Windermere Road Improvements, Municipal Class Environmental Assessment, Environmental Impact Study

Draft Report

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City of London

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Sign-off Sheet

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Table of Contents

List of Tables

List of Appendices

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

COSEWIC. 2008. COSEWIC assessment and status report on the Snapping Turtle Chelydra serpentina in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 47 pp.

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References
December 17, 2021

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UTRCA [Upper Thames River Conservation Authority]. 1998. The Thames River Watershed: A Background Study for Nomination under the Canadian Heritage Rivers System. Online: https://thamesriver.on.ca/wp-content/uploads/Publications/Thames-CHRS-BackgroundStudy.pdf

UTRCA [Upper Thames River Conservation Authority]. 2018. Regulated Areas Screening Map. Accessed December 7, 2021. Online: https://maps.thamesriver.on.ca/

APPENDIX A
Figures

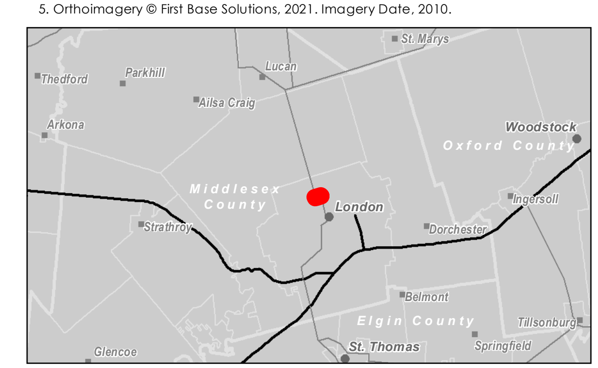
Stantec

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

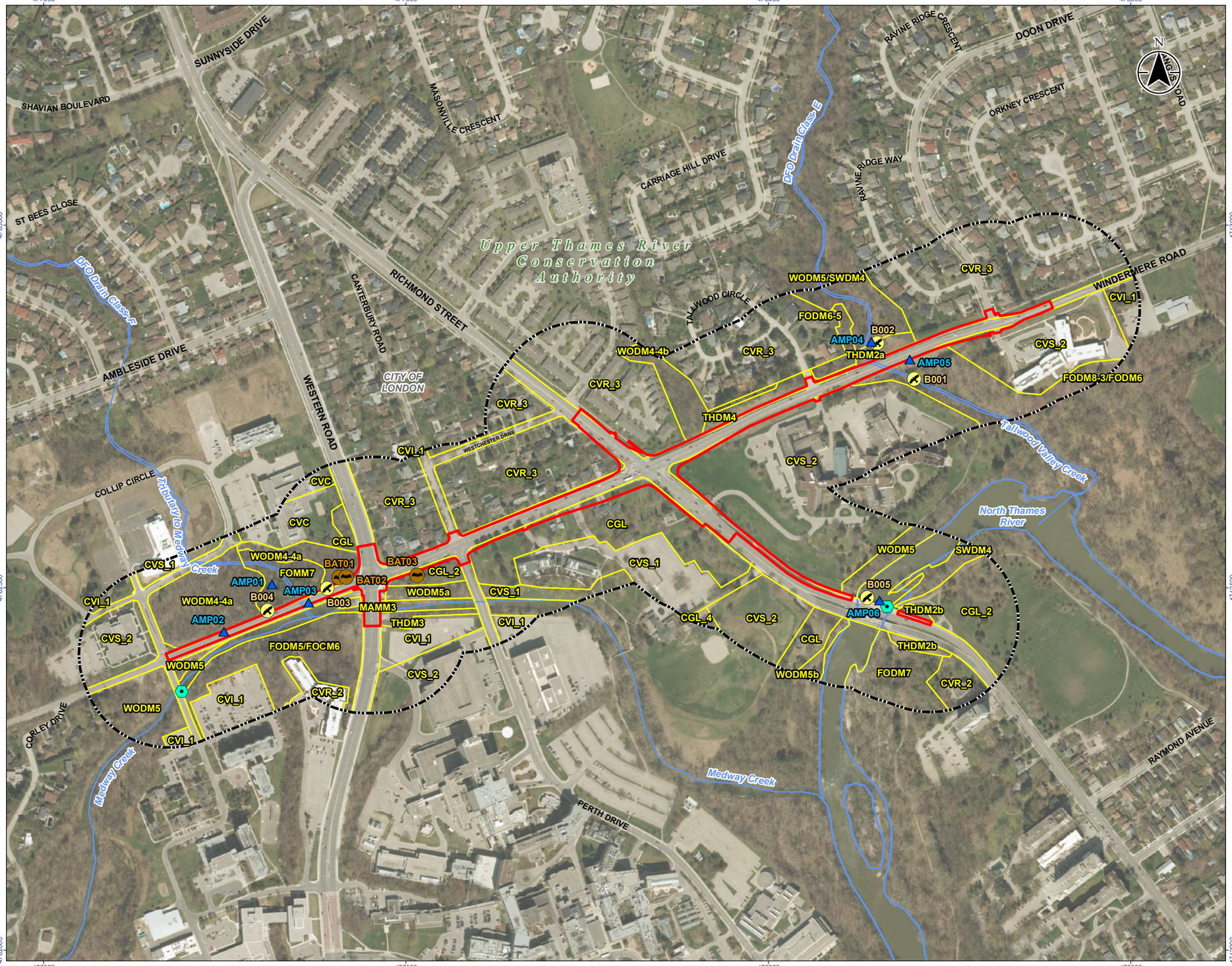
165001183 REV4
Prepared by KB on 2021-12-10
Technical Review by DH on 2021-12-06

Client/Project
CITY OF LONDON
WINDERMERE RD EA

Figure No.
1

DRAFT

Title
Study Area and Designated Features



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

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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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

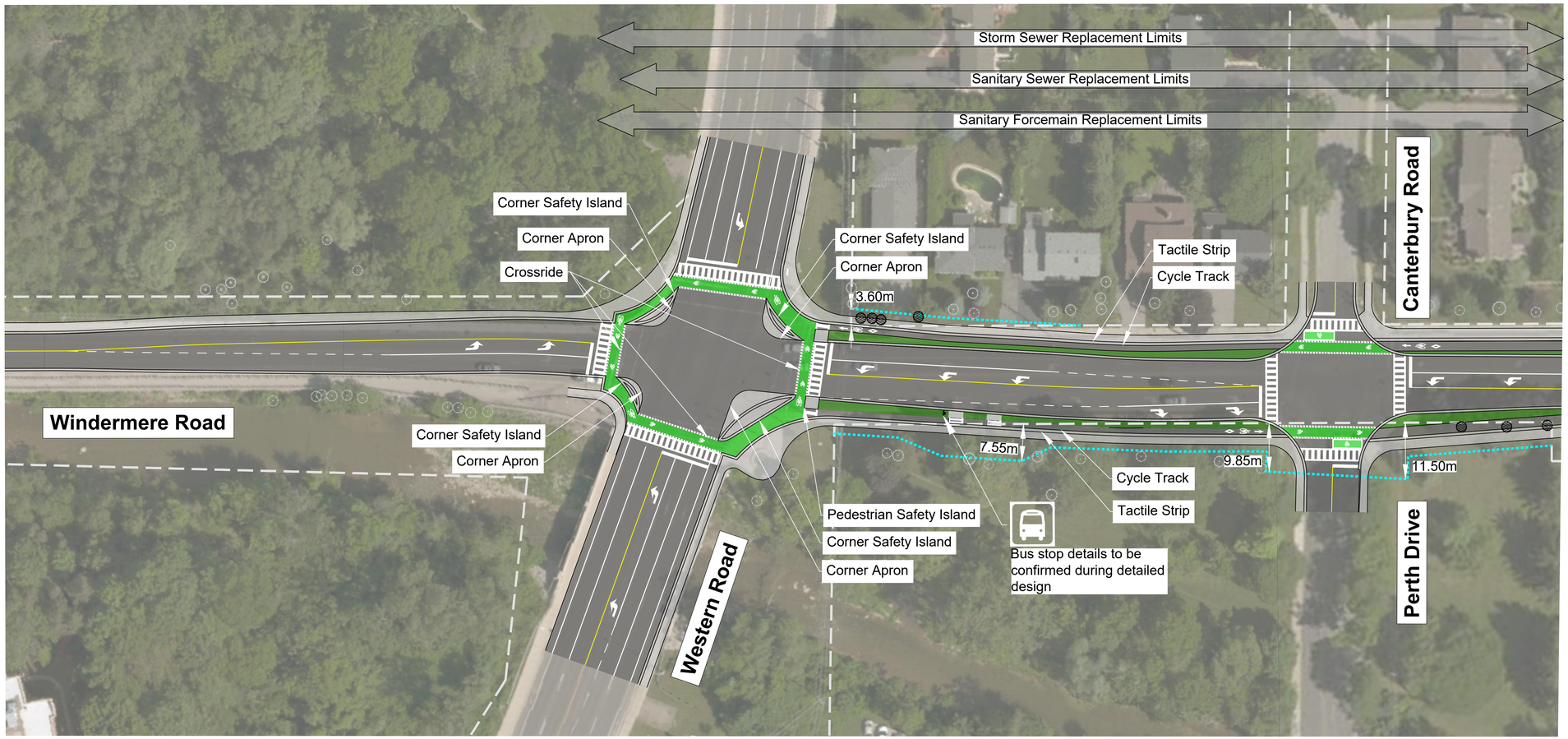
THICKET (THDM2, THDM3, THDM4)	WOODLAND (WODM4-4, WODM5)	FORESTS (FOCM6, FOMM7, FODM6 / 7 / 8)	RIVERBANK MARSH & SWAMP (MAM & SWDM4)	CONSTRUCTED AREAS (CGL, CVC, CVR, CVS)	SCIENTIFIC NAME	COMMON NAME	PROVINCIAL STATUS (S-RANK)	SARO & COSEWIC STATUS	REGIONAL STATUS (MIDDLESEX)	COEFFICIENT OF CONSERVATISM	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
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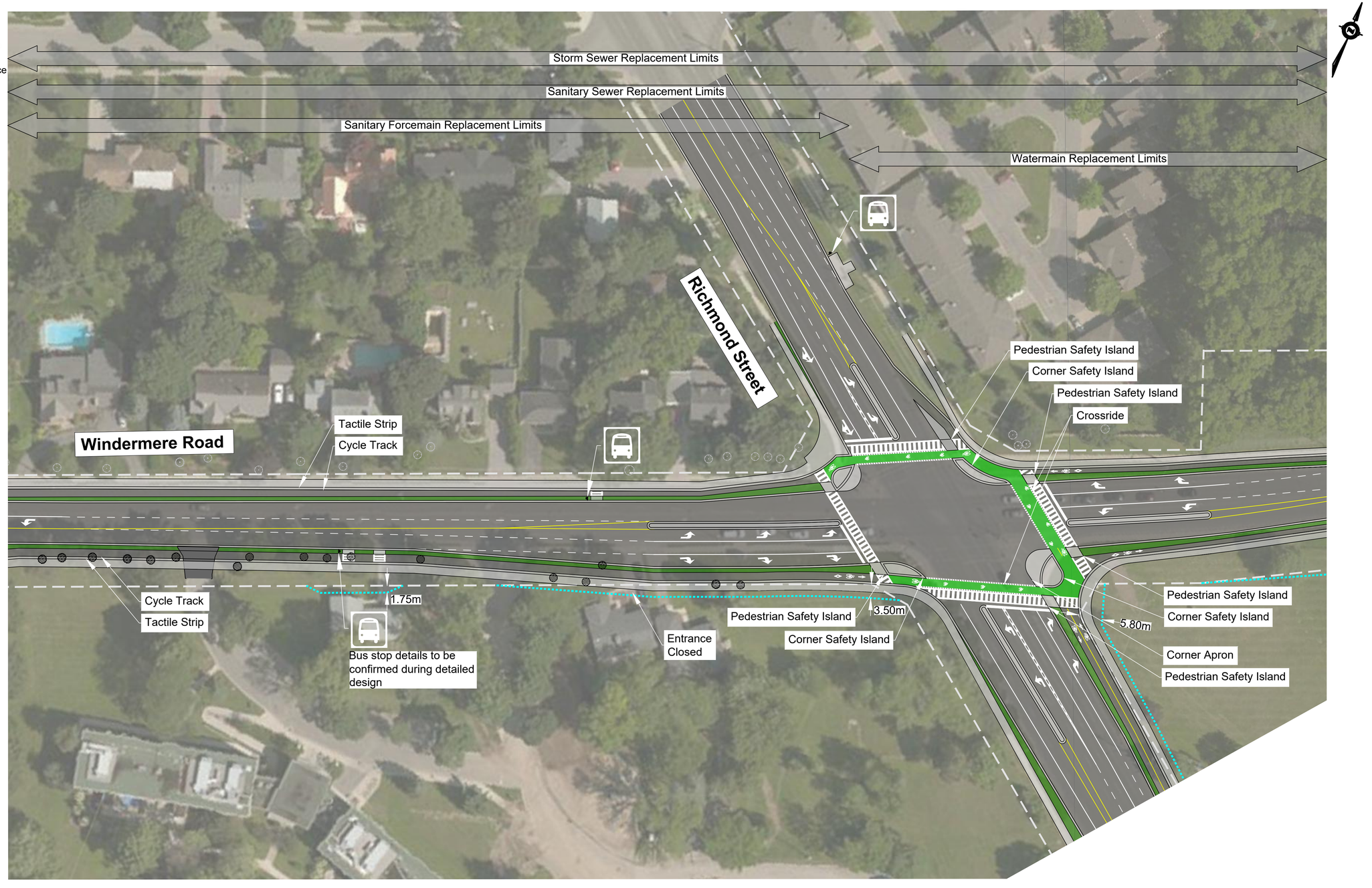

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TITLE

WINDERMERE RD EA

WINDERMERE ROAD

PROJECT No.

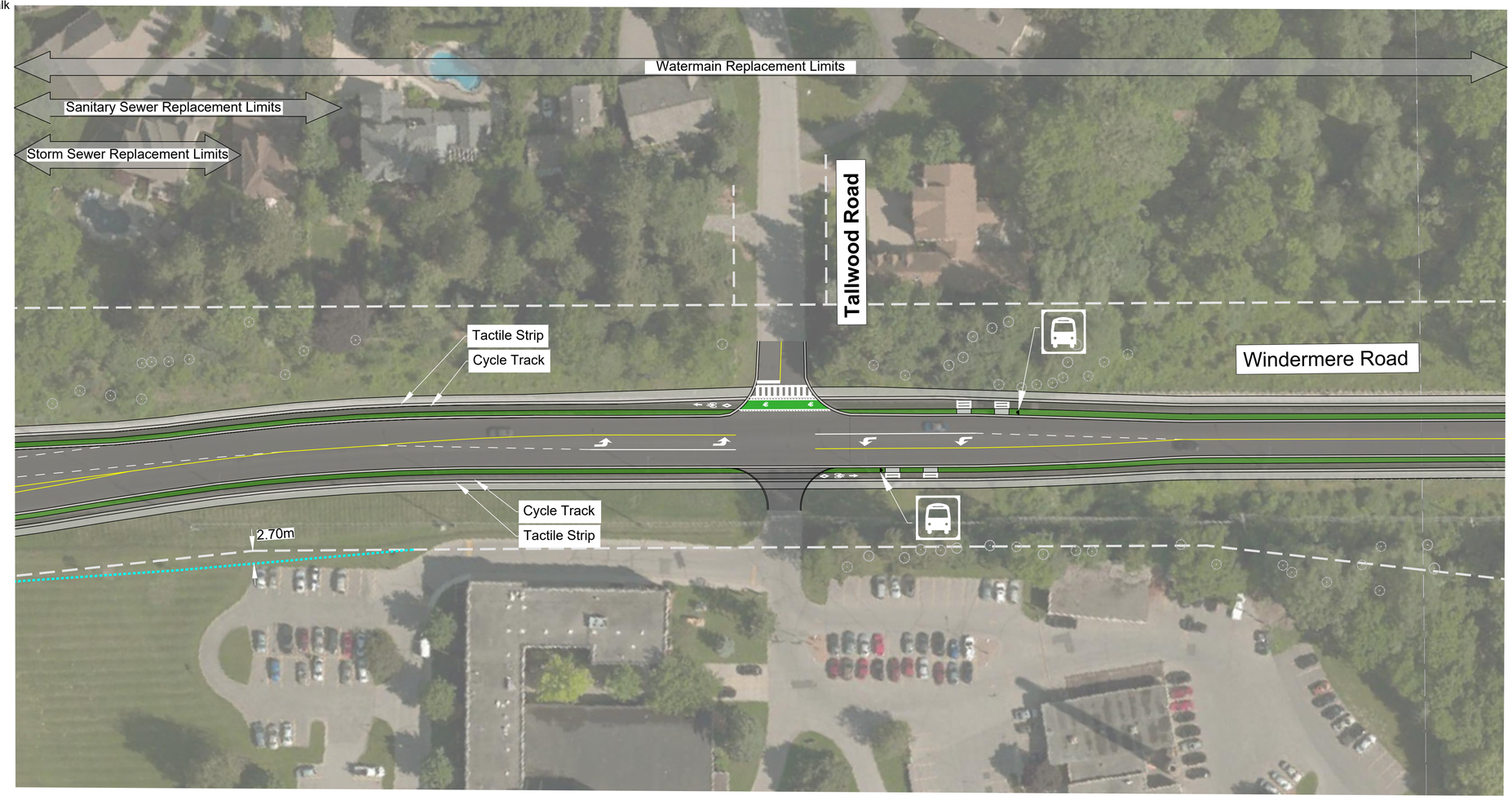
SHEET No.

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



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London CANADA

SCALE

TITLE

WINDERMERE RD EA

WINDERMERE ROAD

PROJECT No.

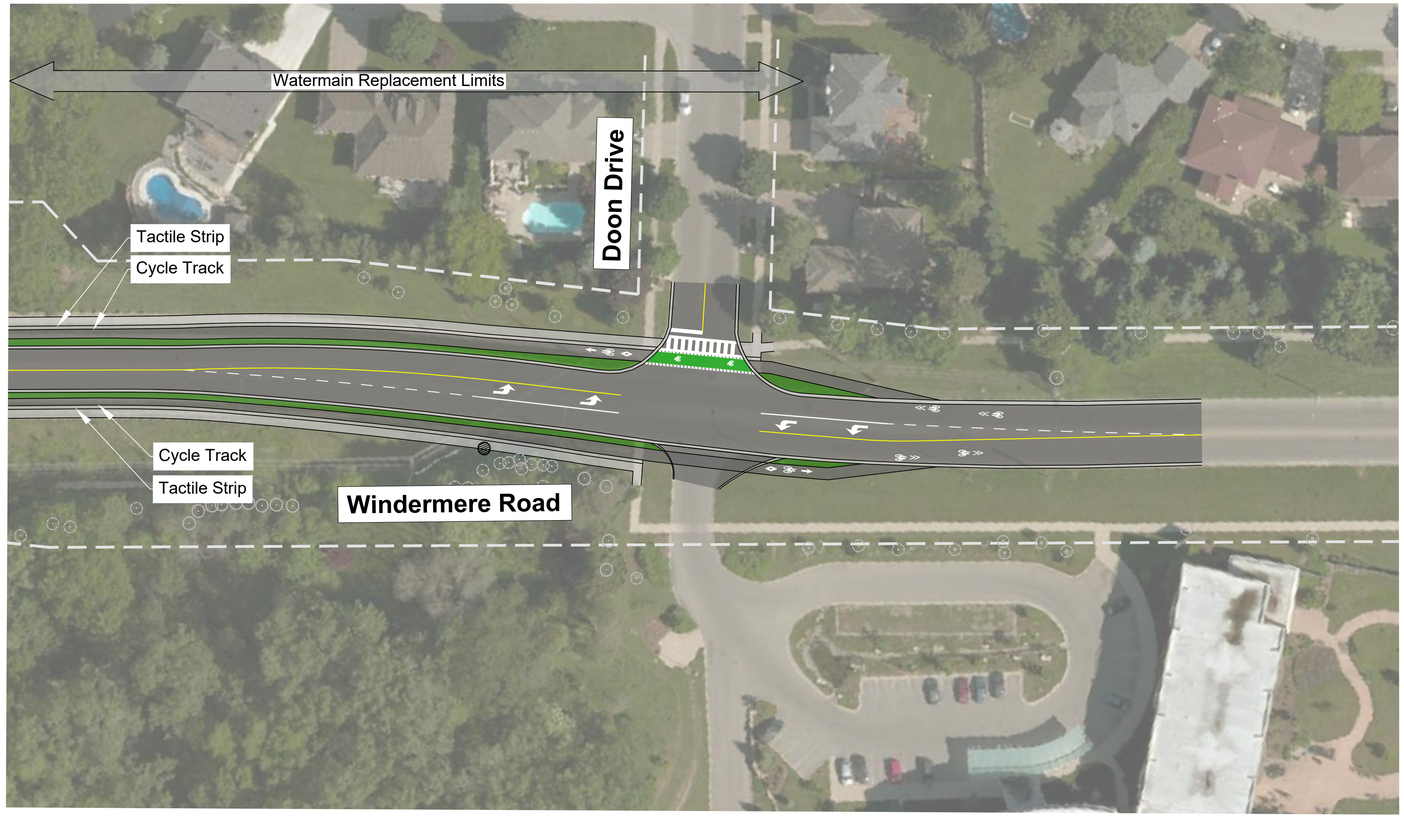
SHEET No.

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



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					DESIGN				
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					CHECKED				
					APPROVED				
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London CANADA

SCALE

TITLE

WINDERMERE RD EA

WINDERMERE ROAD

PROJECT No.

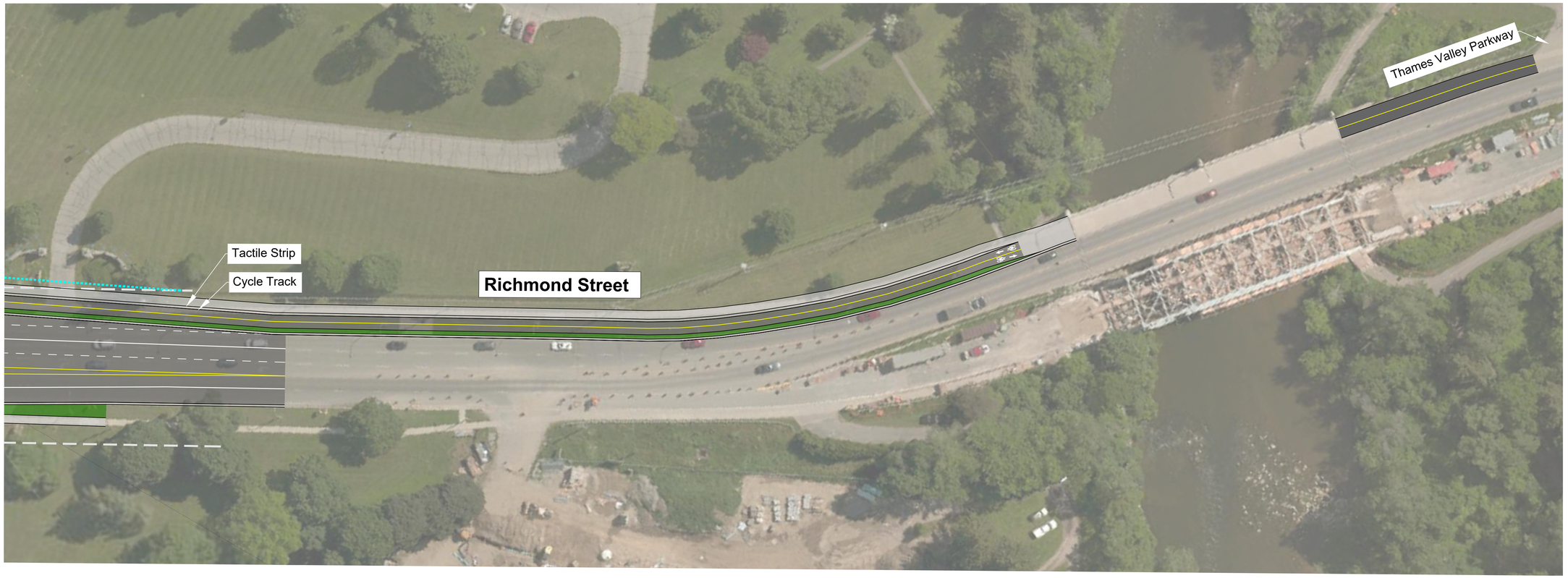
SHEET No.

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



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					DRAWN BY				
					CHECKED				
					APPROVED				
					DATE				

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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.