Records. • Reports and other information available from Conservation Authorities. • Ontario Breeding Bird Atlas.	Studies confirm: • Presence of five or more nesting pairs of Sedge Wren or Marsh Wren **or** breeding by any combination of four or more of the listed species.Ⓔ • Note: any wetland with breeding of one 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"[ccxi] • SWH MIST[cxlix] Index #35 provides development effects and mitigation measures.	• None- the study area does not contain wetlands
Open Country Bird Breeding Habitat **Rationale:** This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	• Upland Sandpiper • Grasshopper Sparrow • Vesper Sparrow • Northern Harrier • Savannah Sparrow **Special Concern** • Short-eared Owl	CUM1 CUM2	• Large grassland areas (includes natural and cultural fields and meadows) >30 ha.[clx, clxi, clxii, clxiii, clxiv, clxv, clxvi, clxvii, clxviii, clxix] • Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years).Ⓔ • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. • The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species. Information Sources • Agricultural land classification maps, Ministry of Agriculture • Local bird clubs • Ontario Breeding Bird Atlas • EIS Reports and other information available from Conservation Authorities.	Field Studies confirm: • Presence of nesting or breeding of two or more of the listed species.Ⓔ • A field with one 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] • SWH MIST[cxlix] Index #32 provides development effects and mitigation measures	• None- the study area does not include large grassland areas >30ha.
Shrub/Early Successional Bird Breeding Habitat	Indicator Spp: • Brown Thrasher • Clay-coloured Sparrow	CUT1 CUT2 CUS1	Large field areas succeeding to shrub and thicket habitats >10 ha[clxiv] in size.	Field Studies confirm:	• None- the study area does not contain large

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Wildlife Habitat	Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
Rationale: This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records.	Common Spp. • Field Sparrow • Black-billed Cuckoo • Eastern Towhee • Willow Flycatcher **Special Concern:** • Yellow-breasted Chat • Golden-winged Warbler	CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species	• Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years).Ⓔ • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species.[clxxiii] • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands. Information Sources • Agricultural land classification maps, Ministry of Agriculture. • Local bird clubs • Ontario Breeding Bird Atlas • Reports and other information available from Conservation Authorities.	• Presence of nesting or breeding of one of the indicator species and at least two of the common species.Ⓔ • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat.Ⓔ • 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] • SWH MIST[cxlix] Index #33 provides development effects and mitigation measures.	shrub/thicket habitats >10ha.
Terrestrial Crayfish **Rationale:** Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare.[ccii]	Chimney or Digger Crayfish; (*Fallicambarus fodiens)* Devil Crayfish or Meadow Crayfish; (*Cambarus Diogenes*)	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) 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. Information Sources • Information sources from "Conservation Status of Freshwater Crayfishes" by Dr. Premek Hamr for the WWF and CNF March 1998	Studies Confirm: • Presence of one or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites.[cci] • Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult.[cci] • SWH MIST[cxlix] Index #36 provides development effects and mitigation measures.	• None- the study area does not contain wetland features, or wet meadows.
Special Concern and Rare Wildlife Species **Rationale:** These species are quite rare or have experienced significant population declines in Ontario.	All Special Concern and Provincially Rare (S1–S3, SH) plant and animal species. Lists of these species are tracked by the NHIC.	All plant and animal element occurrences (EO) within a 1- or 10-km grid. Older element occurrences were recorded prior to GPS being available; therefore, location information may lack accuracy	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites.[lxxviii] Information Sources • NHIC will have Special Concern and Provincially Rare (S1–S3, SH) species lists with element occurrences data. • NHIC Website "Get Information": http://nhic.mnr.gov.on.ca • Ontario Breeding Bird Atlas	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life	Candidate – • Eastern Wood Pewee • Eastern Ribbonsnake • Hackberry Emperor • Monarch • Tawny Emperor • Spotted Sucker • Black Sandshell • Mucket

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Wildlife Habitat	Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosite Codes	Habitat Criteria and Information Sources		
			• Expert advice should be sought as many of the rare spp. have little information available about their requirements.	stage component for a species e.g. specific nesting habitat or foraging habitat. • SWH MIST[cxlix] Index #37 provides development effects and mitigation measures.	• Eastern Stiff-leaved Goldenrod • Hairy Fruited Sedge Confirmed – • Northern Map Turtle • Snapping Turtle

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TABLE F5 Animal Movement Corridors

Wildlife Habitat	Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		ELC Ecosites	Habitat Criteria and Information Sources		
Amphibian Movement Corridors **Rationale:** Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	• 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	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. • Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 **(Amphibian Breeding Habitat –Wetland)** of this Schedule. Information Sources • MNRF District Office • NHIC • Reports and other information available from Conservation Authorities. • Field Naturalist Clubs	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant • Corridors should have at least 15 m of vegetation on both sides of waterway or be up to 200 m wide of woodland habitat and with gaps <20 m • Shorter corridors are more significant than longer corridors; however, amphibians must be able to get to and from their summer and breeding habitat • SWH MIST Index #40 provides development effects and mitigation measures	• Candidate – natural areas adjacent or within the contiguous natural corridor of the Thames River should be considered potential amphibian movement corridors.

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TABLE F6 Significant Wildlife Habitat Expectations for Eco-districts within Eco-Region 7E

Ecodistrict	Wildlife Habitat and Species	Candidate SWH		Confirmed SWH Defining Criteria	Candidate or Confirmed Habitat Present Greenway WWTC
		Ecosites and Habitat Description	Habitat Criteria and Information		
7E-2	**Bat Migratory Stopover Area** Rationale: Stopover areas for long distance migrant bats are important during fall migration. • Hoary Bat • Eastern Red Bat • Silver-haired Bat	No specific ELC types or habitat descriptions	• Long-distance migratory bats typically migrate during late summer and early fall from summer breeding habitats throughout Ontario to southern wintering areas. Their annual fall migration may concentrate these species of bats at stopover areas. • This is the only known bat migratory stopover habitats based on current information. <u>Information Sources</u> • OMNRF for possible locations and contact for local experts • University of Waterloo, Biology Department	• Long Point (42°35'N, 80°30'E, to 42°33'N, 80°03'E) has been identified as a significant stop-over habitat for fall migrating Silver-haired Bats, due to significant increases in abundance, activity and feeding that was documented during fall migration. • The confirmation criteria and habitat areas for this SWH are still being determined. • SWH MIST Index #38 provides development effects and mitigation measures	• None- the study area is not included within the known stopover areas.

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APPENDIX G
Species of Conservation Concern Assessment

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SPECIES OF CONSERVATION CONCERN ASSESSMENT
GREENWAY WASTEWATER TREATMENT CENTRE

TABLE G1 Avian Species of Conservation Concern Assessment for Greenway Wastewater Treatment Centre

Common Name	Scientific Name	Priority Species[1]	ESA 2007	SARA 2002	Preferred Habitat[2]	Status and Observations
Eastern Wood-Pewee	*Contopus virens*	Regional Concern - Recovery Objective	SC	SC	Wooded habitats	Potential- Suitable habitat for this species is present in any mature wooded ecosite within the study area

[1] Government of Canada 2014.
[2] Cornell lab of Ornithology 2021.

TABLE G2 Herpetofauna Species of Conservation Concern Assessment for Greenway Wastewater Treatment Centre

Common Name	Scientific Name	S-rank	ESA 2007	SARA 2002	Preferred Habitat[1]	Status and Observation
Eastern Ribbonsnake	*Thamnophis sauritus*	S4	SC	SC	Aquatic habitats with forested riparian zone	Potential- suitable habitat for this species may be present on the nearshore banks adjacent to the Thames River.
Northern Map Turtle	*Graptemys geographica*	S3	SC	SC	Aquatic habitats with mollusc prey and basking areas	Confirmed- This species at been confirmed within the Thames River surrounding Greenway WWTC
Snapping Turtle	*Chelydra serpentina*	S4	SC	SC	Prefers shallow aquatic habitats and gravel/sand banks for nesting.	Confirmed- This species at been confirmed within the Thames River surrounding Greenway WWTC

[1] Ontario Nature 2021

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TABLE G3 Insects Species of Conservation Concern Assessment for Greenway Wastewater Treatment Centre

Common name	Scientific name	S-Rank	ESA 2007	SARA 2002	Preferred Habitat[1]	Status and Observation
Hackberry Emperor	*Asterocampa celtis*	S3	-	-	Habitats which support Hackberry trees	Potential – Hackberry trees are present within treed ecosites on the study area.
Monarch	*Danaus plexippus*	S2N,S4B	SC	SC	Caterpillars are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats.	Potential – Common milkweed is present within CUM1 ecosites on the study area.
Sleepy Duskywing	*Erynnis brizo*	S1	-	-	Oak or Oak-Pine Scrubland	Unlikely- the study area did not contain oak or oak-pine scrubland.
Tawny Emperor	*Asterocampa clyton*	S2S3	-	-	Riparian habitats which support Hackberry trees	Potential – Hackberry trees are present within treed ecosites on the study area.

[1] IUCN 2021

TABLE G4 Fish Species of Conservation Concern Assessment for Greenway Wastewater Treatment Centre

Common name	Scientific name	S-rank	ESA 2007	SARA 2002	Preferred Habitat[1]	Status and Observation
Spotted Sucker	*Minytrema melanops*	S5	SC	SC	Clear creeks and small to moderate sized rivers with sand and gravel substrate	Potential- the Thames River meets the description of preferred habitat.

[1] IUCN 2021

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TABLE G5 Mussel Species of Conservation Concern Assessment for Greenway Wastewater Treatment Centre

Common name	*Scientific Name*	S-rank	ESA 2007	SARA 2002	Preferred Habitat[1]	Status and Observation
Black Sandshell	*Ligumia recta*	S3	-	-	Found in medium-large rivers with strong current and substrates of coarse sand and gravel with cobbles.	Potential- the Thames River meets the description of preferred habitat.
Elktoe	*Alasmidonta marginata*	S3	-	-	Found in cool, medium-sized creeks or rivers with fast to moderately-flowing currents. They prefer rock and gravel substrates.	Unlikely- the Thames River is a large, warm-water, river, which would not meet this species preferred habitat.
Mucket	*Actinonaias ligamentina*	S3	-	-	Found in medium to large rivers with coarse sand and gravel substrates.	Potential- the Thames River meets the description of preferred habitat.

[1] IUCN 2021.

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TABLE G6 Plant Species of Conservation Concern Assessment for Greenway Wastewater Treatment Centre

Common name	*Scientific Name*	S-rank	ESA 2007	SARA 2002	Preferred Habitat[1]	Status and Observation
Broad Beech Fern	*Phegopteris hexagonoptera*	S3	**SC**	-	Grows in rich soils in deciduous forests, often in areas dominated by maple and beech trees	Unlikely- the study area does not contain deciduous forests and the species was not observed during the 2021 field study.
Chinese Hemlock-parsley	*Conioselinum chinense*	S2	-	-	Grows in stream banks, swamps and riparian forests	Unlikely-the species was not observed during the 2021 field study.
Eastern Green-violet	*Hybanthus concolor*	S2	-	-	Grows in nutrient rich, calcareous forests and woodlands, typically in mesic or bottomland conditions	Unlikely- the study area does not contain mesic bottomland deciduous forests and the species was not observed during the 2020 field study.
Eastern Stiff-leaved Goldenrod	*Solidago rigida ssp. rigida*	S3	-	-	found in open, dry areas associated with calcareous or sandy soil.	Potential – this species may be present within CUM1 ecosites within the study area.
Edible Valerian	*Valeriana edulis*	S1	-	-	Grows in moist montane meadows and subalpine parks	Unlikely- the study area does not contain moist meadows and the species was not observed during the 2021 field study.
Hairy Fruited Sedge	*Carex trichocarpa*	S3	-	-	Openings in bottomlands, marshes, wet meadows, wet thickets along streams and rivers	Potential - the species was not observed during the 2021 field study but may be present on vegetated portions of the lower banks of the Thames River

[1] FNAA 2020Adelaide Wastewater Treatment plant

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APPENDIX H
Species at Risk Assessment

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APPENDIX H

SPECIES AT RISK HABITAT ASSESSMENT

TABLE H1 Habitat Assessment for Potential Species at Risk within Greenway Wastewater Treatment Centre

Common Name	Scientific Name	ESA	SARA	Habitat Requirements (MECP 2021)	Year and General Location of Species Record	Observations and Likelihood of Occurrence within Study area
Flora (3)						
Butternut	*Juglans cinerea*	END	END	This species prefers moist, well-drained soil, often found along streams. Also found on well-drained gravel sites.	This species was identified as potentially occurring within NHIC 1km square	Potential – Suitable habitat is present within lowland areas of wooded ecosites within the study area. This species was no observed within the study area during the 2021 field study.
Kentucky Coffee-tree	*Gymnocladus dioicus*	THR	THR	This tree is found in floodplains and river valleys	MECP records for Greenway WWTC	Confirmed – This species is present within open parking areas near the dog park. Individuals observed within the study area during the 2021 field study are assumed to be planted as ornamentals.
Red Mulberry	*Morus rubra*	END	END	This species is found in forested floodplains, valleys, moist slopes in mixed hardwood forests	MECP records for Greenway WWTC	Unlikely – Wooded ecosites within the study area, however it was not observed within the study area during the 2021 field study.
Birds (7)						
Bank Swallow	*Riparia riparia*	THR	THR	Bank swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits.	Species identified within *OBBA* 10 km square.	Confirmed – The species was identified during the breeding bird survey foraging within the study area. The study area does not contain suitable banks for bank swallow nesting, and therefore it is assumed that this species is nesting on the northern bank of the Thames River. Since no habitat exists within study area, no further impact assessment is required.
Barn Swallow	*Hirundo rustica*	THR	THR	This species prefers human-made structures, such as open barns, bridges, or culverts to build their nests.	Species identified within OBBA 10 km square.	Confirmed – The species was identified during the breeding bird survey foraging within the study area. This species may have nest cups on the WWTC or under the pedestrian bridge located upstream of the study area. No nest cups were observed during the breeding bird survey. Since no habitat exists within study area, no further impact assessment is required.
Bobolink	*Dolichonyx oryzivorus*	THR	THR	This species prefers open prairie or meadow habitat, and builds its nests on the ground in the dense grasses.	Species identified within OBBA 10 km square.	Potential – Open meadow habitat is present within CUM1 ecosites on the study area.
Chimney Swift	*Chaetura pelagica*	THR	THR	This species establishes colonies within unused chimneys in order to roost or build their nest.	Species noted within the One River EA (Matrix 2019). Species identified within NHIC 1km square.	Confirmed – The species was identified during the breeding bird survey foraging within the study area. The study area does not contain suitable chimneys for nesting, and therefore it is assumed that this species is nesting within one of the surrounding neighbourhoods. Since no habitat exists within study area, no further impact assessment is required.
Common Nighthawk	*Chordeiles minor*	SC	THR	Open areas with little to no ground vegetation, such as, forest clearings, rock barrens, peat bogs, lakeshores, and mine tailings.	Species identified within OBBA 10 km square.	Unlikely – The study area does not contain the preferred habitat for this species.
Eastern Meadowlark	*Sturnella magna*	THR	THR	This species primarily breeds in prairie and grassland habitats, but may also breed in croplands, orchards, or overgrown fields.	Species identified within OBBA 10 km square.	Potential – Open meadow habitat is present within CUM1 ecosites on the study area.
Wood Thrush	*Hylocichla mustelina*	SC	THR	This species prefers mature, unfragmented, deciduous forests.	Species identified within NHIC 1km square.	Unlikely – The study area does not contain the preferred habitat for this species.
Herpetofauna (3)						
Eastern Spiny Softshell	*Apalone spinifera*	END	THR	This species prefers slow-moving large water bodies or rivers with soft muddy bottoms and aquatic vegetation. Nests are located near water on sandy beaches or gravel banks with sun.	Species noted within the One River EA (Matrix 2019). Species identified within NHIC 1km square	Confirmed – The Thames River within the study area contains the preferred habitat for this species. This species has been documented within the study area in recent years (Matrix 2019).

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Common Name	Scientific Name	ESA	SARA	Habitat Requirements (MECP 2021)	Year and General Location of Species Record	Observations and Likelihood of Occurrence within Study area
Eastern Foxsnake	*Pantherophis gloydi*	END	END	This species is found in old fields, marshes, along hedgerows, drainage canals and shorelines.	Species identified within ORAA 10km square	Potential – the narrow treed riparian corridor of the Thames River may be suitable habitat for this species.
Eastern Hog-nosed Snake	*Heterodon platirhinos*	THR	THR	This species prefers sandy, well-drained soils to burrow and lay eggs. Such as beaches and dry forests.	Species identified within ORAA 10km square	Unlikely – The study area does not contain the preferred habitat for this species.
Mammals (5)						
American Badger	*Taxidea taxus*	END	END	This species prefers open grassland habitats	This species was identified as potentially occurring within NHIC 1km square	Unlikely – The study area does not contain the suitable habitat for this species.
Eastern Small-footed Myotis	*Myotis leibii*	END	END	Day and maternity roosts typically in cavities of trees, under rocks, in bedrock fissures, under bridges, culverts, abandoned buildings, etc. Hibernate in caves and abandoned mines.	Species distribution in the province poorly understood. Suitable habitat potential assessed for due diligence.	Unlikely – Though suitable roosting habitat may be present in the form of tree cavities; this species prefers rock crevices and anthropogenic structures. No overwintering habitat present.
Little Brown Myotis	*Myotis lucifugus*	END	END	Mature trees, roost within cavities and under loose bark. Can also utilize anthropogenic structures such as abandoned buildings, barns, and attics. Hibernate in caves and abandoned mines.	Species potential based on the Mammal atlas of Ontario	Potential – The FOD and CUW ecosites contain mature trees that may contain suitable day and maternity roosting features as cavities and loose bark. No overwintering habitat present.
Northern Myotis	*Myotis septentrionalis*	END	END	Mature trees, roost within cavities and under loose bark. Can also utilize anthropogenic structures such as abandoned buildings, barns, and attics. Hibernate in caves and abandoned mines.	Species potential based on the Mammal atlas of Ontario	Potential – The FOD and CUW ecosites contain mature trees that may contain suitable day and maternity roosting features as cavities and loose bark. No overwintering habitat present.
Tri-colored Bat	*Perimyotis subflavus*	END	END	Mature trees, with preference for downed foliage of oak and maple species. Has been observed to utilize anthropogenic structures such as abandoned buildings, barns, and attics. Hibernate in caves and abandoned mines.	Species distribution in the province poorly understood. Suitable habitat potential assessed for due diligence.	Potential – The FOD and CUW ecosites contain mature trees that may contain suitable day and maternity roosting features as cavities and loose bark. No overwintering habitat present.
Fish (3)						
Black Redhorse	*Moxostoma duquesnei*	THR	NAR	This species prefers pools and riffle of medium-sized rivers that are usually less than 2 m deep. This species has been observed in moderate to fast currents, with sandy or gravel substrates.	Critical habitat and species presence were documented by Fisheries and Oceans Canada (DFO 2021)	Confirmed – The Thames River within the study area contains recent records of this species (Ramsey 2021, Pers. Comm.).
Lake Sturgeon	*(Great Lakes - Upper St. Lawrence River population)*	THR	NAR	Larger rivers and lakes, usually less than 30 feet deep.	This species was identified as potentially occurring within NHIC 1km square	Unlikely – The study area does not contain the preferred habitat for this species.
Silver Shiner	*Notropis photogenis*	THR	THR	This species prefers deep riffles or pools of medium to large rivers with moderate to high gradients. Preferred substrates are variable.	Species noted within the One River EA (Matrix 2019). Critical habitat and species presence were documented by Fisheries and Oceans Canada (DFO 2021)	Confirmed – The Thames River within the study area contains recent records of this species and has been identified as critical habitat by the DFO.

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Common Name	Scientific Name	ESA	SARA	Habitat Requirements (MECP 2021)	Year and General Location of Species Record	Observations and Likelihood of Occurrence within Study area
Mussels (3)						
Rayed Bean	*Villosa fabalis*	END	END	This species prefers small to large streams often in or near riffle areas, and in the headwaters and smaller tributaries of river systems. Four potential host species for the larvae include Mottled Sculpin (*Cottus bairdii*), Smallmouth Bass (*Micropterus dolomieu*), Greenside Darter (*Etheostoma blennioides*) and Rainbow Darter (*Etheostoma caeruleum*).	Species presence was documented by Fisheries and Oceans Canada (DFO 2021)	Potential – The Thames River within the study area contains the preferred habitat for this species, and the host species are present.
Round Pigtoe	*Pleurobema sintoxia*	END	END	This species is found in rivers of various sizes with deep water and sandy, rocky, or mud bottoms. Host species for larvae include Bluegill (*Lepomis macrochirus*), Spotfin shiner (*Cyprinella spiloptera*), Bluntnose minnow (*Pimephales notatus*), and Northern redbelly dace (*Chrosomus eos*).	MECP records for Greenway WWTC.	Potential – The Thames River within the study area contains the preferred habitat for this species, and the host species are present.
Wavy-rayed Lampmussel	*Lampsilis fasciola*	THR	SC	This species prefers riffle areas of clear, small to medium sized streams and rivers of various sizes with gravel and sand stabilized with cobble and boulders. Larvae hosts for this species include: Smallmouth Bass and Largemouth Bass	Species was documented within UTRCA records (Ramsey 2021, Pers. Comm.)	Potential – The Thames River within the study area contains the preferred habitat for this species, and the host species are present.

ESA - *Endangered Species Act*
SARA - *Species at Risk Act*

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Mobility Master Plan

Environmental and Ecological Planning Advisory Committee
January 20, 2022

London CANADA

Presentation Overview

- Context
- Scope
- Schedule
- Engagement
- Draft Vision & Guiding Principles

“Mobility is the movement of people and goods through, and beyond, the city from one location to another in a safe, accessible, convenient, and affordable manner”

-The London Plan (2016)

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Context

- Smart Moves Transportation Master Plan (2013)
- London Road Safety Strategy (2014)
- The London Plan (2016)
- London ON Bikes Cycling Master Plan (2016)
- Rapid Transit Master Plan (2017)
- Complete Streets Design Manual (2018)
- Council Strategic Plan (2019 – 2023)
- Community Diversity and Inclusion Strategy (2019)
- Safe Cities London Action Plan (2020)
- Multi-Year Accessibility Plan (in development)
- Climate Emergency Action Plan (in development)

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Mobility Facts

- Londoners make an average of 3.4 trips per day; that adds up to 1.63 million trips each day
- 5.2 km is the average trip distance within London
- 273,000 vehicles are registered in London (almost one per adult)
- COVD-19 has resulted in reduced transit and automobile travel and increased walking and cycling
- Automobile use has declined but still generates more than 1/3 of greenhouse gas emissions
- Access to transportation is linked to low London labour market participation

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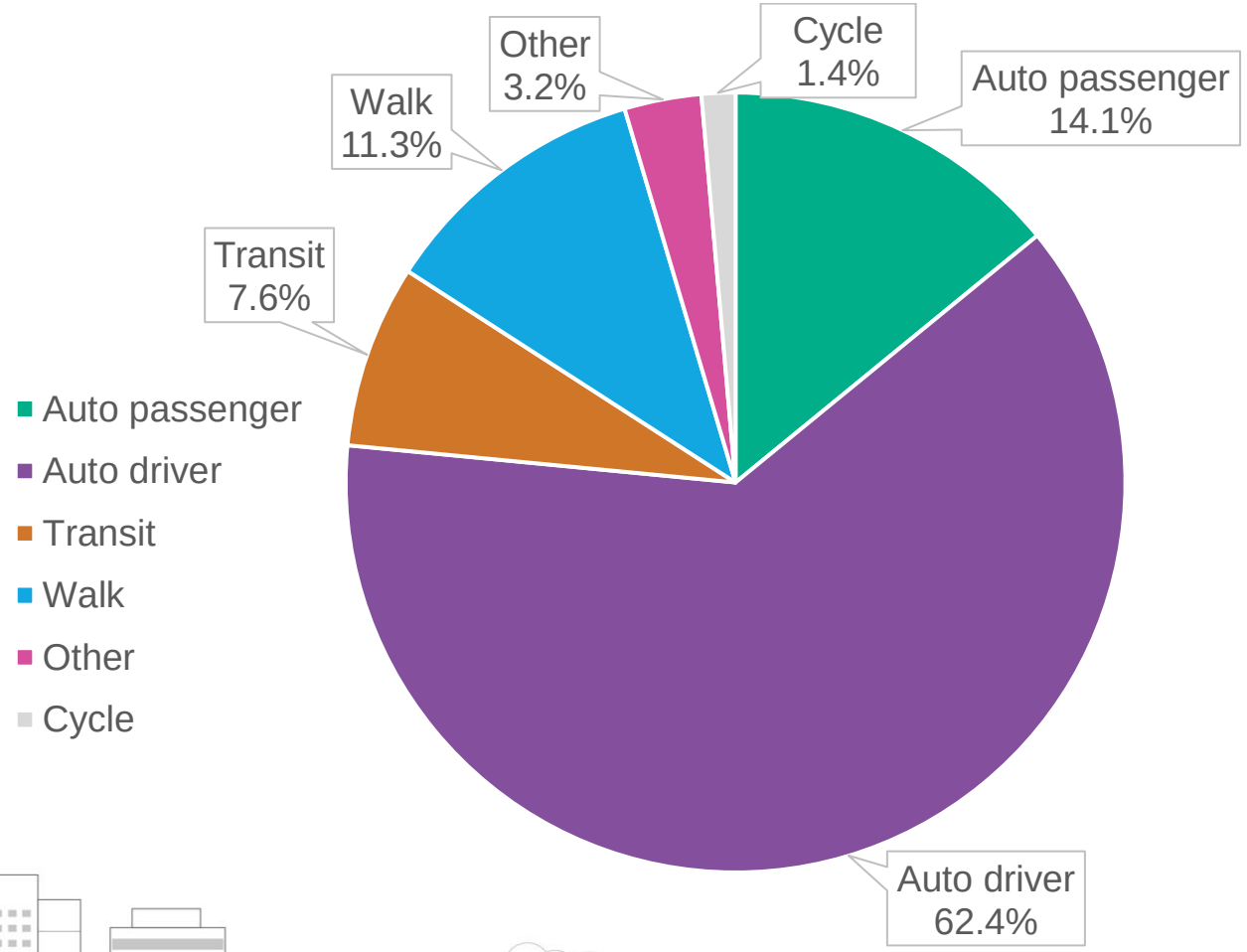
2016 Daily Mode Share



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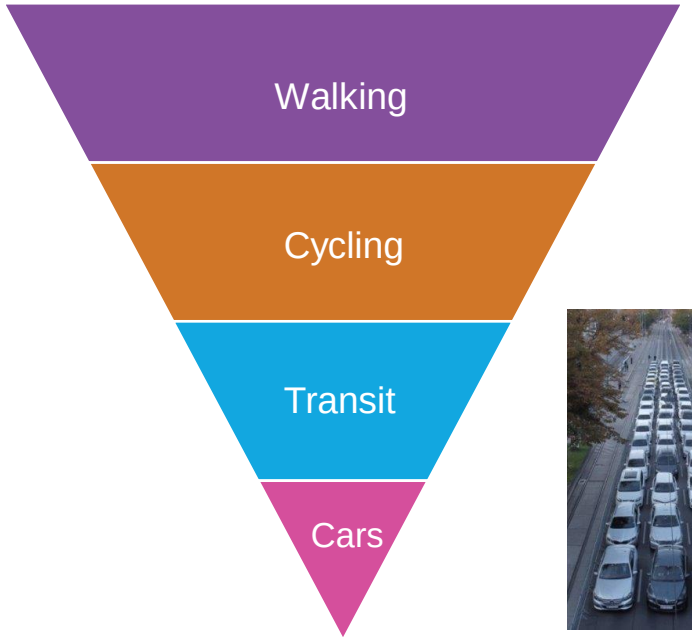
Scope Considerations

- Moving people
- Multi-modal level of service
- Cycling
- Equity and inclusion
- Link to land use
- Reducing auto-dependency



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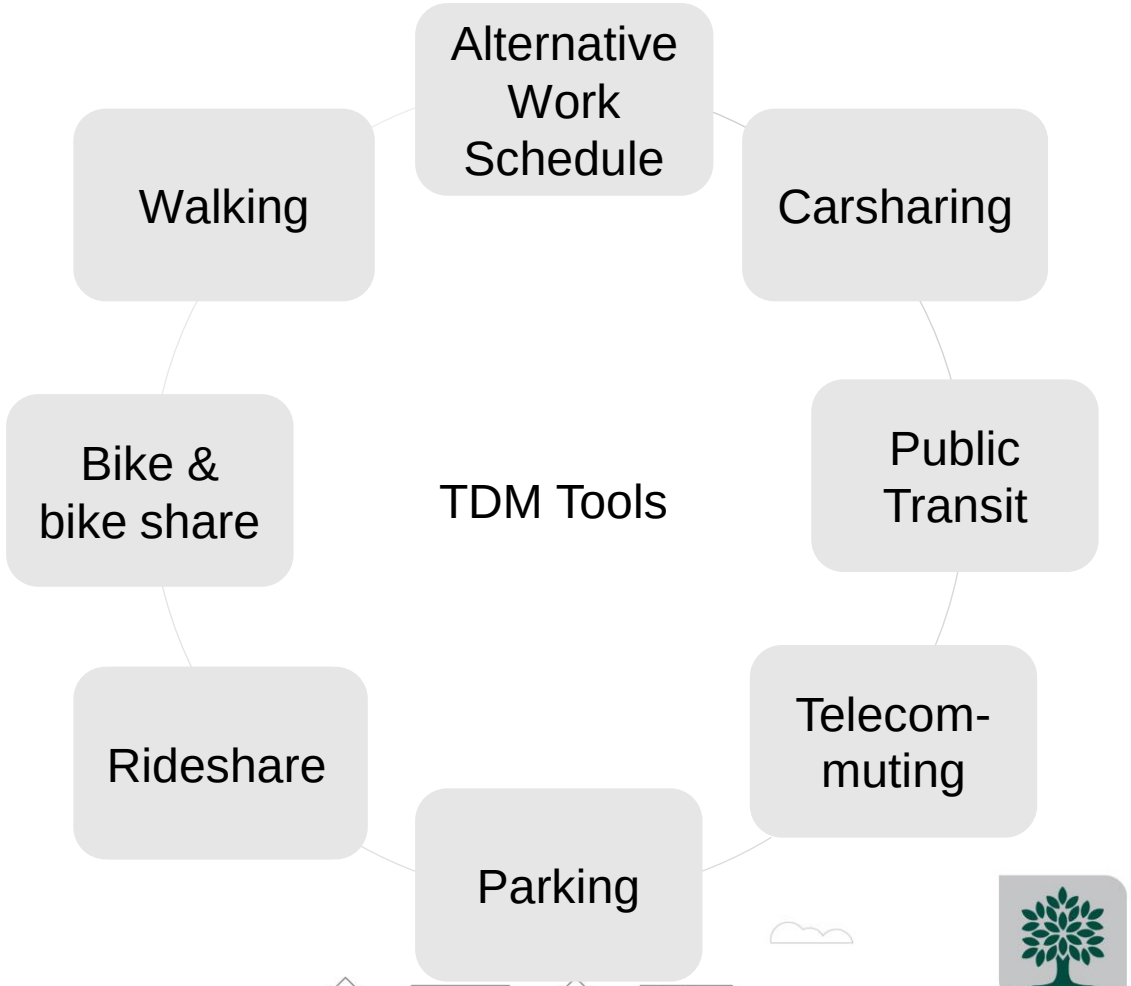
Scope Considerations

- Climate lens
- Transportation Demand Management (TDM)
- Data collection and modelling
- Operations & winter maintenance
- Financial implications



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Schedule

Phase 1: Establish shared vision & understand needs	Phase 2: Explore solutions & make connections	Phase 3: Confirm & refine path forward
Fall 2021 – Spring 2022	**Summer 2022 – Winter 2023**	**Spring 2023 – Winter 2024**
• Establish community connections • Provide education opportunities • Consult on vision and guiding principles • Learn about mobility experiences, goals, and barriers	• Identify opportunities and challenges • Link feedback to existing policies, plans and programs and identify gaps • Collect people-trip information • Develop options for future mobility networks • Identify opportunities for community empowerment	• Begin drafting Mobility Master Plan • Forecast budgets needed to carry out the plan • Revisit recommendations with most impacted groups • Present & publish final plan

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Engagement Framework

- Follow equitable engagement best practices
- Use IAP2 Spectrum of Public Participation
- Leverage existing networks (e.g., Advisory Committees)
- Form a Community Engagement Panel
- Recruit Community Connectors
- Complete a demographics data analysis
- Ensure representation from Indigenous people, Black people, people of colour and other equity-deserving groups
- Identify and address engagement barriers
- Establish clear feedback loops

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Draft Vision Statement

“In 2050, Londoners of all identities, abilities and means will have viable mobility options to allow them to move throughout the city safely and efficiently. The movement of people and goods will be environmentally sustainable, affordable, and supportive of economic growth and development.”

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Mobility Master Plan Guiding Principles

Environmentally sustainable:

Take bold action to address climate change and design and move in ways that protect and enhance the natural environment.

Integrated, connected and efficient:

Strengthen community and the economy with better access to people, places, goods and services as London grows.

Financially sustainable:

Ensure mobility and its infrastructure is affordable for current and future generations.

Equitable:

Recognize diverse mobility needs and embed equity into decision making to enable everyone to move through the city.

Healthy and safe:

Promote and protect the physical, mental and social wellbeing of all and encourage active living.

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Staying Connected

For project updates:

- Subscribe to email list
- Visit web page: getinvolved.london.ca/mobility-master-plan

To contact the team:

- mmp@london.ca
- 519-661-4580

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A Better London For All

Mobility Master Plan

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