Mud Creek – Beaverbrook Avenue

Environmental Impact Study (EIS)

Project Location:
323 Oxford Street West, 92 Proudfoot Lane, and 825 Proudfoot Lane, London, ON
Part Lots 19 & 20, Concession 2
London, ON

Prepared for:
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Engineers, Scientists, Surveyors.

Contents

Figures

Tables

Appendices

1.0 Introduction

Sam Katz Holdings Ltd. (the proponent) has initiated the updated Draft Plan of Subdivision approval and zoning by-law amendment process for institutional and residential development on a legal parcel located at the northeast corner of Oxford Street West and Proudfoot Lane in the City of London. The property is located on Concession 2, Part Lots 19 and 20. For the purpose of this report, the Subject Lands are composed of three properties that are under the same ownership: 323 Oxford Street West, 92 Proudfoot Lane, and 825 Proudfoot Lane. As part of the proposed development, and as shown within the London Plan, Beaverbrook Avenue will be extended to connect the existing portions of this road west and south of the Subject Lands. The Subject Lands are bounded approximately by the CP rail line to the north, Oxford Street West to the south, Proudfoot Lane to the west and Cherryhill Boulevard to the east [Figure 1].

The Subject Lands are located within the Mud Creek subwatershed, a tributary of Thames River. Under existing conditions, stormwater runoff within the subwatershed contributes to frequent flooding along Oxford Street West and Proudfoot Lane where the proposed Oxford Street Rapid Transit Corridor will be located.

The application dates back to the early 1990's, when a Draft Plan of Subdivision was approved by the Ministry of Municipal Affairs on September 26, 1990 (MBTW, 2020). A revised Draft Plan was prepared in 1999 and approved by Council in 2000 following completion of a subwatershed study for Mud Creek (Beak, 1995). The City of London Official Plan (1989) and Zoning By-law were amended to implement the approved Draft Plan of Subdivision (MBTW, 2020). Subsequent updates to the Official Plan (the 2016 London Plan) affecting the Subject Lands were appealed and settled by the Local Planning Appeal Tribunal (LPAT) in December 2019.

In 2017, the City of London completed a Schedule 'B' Municipal Class Environmental Assessment (EA) to identify the preferred drainage and stormwater management strategy in the Mud Creek Subwatershed. The objectives of the EA strategy were to:

- Mitigate the flooding impacts on developed and undeveloped public and private lands, and to reduce the frequency of flooding of the proposed Oxford Street Rapid Transit Corridor.
- Rehabilitate sections of the Mud Creek corridor to a sustainable creek cross-section, which will improve the aquatic habitat in the short term and the terrestrial habitat in the long-term.
- Protect natural heritage features and functions through retention where possible and where necessary, to provide appropriate mitigation/compensation so proposed or upgraded infrastructure satisfies Official Plan Policy 15.3.3.

The preferred alternative presented in the EA included the following developer-led works on the Subject Lands:

- Construction of an approximately 1 kilometer (km) long natural corridor channel generally 60-metres wide from north of Oxford Street to the CP Railway.
- Compensation measures include the following:
    - Wetland and terrestrial habitat re-creation for Species at Risk, and other wildlife;
    - Pools and riffles within the stream corridor to enhance the aquatic habitat;
    - A multi-use pathway and 5 metre buffer along the west side of the corridor; and,
    - Realignment of the sanitary trunk sewers to the road network to mitigate impacts from future sewer maintenance/replacement.
- Up to three stream crossings of the proposed Beaverbrook Avenue extension
- Onsite stormwater management controls (private permanent systems) for the remaining 54-hectare service area.

The EA also recommended mitigation and compensation measures for impacts resulting from implementation of the Mud Creek corridor preferred alternative. These include 1:1 compensation by area (or 1:3 replacement by number of trees) for removal of woodlands within the limits of the preferred alternative. Reference to mitigation and compensation measures on private development

lands outside the corridor or road alignments were not included within the EA. This EIS will incorporate the recommendations for compensation from the EA related to the corridor construction and extensions of Beaverbrook Avenue and Westfield Drive while separately providing recommendations for woodland compensation in the areas of proposed development.

Natural heritage features on the Subject Property were further confirmed through a negotiated settlement of the London Plan Map 5, as settled through site-specific appeal on February 3, 2019 (LPAT Case Number PL170100). The settlement confirmed the alignment of the 1 km long Mud Creek natural channel and valleyland as well as the designation of Significant Woodland on the Subject Lands, which are described further in Section 2.1 of this report. As this settlement occurred after the completion of the EA, the determination of significant natural heritage features on the Subject Lands within the negotiated settlement supersedes the conclusions of the Mud Creek EA with respect to the Subject Lands. The LPAT settlement states that the modifications agreed to on Map 5 “implement the Mud Creek Environmental Assessment with a Natural Heritage designation and related policies…”. The modifications agreed upon were deemed to have “regard to matters of provincial interest under s.2 of the Planning Act, to be consistent with the Provincial Policy Statement and to represent good planning.”.

1.1 Report Objective

This report is a Subject Lands Status Report and Environmental Impact Study (SLSR/EIS) for the Subject Lands, as requested by the City of London and Upper Thames River Conservation Authority (UTRCA) [Appendix A]. The objective of the SLSR/EIS is to describe the natural heritage features and functions to be protected or replicated on the Subject Lands, as determined in previous studies and/or agreed upon in the negotiated settlement, and to provide recommendations for avoidance or mitigation of impacts, potential restoration and enhancement measures, and a monitoring program to protect significant natural heritage features and functions.

The SLSR/EIS will reference the negotiated settlement for assessment of features, as well as incorporate findings and recommendations from the Mud Creek Subwatershed EA (CH2M 2017) and earlier natural heritage studies undertaken on the Subject Lands [Section 1.3]. The Study Area for the EA included the property at 323 Oxford Street West, but not the properties along Proudfoot Lane. Additional life science data collection was completed by MTE Consultants for these additional lands (92 and 825 Proudfoot Lane) in 2018. This report summarizes the data provided in an SLSR/EIS completed by LGL (2016) as part of Mud Creek EA and compiles the data collected by MTE in 2018 for the additional properties along Proudfoot Lane, as well as subsequent surveys undertaken by MTE in 2020 and 2021.

The process and reporting are also designed to provide a supporting document for a subsequent site alteration permit application that may be submitted to the UTRCA.

1.2 Format

Natural heritage features and functions identified in this SLSR/EIS were evaluated through a review of the Natural Heritage Reference Manual (NHRM, 2010) for policy 2.1 of the Provincial Policy Statement (MMAH, 2020), Section 15 of the City of London Official Plan (1989), and in-force policies of the London Plan as of April 15, 2021.

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

Section 2.0	Land Use Setting and Policy Overview
Section 3.0	Triggers for EIS
Section 4.0	Description of the Natural Environment
Section 5.0	Natural Heritage Policy Considerations
Section 6.0	Description of the Development
Section 7.0	Mitigation and Recommendations
Section 8.0	Summary and Conclusions
Section 9.0	References

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

1.3 Background and Related Studies

The following relevant studies and files were reviewed as part of this SLSR/EIS:

- Natural Heritage Study (BioLogic, 2008)
- Mud Creek Subwatershed Class Environmental Assessment (CH2M, 2017), including the Subject Lands Status Report and Environmental Impact Statement (LGL, 2016)
- The Beaverbrook Lands – Initial Proposal Report (MBTW, 2020)
- Functional Servicing and Stormwater Management Report (TMIG, 2021)

1.4 Pre-Consultation

A proposal review meeting to discuss the Proposed Draft Plan of Subdivision was held on June 10, 2020, with the proponent, City staff, and consultants. Comments related to natural heritage were provided in the meeting by James McKay, City of London Ecologist, and by email from Christine Creighton, UTRCA Land Use Planner. An EIS scoping meeting was held on November 12, 2020, the proponent, City staff, and consultants, including ecologists from MTE Consultants. The Issues Summary Checklist Report developed in this meeting is attached in Appendix A. Further comments were provided by UTRCA (Christine Creighton, Land Use Planner) to MTE Consultants by email on December 3, 2020. A record of pre-consultation is provided in Appendix A.

As part of the EA, MNRF (Aylmer District) was contacted to identify potential species at risk (SAR) in the Study Area. Species records provided by MNRF and obtained from background sources are discussed in Section 4.2.2. Since the EA was completed, responsibility for administering the Endangered Species Act, 2007 (ESA) has been transferred to the Ministry of Environment, Conservation and Parks (MECP). Current report findings and conclusions with respect to SAR will be provided to MECP as an update.

The SLSR/EIS was submitted to the City of London in support of the revised Draft Plan on June 30, 2021. Comments on the SLSR/EIS (MTE, 2021) were received from the City and UTRCA on May 1, 2022 and again from the City on October 11, 2022. Two site walks were undertaken with reviewing agencies to review the Subject Lands. On July 6, 2022 a site walk was coordinated by Planner Michael Hannay (MBTW) to provide a general overview for all relevant City and UTRCA staff. A subsequent meeting relating to site ecology was held on October 25, 2022 with Margot Ursic (City of London Ecologist), Michael Hannay (MBTW), David Ailles (York Developments), Dave Hayman (MTE) and Allie Leadbetter (MTE). This second site walk reviewed areas proposed for removal and compensation and discussed potential park spaces. Following this site walk and a follow-up meeting with City staff on October 28, 2022, additional comments were provided by the City via email. All of these comments have been reviewed and will be addressed in this revised EIS. As requested by the City of London, a matrix outlining the changes from the original EIS submission (MTE, 2021) in comparison to this EIS is provided in Appendix E.

2.0 Land Use Setting and Policy Overview

The proposal is for the development of a mixed residential and commercial development within the 36.96 ha area of the Subject Lands. The Subject Lands are comprised of three properties owned by the proponent, northeast of the intersection of Oxford Street West and Proudfoot Lane, Part Lots 19 and 20, Concession 2, City of London.

The regions surrounding the Subject Lands are primarily existing residential lands with areas of commercial development and natural features interspersed.

2.1 The London Plan

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

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

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

2.1.1 Environmental Classifications (London Plan, Map 5)

Unevaluated Vegetation patches are identified in the northwest corner of the Subject Lands and to the west of the Subject Lands. A Significant Woodland lies between these two unevaluated patches. A Significant Valley corridor which reflects the preferred alignment from the EA parallels the future Beaverbrook Extension. As noted in Section 1.0, the configuration of natural heritage features on the Subject Lands as shown on Map 5 was determined as part of a 2019 LPAT decision on appeal PL170100 (MBTW, 2020).

2.1.2 Land Use Designations (London Plan, Map 1)

The Subject Lands are designated as a mixture of Neighbourhood, Rapid Transit Corridor, and Open Space [Figure 3] (London Plan, Map 1), as settled in a 2019 LPAT decision on appeal PL170100 (MBTW, 2020). Site specific policies for the site are outlined in policies 774A, 864B, 864C, 961A, 1066, and 1067A of the London Plan (MBTW, 2020). The land use for the areas of the Subject Lands proposed for development conform to these policies.

2.2 Zoning Bylaws

The Subject Lands are zoned as different forms of residential (R) zones, Open Space areas (OS), and Neighbourhood Facility (NF) [Figure 4]. This zoning reflects the prior approved draft plan of subdivision and as part of this application is proposed to be amended to bring the lands into conformity with the EA recommendations and the London Plan.

2.3 Upper Thames River Conservation Authority (UTRCA) Regulation

The Upper Thames River Conservation Authority (UTRCA) regulates the majority of the Subject lands under Ontario Regulation 157/06, pursuant to Section 28 of the Conservation Authorities Act. The UTRCA has jurisdiction over riverine flooding and erosion hazards, wetlands and the surrounding area, and requires that landowners obtain written approval from the Authority prior to undertaking any site alteration or development within the regulation limit. On the Subject Lands, the regulation limit is associated with the identified Significant Valleyland feature, the unevaluated wetland and the watercourses (Mud Creek and tributaries) found within the Subject Lands.

In correspondence regarding the Mud Creek EA, UTRCA provided support in principle for the concept proposed for the Beaverbrook Lands [Appendix A1], including the re-alignment of Mud Creek [Appendix A3]. It should be noted that UTRCA also expressed in correspondence dated May 16, 2017, that further technical support was needed to determine if the proposed concept would be compliant with UTRCA policies [Appendix A4].

3.0 Triggers for EIS

When a development proposal requires a Planning Act application (i.e., Draft Plan submission, or amendments to the Official Plan and/or zoning by-law), the City of London requires an EIS to be completed if the Subject Lands are adjacent to or within natural heritage components (City of London Official Plan Section 15).

The proponent is planning a combination of medium and high density residential and commercial development blocks within the Subject Lands located northeast of the Oxford Street West and Proudfoot Lane intersection. The triggers for the Environmental Impact Study (EIS) pertaining to the proposed development, based on Official Plan prior to settlement hearings of the London Plan, are as follows:

- Proposed development within 50m of an identified Significant Valleyland (Corridor)
- Proposed development within 30m of an unevaluated wetland
- Proposed development within 100m of areas that provide or may provide suitable habitat for Protected Species
- Proposed development within 30m of Fish Habitat
- Proposed development within 30m of Woodlands

While the Mud Creek valleyland creation was approved in principle by the UTRCA, a formal application for a permit under the UTRCA Ontario Regulation 157/06 may require an EIS as the Subject Lands are within the UTRCA's regulation limits.

In addition, the Endangered Species Act (2007) protects species and habitat not specifically identified on Official Plan Schedules. To be consistent with the Provincial Policy Statement (Ministry of Municipal Affairs and Housing (MMAH, 2020), the requirements for an additional study can be triggered without any adjacent features identified on the Official Plan schedules.

The following section (Section 4) reviews the existing natural heritage setting of the Subject Lands. Section 5 reviews the proposed land use change in conjunction with natural heritage issues that may require consideration during the application process.

4.0 Description of the Natural Environment

The following section reviews the abiotic and biotic features on and directly adjacent to the Subject Lands that contribute to the overall natural heritage features and functions. This review provides relevant background information for interpreting environmental features and functions on the Subject Lands for the evaluation in Section 5.

4.1 Physical Setting

4.1.1 Physiography

Bedrock for the site is sedimentary rock of the Hamilton Group comprised of shale and limestone (Palmer, 2021). The Subject Lands are located within the Stratford Till Plain physiographic region, described as till plains of ground moraine features and terminal moraines (Palmer, 2021).

4.1.2 Soils

The Subject Lands are underlain by soils described as glaciolacustrine deposits overlain by fluvial deposits and a recent organic deposit generally consisting of clay, silt, sands, organics, and marl (Palmer, 2021).

On a site-specific level, soils identified within the boreholes on the Subject Lands were comprised of topsoil, fill material (clayey silt, sandy silt), organic deposits (organic silt and silty sand deposits), modern fluvial deposits (variety of soil types), varying glaciolacustrine textured soils, and Tavistock Till (Palmer, 2021).

4.1.3 Topography

The topography in the region is generally level and gently slopes towards the southwest (Palmer, 2021). On a site-specific scale, the site slopes from the highest point in the northwest corner towards the lower elevations in the south.

4.1.4 Hydrogeology

Significant Groundwater Recharge Areas (SGRAs) are found surrounding Mud Creek and a large portion of the site is considered Highly Vulnerable Aquifer (HVA) with a vulnerability score from 4 to 6 in the northern portion of the site. Under these conditions, no restrictions to land use are required under Source Water Protection policies, but pre-development infiltration should be maintained in post-development.

A site-specific hydrogeological study was undertaken by Palmer (2021) to characterize the hydrogeological conditions of the site, including groundwater elevation and the interaction with the design of the proposed development, and to develop a pre-to-post development water budget to evaluate the potential impacts from site development on groundwater levels, aquifer units and Mud Creek [Excerpts in Appendix B]. Data were gathered in groundwater monitoring wells and piezometers within Mud Creek from October 2018 to October 2019. Groundwater levels at their highest (April 2019) ranged from 234.62 to 256.24 metres above sea level (masl). The flow of groundwater generally follows topography, from high elevation in the northwest to low elevation in the south. Groundwater was generally 1.5 to 3.5 metres below ground surface (mbgs), but ranged from 0.26 mbgs to 3.41 mbgs in monitoring wells during the study period.

Within Mud Creek and its tributaries, data gathered from piezometers indicated that there were areas of groundwater recharge and discharge depending on location and season (Palmer, 2021). The upper reach of Mud Creek receives groundwater input for most of the year, with groundwater depths of 0.59 to -0.10 metres above ground surface (mags). At monitoring point 2 [Figure 5], near the confluence of Tributary A and within the marsh/thicket wetland (polygon 10), groundwater was measured close to surface; however, a downward hydraulic gradient indicates that this portion of the creek and the wetland may be perched on lower permeability soils. In the lower reach of Mud Creek, as it bends toward Oxford Street West, groundwater was variably above (0.12 mags) and below (-0.60 mags) the creek bed. Monitoring results here suggest that this portion of the creek has a neutral to downward hydraulic gradient and, therefore, is losing water to the water table. This site, has a high hydraulic conductivity and infiltration rate that can readily accept infiltration and subsequent groundwater recharge (Palmer, 2021).

4.2 Biological Setting

As noted above, a comprehensive natural heritage study (SLSR/EIS) was completed by LGL (2016) as part of the Mud Creek subwatershed EA (CH2M, 2017). LGL conducted field investigations in 2014 and 2015 for vegetation communities, flora, fisheries, mammals, reptiles, breeding birds, anurans and bats in the EA Study Area, which included a portion of the Subject Lands at 323 Oxford Street West. Supplementary life science data collection was completed by MTE Consultants for the remainder of the Subject Lands in 2018, 2020, and 2021. This section summarizes the data provided as part of Mud Creek EA (CH2M, 2017) and compiles the data collected by MTE in 2018, 2020, and 2021 for the additional properties along Proudfoot Lane. Where relevant, data gathered

by BioLogic (now MTE) on the Subject Lands prior to the Mud Creek subwatershed EA are also included.

4.2.1 Designated Natural Heritage Features

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

No Areas of Natural and Scientific Interest (ANSI) or Environmentally Significant Areas (ESA) are located within or adjacent to the Subject Lands within 120m.

Per the London Plan Map 5 (2021), as determined in the negotiated settlement, the central portion of the Subject Lands is identified as Significant Woodlands and the proposed 60m wide corridor for the realigned Mud Creek is designated as Significant Valleylands [Figure 2]. Unevaluated Vegetation patches (#06013 and 06012) are identified in the northwest corner of the Subject Lands (overlapping 92 and 825 Proudfoot Lane).

4.2.2 Species Records

For this SLSR/EIS, Protected Species are those listed as Endangered or Threatened on the Species at Risk in Ontario (SARO) List of the ESA. Only species listed as Endangered or Threatened on the SARO List receive protection for individuals or habitat under the ESA. Species of Conservation Concern are those listed as Special Concern on the SARO list and species with a provincial ranking of S1-S3.

Provincial status rankings for plants, vegetation communities and wildlife are based on the number of occurrences in Ontario and have the following meanings:

S1: critically imperiled; often fewer than 5 occurrences
S2: imperiled; often fewer than 20 occurrences
S3: vulnerable; often fewer than 80 occurrences
S4: apparently secure
S5: secure
S?: unranked, or, if following a ranking, rank uncertain (e.g., S3?)

A list of Protected Species and Species of Conservation Concern (SOCC) potentially found within the area of the Subject Lands was compiled using data provided in the SLSR/EIS for the Mud Creek EA (LGL, 2016; CH2M 2017) as well as a review of updated information on the Ontario Natural Heritage Information Centre (NHIC) database [Appendix C, Table C-1]. Based on habitat assessments and targeted surveys conducted as part of the SLSR/EIS for the Mud Creek EA (LGL, 2016; CH2M 2017), there is potential for two Protected Species (Little Brown Myotis and Northern Myotis) and on the Subject Lands. Targeted surveys for these Protected Species, as well as for surveys for SOCC, were conducted by MTE on the Subject Lands as part of the current EIS. Survey methods and results are discussed in Sections 4.3 and 4.4.

4.3 Vegetation and Floral Site Investigations

4.3.1 Vegetation Communities and Wetlands

Vegetation communities within the Subject Lands were assessed by Will Huys (MTE), certified to conduct ELC in Southern Ontario, in 2012, using protocols outlined in the Ecological Land Classification (ELC) System for Southern Ontario (Lee et al., 1998). ELC community boundaries were updated in 2018 to account for properties added to the application in the northwest corner, near Proudfoot Lane. Community classification was also completed as part of the Mud Creek EA (CH2M, 2017) to refine vegetation communities previously described in the Study Area by Delcan (2013). Community mapping from the EA is consistent with that presented in this SLSR/EIS. As the data collected for this report were categorized by community, the MTE vegetation communities and polygons have been referred to in this report to more readily link field data sheets to the location. The determination of significance of vegetation communities was made using the provincial rankings assigned by the NHIC (MNRF, 2020).

Vegetation communities within the Subject Lands are a mix of forest, cultural and wetland communities [Figure 6]. The communities are associated with floodplain areas of Mud Creek, valleyland slopes and adjacent tablelands. Many of the forested communities have resulted from past disturbance as they are dominated by nuisance species such as Black Locust and Manitoba Maple. Other portions of the Subject Lands are currently agricultural. All communities listed in Table 1 are secure in Ontario (NHIC, 2021) [Table 1].

Table 1: Ecological Land Classifications for the Subject Lands

Polygon	ELC Code	Description	S-rank	Area (ha)
Anthropogenic				
A1		Active Agriculture. This community is outside the Subject Lands and has been removed from the current SLSR/EIS.		
A2		Maintained Landscape/Park		
A3		Active Agriculture		
A4		Active Agriculture		
A5		Active Agriculture		
A6		Forest Glen Golf Centre Driving Range		
A7		Community Gardens/Maintained Landscape		
A8		Maintained Landscape		
Cultural				
1	CUM1	This community is outside the Subject Lands and has been removed from the current SLSR/EIS.		
2	CUM1-1	**Dry-Moist Old Field Meadow Type:** Dominant species are grasses, goldenrods and asters. There are inclusions of CUW1 Mineral Cultural Woodland Ecosite less than 0.2ha is size dominated by Manitoba Maple, Black Locust and Walnut within the overall CUM1-1. These CUW1 inclusions are typically littered with concrete and brick rubble, lumber, steel and general trash. The ground layer is typically dominated by Garlic Mustard and Goldenrods.		1.46
3	CUM1-1	**Dry-Moist Old Field Meadow Type:** The dominant species are grasses, goldenrods, asters, Mullein, Queen Anne's Lace and Multiflora Rose. This community is succeeding to a thicket community although at this time shrub cover is not greater than 25%. Shrubs species in this community are typically Red Cedar, Honeysuckle, Walnut and Multiflora Rose.		0.77
4	CUT1	**Mineral Cultural Thicket Ecosite:** Buckthorn dominated thicket. The ground layer, where present, is dominated by Garlic Mustard.		1.32
5	CUW1	This community is outside the Subject Lands and has been removed from the current SLSR/EIS.		

Polygon	ELC Code	Description	S-rank	Area (ha)
6	CUW1	**Mineral Cultural Woodland Ecosite:** Canopy is dominated by Trembling Aspen. Other canopy species include Red Maple and Manitoba Maple and Black Locust. The understory is dominated by both Honeysuckle and Buckthorn. Garlic Mustard, Common Evening Primrose and Burdock are dominant in the ground layer. There are large and extensive areas of waste debris such as grass clippings, picnic tables, gravel, Christmas trees and landscape refuse throughout the community. There are 3-4m wide mown pathways to facilitate ongoing access to the community. A 0.44 ha Cultural Thicket inclusion is present in the southeast of Polygon 6. This inclusion contains young Black Locust and there is also evidence of historic occupation of the site here as there is an abandoned, crumbling swimming pool which is partially filled with concrete rubble.		2.10
7	CUW1	**Mineral Cultural Woodland Ecosite:** A Manitoba Maple dominated woodland. Other canopy species include Black Walnut and Trembling Aspen. A tributary to Mud Creek (Tributary B) and Mud Creek itself flows through this community. The canopy cover is relatively open and patchy with medium sized to large gaps. Non-native, invasive species are abundant and widespread including Manitoba Maple, Black Locust, Garlic Mustard and Honeysuckle species. There has been a great level of cultural disturbance in this community evidenced by earth displacement, trash and construction debris and the level of invasive species present. This community also includes a narrow 0.36 ha CUT1 inclusion in the east, adjacent to polygon 10.		2.52
8	CUW1	**Mineral Cultural Woodland Ecosite:** A poplar dominant community. Other canopy species include Manitoba Maple and Black Locust. The Trott Award Drain/Mud Creek flows through this community. There is also a manmade outlet with some overland flow (Tributary C) leading from the parking lot to the east of this community carrying flows to Mud Creek at the west edge of the site. The canopy cover is relatively open and patchy with medium sized to large gaps. Non-native, invasive species are abundant and widespread including Manitoba Maple, Black Locust, Garlic Mustard and Honeysuckle species. As with Community 7, there has been anthropogenic disturbance in this community evidenced by extensive earth displacement, trash and construction debris and the level of invasive species present. A small (0.03 ha) Mineral Swamp Thicket inclusion (8a) is present in the east of this community. *Phragmites* is prominent in the inclusion.		5.81
Natural Successional				
9	FOD7	**Fresh-Moist Deciduous Forest Ecosite:** Basswood dominated forest. Other canopy and sub-canopy species include Black Locust and Black Cherry. The understorey and ground layer are dominated by invasive species, Honeysuckle spp., Buckthorn, Garlic Mustard. There are traces of Red Maple and Bloodroot in the community indicating fresh-moist conditions. There is a moderate level of earth displacement and debris.		0.39

Polygon	ELC Code	Description	S-rank	Area (ha)
Wetland				
10	SWT3/ MAM3-5	**Mineral Thicket Swamp and Narrow-leaved Sedge Organic Meadow Marsh Type:** Organic soils. A Maple/Poplar Swamp to the west and Silky Dogwood Thicket Swamp to the east, with an inclusion of meadow marsh along Mud Creek. Giant Hogweed was noted in this community. The is little cultural influence in the small marsh inclusion, and a very high presence of Skunk Cabbage. The overall community contributes hydrological functions associated with Mud Creek. This community was designated SWT2/MAM2-5 in the Mud Creek EA (LGL, 2016; CH2M, 2017).	S5	1.96

4.3.2 Floral Inventory

A floristic survey was undertaken by LGL on September 25 and 26, 2014, as part of the Mud Creek EA (LGL, 2016; CH2M, 2017). Supplementary botanical investigations were conducted by MTE (Will Huys) on August 21 and October 22, 2020, and May 18 and June 2, 2021. The final MTE plant list is provided in Appendix C. The status of all plant species is based on the provincial NHIC database (MNRF, 2020) and the list of vascular plants for the Carolinian Zone (Oldham, 2017).

A total of 310 vascular plant species were recorded on the Subject Lands between 2007 and 2021, of which 263 or 85% are native to Ontario and 47 or 15% are invasive. Non-native and invasive plant species were generally found within the cultural woodland and meadow communities which have a history of disturbance. Native species were most dominant within the marsh wetland (Polygon 10 – SWT3/MAM3-5) and deciduous forest (Polygon 9 - FOD7).

One species of conservation concern (SOCC) was observed on the Subject Lands during site investigations:

- Twelve to fifteen stems of Stiff Goldenrod (*Solidago rigida* – ranked S3) in the cultural woodland along Oxford Street West (polygon 8; Figure 6). Stiff goldenrod occurs in dry, open ground and is occasionally found in disturbed areas such as roadsides and railways. It is sometimes introduced in restoration and roadside plantings (NHIC, 2021)

No other SOCC and no floral Protected Species were observed on the Subject Lands during site investigations.

4.4 Faunal Site Investigations

4.4.1 Avifauna

Breeding bird surveys were conducted by LGL on May 26 and June 4, 2015, as part of the Mud Creek EA (LGL, 2016; CH2M, 2016). MTE conducted supplementary breeding bird surveys on the Subject Lands June 15 and 29, 2018. Surveys conducted in 2018 consisted of 10-minute point counts at 8 stations accompanied by an area search in all vegetation communities on the Subject Lands [Figure 7]. The highest level of breeding evidence was recorded for each species using codes from the Ontario Breeding Bird Atlas (Cadman et al. 2007). Surveys began within half an hour of sunrise and were completed by 10am.

A targeted grassland bird survey was also conducted by MTE staff in Community 2 (CUM1-1) of the additional lands on June 4, June 16, and June 28, 2021. These surveys were guided by Ontario grassland bird survey protocols for Bobolink (MNR, 2011) and Eastern Meadowlark (OMNR, 2013). No Protected avian species were observed, including Bobolink [THR] and Eastern Meadowlark [THR], during these surveys.

The Mud Creek EA notes that the Study Area contained a low to moderate number of breeding bird species representing several habitat types: forest/forest edge, swamp, marsh and cultural habitat

types. All species observed are secure (S5B) or apparently secure (S4B) breeding species in Ontario. A complete list of bird species observed is provided in Appendix C.

No Protected Species were detected by LGL on the Subject Lands in 2015. During 2018 breeding bird surveys, one Protected Species and one SOCC were detected by MTE:

- Barn Swallow (Threatened) was observed in both thicket and woodland communities on the Subject Lands (polygons 4 & 8), however no suitable nesting habitat for this species was present. Barn Swallows typically build nests on human-made structures, such as barns, bridges or within large culverts (Cadman et al., 2007). This species is considered non-breeding on the Subject Lands.
- Eastern Wood-Pewee (Special Concern) was observed (heard) on June 15, 2018 in a wetland vegetation community (marsh/thicket, polygon 10). Eastern Wood-Pewee is a bird of deciduous and mixed woods (Cadman et al., 2007) and is unlikely to breed in the area where it was observed. Suitable nesting habitat is present in woodlands on the Subject Lands and adjacent lands, particularly the wooded valley running northeast/southwest to Proudfoot Lane. Eastern Wood-Pewee is described as “still common” in Ontario (COSSARO, 2013) and, within its Canadian range, is at its most abundant in southern Ontario (COSEWIC, 2012). The species was not detected on the Subject Lands during the Mud Creek SLSR/EIS (LGL, 2016), but has been recorded in citizen science databases (e.g., eBird, iNaturalist) in woodlands along the Thames Valley corridor in London. Eastern Wood-Pewee is assumed to be breeding in nearby deciduous forest/woodland (polygons 9 [FOD7] and 7 [CUW1]) on the Subject Lands and the adjacent woodlands.

4.4.2 Amphibians

Anuran (frog and toad) calling surveys were conducted in 2015 by LGL and in 2018 and 2020 by MTE following the Marsh Monitoring Protocol (Bird Studies Canada, 2009). Surveys were conducted during suitable weather conditions between 30-minutes after sunset and midnight in three survey periods (April, May and June). Four monitoring stations [Figure 7] were established by MTE for surveys undertaken on May 23 and June 18, 2018, and April 4, 2020. Survey stations targeted wetlands or seasonally ponded areas.

One green frog was detected by LGL on May 27, 2015 in the seasonally-flooded portion of Mud Creek along Oxford Street West. Spring peepers (call code 2) were recorded by MTE on May 23, 2018 in vegetation community CUW1 (polygon 6). No other anurans were noted on the Subject Lands.

4.4.3 Bats

To determine the potential for bats or bat habitat on the Subject Lands, a two-step approach was used by both LGL and MTE. First, candidate bat maternity roost trees were identified using guidance from the Survey Protocol for Species at Risk within Treed Habitats: Little Brown Myotis, Northern Myotis & Tri-coloured Bat (MNRF, 2017). This protocol involves assessing trees based on: Species, diameter at breast height (DBH), height, presence of loose/peeling bark, cavity and cavity height, decay class, open canopy, and proximity of other snags.

Four low-quality candidate bat maternity roost trees were observed by LGL in 2015, along Mud Creek near Oxford Street West in a cultural woodland community (polygon 8; Figure 6). These trees were determined to be of low quality as they were fractured main stems or leaders of the trees, and they were at the heights of 3-5 metres from the ground, which is not preferred for roosting by bats (LGL, 2015). An additional seven candidate bat maternity roost trees were observed by MTE in 2018 in the northwest portion of the Subject Lands [Figure 6].

Once candidate bat maternity roost trees have been identified, the second step was to determine whether or not bats are present using acoustic monitoring. Acoustic monitoring was completed by LGL from May 27 to June 12, 2015 at one station on the Subject Lands using the Wildlife Acoustics Song Meter SM2Bat+. These data were presented in the EA as an overview only without a time

sequence to relate to maternity roost exit versus evening foraging. Big Brown Bat was the most frequently recorded species with 917 calls in the 10-day survey period. All other species detected were recorded in five or fewer calls (Eastern Red Bat, Hoary Bat, Silver-haired Bat, Little Brown Myotis and Northern Myotis). Little Brown Myotis and Northern Myotis are protected bat species.

MTE conducted acoustic monitoring from June 1 to June 11, 2018, at two stations on the Subject Lands [Figure 7] using the SongMeter SM4Bat. Acoustic monitors were placed in proximity to the candidate bat maternity roost trees identified in step one (Polygons 6 and 9; Figure 5). Ultrasonic recordings were analyzed to species using Kaleidoscope software and SAR calls were manually reviewed to confirm species. A summary of recordings is provided in Table 2. As acoustic monitoring does not differentiate between calls made by bats while foraging and those made by bats entering or exiting a roost, calls were further analysed based on time of day. Bat calls recorded at dawn or dusk by day over 10 detector nights are shown in Tables 3 and 4, below.

Table 2: Summary of Bat Calls on the Subject Lands in 2018

Location/Species	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis*
MTE-Bat 1	2198	100	187	49	71
MTE-Bat 2	1415	35	126	57	29

Data gathered in 2018 indicate that most bat species are using the Mud Creek corridor for foraging and drinking, and/or as a fly-over corridor to connect to the Thames River, as they are active throughout the night. One protected bat species, Little Brown Myotis (END) was detected on the Subject Lands, but rarely (numbers and frequency) during the dawn or dusk periods. Most Little Brown Myotis calls were recorded singly and are not indicative of communal maternity roosting on the Subject Lands. In contrast, Big Brown Bat was more often detected in 2018 at dawn or dusk (84% of calls) suggesting the species is roosting on or in proximity to the Subject Lands. Big Brown Bat are generalist in their habitat selection, roosting in both buildings and trees, and foraging in woodlands, clearings or over water (Bat Conservation International, 2021). Bats typically exit their summer roost around 30 minutes after sunset (MECP, 2018). Sunset on June 6, 2018, mid-way through the survey period, was 8:59 PM.

Table 3: Dawn and Dusk Bat Calls Recorded at MTE-Bat 1 on the Subject Lands in 2018

Date/Species	Time	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis*
1-Jun-18	9pm-10:30pm	216	6	1		
2-Jun-18	4:30am-6am	32	1	7		
	9pm-10:30pm	155	1	18	2	1
3-Jun-18	4:30am-6am	25		9		
	9pm-10:30pm	216		6	3	
4-Jun-18	4:30am-6am	2		1		
	9pm-10:30pm	191	2	11	5	2
5-Jun-18	4:30am-6am			3		
	9pm-10:30pm			4		
6-Jun-18	4:30am-6am			1		
	9pm-10:30pm	35		7		
7-Jun-18	4:30am-6am	2		2	1	
	9pm-10:30pm	267		4	3	
8-Jun-18	4:30am-6am	36	3	2	2	
	9pm-10:30pm	255	3	3	3	2
9-Jun-18	4:30am-6am	22	3	4		
	9pm-10:30pm	220	1	3	1	
10-Jun-18	4:30am-6am	3		3	1	
	9pm-10:30pm	167		4	4	
11-Jun-18	4:30am-6am		1	3		

Date/Species	Time	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis*
Total Calls Dawn and Dusk		1844	21	96	25	5
% of Total Calls (9pm - 6am) Recorded at Dawn or Dusk						
		84%	21%	51%	51%	7%

*- species is listed as Endangered under the ESA. NOTE: Only 1 Little Brown Myotis call was detected within one hour of sunset (recorded at 9:41pm)

Table 4. Dawn and Dusk Bat Calls Recorded at MTE-Bat 2 on the Subject Lands in 2018

Date/Species	Time	Big Brown Bat	Eastern Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis*
1-Jun-18	9pm-10:30pm	76				
2-Jun-18	4:30am-6am	8	1	1		
	9pm-10:30pm	102	1	10	2	
3-Jun-18	4:30am-6am	31		1		
	9pm-10:30pm	81		3	8	
4-Jun-18	4:30am-6am	3		1		
	9pm-10:30pm	87		2	1	1
5-Jun-18	4:30am-6am			5	1	
	9pm-10:30pm	1		4		
6-Jun-18	4:30am-6am					
	9pm-10:30pm	27		3		1
7-Jun-18	4:30am-6am	1		1	1	
	9pm-10:30pm	137		8	7	
8-Jun-18	4:30am-6am	13	1	1		
	9pm-10:30pm	130		5	9	
9-Jun-18	4:30am-6am	41	1	3	3	
	9pm-10:30pm	276		2	4	
10-Jun-18	4:30am-6am	16	4	5		
	9pm-10:30pm	162	4	5	3	
11-Jun-18	4:30am-6am			1		
Total Dawn and Dusk		1192	12	61	39	2
% of Total Calls (9pm - 5am) Recorded at Dawn or Dusk						
		84%	34%	48%	68%	7%

*- species is listed as Endangered under the ESA. NOTE: Only 1 Little Brown Myotis call was detected within one hour of sunset (recorded at 9:59pm)

4.4.4 Mammals

Eight mammal species were observed during field investigations undertaken by LGL in 2015: northern racoon (*Procyon lotor*), eastern cottontail (*Sylvagus floridanus*), eastern gray squirrel (*Sciurus carolinensis*), groundhog (*Marmota monax*), American mink (*Neovison vison*), eastern chipmunk (*Tamias striatus*), coyote (*Canis latrans*) and white-tailed deer (*Odocoileus virginianus*).

4.5 Aquatic Habitat Assessment

Mud Creek is an urban tributary to the Thames River. It has been highly altered in the past with channel realignments and alterations throughout, as well as enclosure of the outlet to the Thames River. Assessment of the aquatic habitat in the study area was undertaken by BioLogic (2008) and by LGL during the Mud Creek EA (LGL, 2016; CH2M, 2017). A summary of findings from BioLogic (2008) and Mud Creek EA is provided below.

The headwaters of the main branch of Mud Creek begin north of the CP rail line near Wonderland Road and Sarnia Road, after which the watercourse is piped under the CP Rail and daylights within the Black Locust woodland (polygon 6) though a concrete pipe. The watercourse meanders in a

southeasterly direction through the woodlot over a cobble and boulder substrate with stream morphology a mix of riffles and pools. Eroding banks indicate flows through this watercourse can be substantial. Three tributaries join the main branch of Mud Creek within the Subject Lands. Tributary A joins the main branch though a marsh/swamp thicket (polygon 10); Tributary B joins from approximately the west end of Westfield Drive, running southwest through woodland (polygon 8) to join the main branch; and Tributary C flows west through woodland (polygon 8) just north of Oxford Street West.

Watercress on the banks of Mud Creek where it bends along Oxford Street West indicates groundwater inputs into this system south of the confluence with Tributary C; however this conclusion is not supported by the groundwater study (Palmer, 2021) which found that water levels within the lower portion of Mud Creek were indicative of a neutral to downward gradient (groundwater recharge). Seepage from the road bed of Oxford Street West may also be contributing to the system and providing suitable growing conditions for watercress.

At Oxford Street West, the channel veers west. Here the straightened channel was filled with silt and sand and lined with cattails and some Phragmites. The morphology in this section is 100% pool and several schools of fish were observed at the double concrete box culvert driveway to the golf course (LGL, 2016). A fourth tributary (Trott-Award Drain) joins Mud Creek downstream of the Subject Lands. The main channel makes a right angle turn before crossing Oxford Street West in a southerly direction.

4.5.1 Fish Community

Fish community data were obtained by MTE from UTRCA (2007) and Delcan (2013). Species observed within the EA Study Area were common and secure and reflect a warm water system. The fish community sampled by UTRCA north of Oxford Street West consisted of: Brook Stickleback (*Culaea inconstans*), Central Stoneroller (*Campostoma anomalum*), Creek Chub (*Semotilus atromaculatus*), Fathead Minnow (*Pimephales promelas*), Spotfin Shiner (*Cyprinella spiloptera*), and White Sucker (*Catostomus commersonii*). It should be noted that fish (not identified to species) have only been observed in a deep pool at the mouth of Tributary C and in the deeper pools along Oxford Street, outside the Subject Lands.

A review of aquatic SAR mapping from UTRCA and the Fisheries and Oceans Canada (DFO) did not indicate the presence of any fish SAR in the subwatershed.

4.5.2 Water Quality

As assessed through physical measurements and benthic community indices, the Mud Creek system has poor to very poor water quality from its headwaters to its mouth. Low dissolved oxygen above Oxford Street West may limit aquatic life in the Subject Lands.

4.6 Wildlife Habitat

4.6.1 Significant Wildlife Habitat

MNRF Significant Wildlife Habitat (SWH) Criteria Schedules for Ecoregion 7E (January 2015) uses ELC ecosite codes and habitat criteria (e.g., Size of ELC polygon, location of ELC polygon) to identify candidate significant wildlife habitat. Additional Significant Wildlife Habitat types for the City of London were obtained from the London Plan (2021). A complete assessment of candidate SWH is provided in Appendix D. The following candidate SWH were noted on the Subject Lands:

Candidate Seasonal Concentration of Animals
Bat Maternity Colonies – Big Brown Bat, assumed in polygon 9 (FOD7)

Rare Vegetation Communities or Specialized Habitats for Wildlife
None

Candidate Habitats for Species of Conservation Concern
Special Concern and Rare Species – Eastern Wood-Pewee (SC; assumed in woodland polygons 7 (CUW) and 9 (FOD7)) and Stiff Goldenrod (S3; polygon 8, CUW1)

Under-represented Habitat Types in the City of London
None

Using site-specific life science information collected for the above habitat types, candidate SWH was further evaluated based on the defining criteria (species presence, abundance, and diversity) to make the final determination of the presence of SWH. Results of this assessment are presented in Section 5, below, following the life science overview.

5.0 Natural Heritage Policy Considerations

This section summarizes the natural heritage features and functions of the Subject Lands in the context of the London Plan and UTRCA regulatory policies. Policies that pertain to this site include the:

- The London Plan, Section 6 – Environmental Policies (May 28, 2021),
- The City of London Environmental Management Guidelines (2007), and
- UTRCA Regulations (*Conservation Authorities Act*, Section 28 – *Ontario Regulation 157/06*).

The above-noted policies are presented here in recognition of a previously approved development and re-organization of the Natural Heritage System as approved in the Mud Creek EA (CH2M, 2017). The agreed-upon Significant Valleyland alignment and woodland areas to be protected, as defined by the EA, are shown in the current London Plan Maps 1 and 5 (City of London, 2021). These policies have been reviewed again and natural heritage features identified are summarized in this section (Table 5) to ensure all significant features and functions identified are protected and/or replicated in the design of the new Mud Creek corridor and valley system.

Objectives of the approved Natural Heritage System, as summarized below, and opportunities for enhancement will be described in greater detail in Sections 6.0 and 7.0 of this report. Natural heritage features to be considered are shown on Figure 8.

Table 5: Features or Functions of the Subject Lands to be Protected and/or Replicated in the Design of the New Mud Creek Corridor

Policy Category	Policy-Protected Feature	Natural Heritage Feature on the Subject Lands
London Plan (2021)	*Wetlands* London Plan Policies 1330-1333 and 1335-1336	• 1.96 ha thicket and marsh wetland community (polygon 10 - SWT3/MAM3-5) along Mud Creek • Portions of this wetland are located within the mapped Significant Woodland on Map 5; the remainder of this community was excluded from Map 5 in the negotiated settlement (2019). • 0.03 ha SWT2 (8a inclusion)
	Significant Woodlands and Woodlands London Plan Policy 1338	• 0.39 ha of natural forest (polygon 9 - FOD7) • 11.37 ha of cultural woodland (polygons 6, 7, 8 - CUW1) • Portions of polygons 3 (CUM1-1), 4 (CUT1), 7, 9, and 10 (SWT3/MAM3-5) are designated as Significant Woodlands on Map 5 of the London Plan (evaluated as part of the negotiated settlement) • Polygon 6 was evaluated as a Significant Woodland as part of the Mud Creek EA (CH2M, 2017) • Other Woodlands (not significant) present on the Subject Lands are polygon 8 and portions of 7.
	Significant Valleylands London Plan Policies 1344-1351	• Mud Creek corridor (alignment approved as part of the negotiated settlement and shown on Map 5)

Policy Category	Policy-Protected Feature	Natural Heritage Feature on the Subject Lands
	Habitat of Endangered and Threatened Species London Plan Policies 1325-1329	• Potential foraging and movement corridor for Little Brown Myotis through the Mud Creek corridor
	Significant Wildlife Habitat London Plan Policies 1352-1354	• Candidate habitat for Bat Maternity Colony (assumed present) in FOD7 (polygon 9) • Assumed habitat for Eastern Wood-Pewee in woodland polygons 7 and 9 on the Subject Lands and adjacent lands. This species is also assumed to breed within the wooded valley running northeast/southwest to Proudfoot Lane • Confirmed habitat for Stiff Goldenrod in CUW1 (polygon 8). This plant occurs in dry, open ground and is occasionally found in disturbed areas such as roadsides and railways. It is sometimes introduced in restoration and roadside plantings (NHIC 2021).
	Fish Habitat London Plan Policies 1323-1324	• Warm water fish habitat in Mud Creek with low dissolved oxygen. Fish were observed only within a deep pool in Tributary C in the Subject Lands and along Oxford St outside the Subject Lands.
	Water Resource Systems London Plan Policies 1361-1366	• Groundwater discharge and recharge along the Mud Creek Corridor
UTRCA Regulations	Regulation Limit	• Mud Creek and its tributaries, and 1.96 ha wetland (polygon 10), on the Subject Lands

6.0 Description of the Development

The proposed development is a mixed-use community, supporting the range of uses approved in the 1999 Draft Plan of Subdivision (File No. 39T-99502) for the lands addressed 323 Oxford Street West, and including Multiple Family, Open Space and Park uses. An extension of Beaverbrook Drive from its intersection with Proudfoot Lane to Oxford Street West was also included in the 1999 Draft Plan. As a condition of Draft Plan approval, the subdivider was required to provide 'adequate conveyance capacity for minor and major flows' within the regulatory floodline for Mud Creek.

The Draft Plan has been redlined to include adjacent lots owned by the applicant, addressed 92 Proudfoot Lane and 825 Proudfoot Lane, as well as recommendations from the 2017 Mud Creek Subwatershed Class Environmental Assessment (herein referred to as "the Mud Creek EA"), which outlines developer-led works on the Subject Lands including the realignment of Mud Creek, and the December 2019 settlement of the Sam Katz Holding appeals to the London Plan. Retail and office uses are contemplated to attain the Rapid Transit Corridor vision of the new London Plan (2016). The neighbourhood will be shaped by the site's particular topographical and ecological features, creating a unique setting for the development's medium and high density residential built form.

The Draft Plan (Figures 9a and 10) has been updated since the original EIS submission (MTE, 2021). Block number and orientation changes are shown on Figure 9b and addressed in greater detail in Section 6.1 below. The primary changes from the previous Draft Plan submission include shifting the alignment of Street 'B' west and expanding the park block in Block 10. A Landscape Plan (RKLA, 2023) for the proposed 1.25 ha park is shown on Figure 9a and includes a standard playground, community pavilion, paved gathering space, open lawn, and sports court. Native tree and shrub species are proposed to line the west boundary of the park to blend the edge of the park with the adjacent significant natural area.

The proposed SWM strategy for the ESAM lands includes the implementation of on-site controls for quantity and quality on the development blocks, as well as low impact development features for

road right-of-ways (TMIG, 2021). Servicing for the proposed subdivision is proposed to come off of Proudfoot Lane.

The conceptual design of the Mud Creek natural corridor was prepared by TMIG in association with Geomorphix (Draft, May 2017) and was presented in the Mud Creek EA (CH2M, 2017) as the preferred solution for Mud Creek within the ESAM lands. Re-aligning Mud Creek through the ESAM lands will provide the conveyance and stormwater management necessary to develop the Subject Lands, while incorporating features to enhance ecological function of the valley and providing net benefit to the natural heritage system. Details of this natural corridor, as well as other proposal ecological enhancements, are provided below and in the Functional Servicing and Stormwater Management Report (TMIG, 2021).

6.1 2021 to 2023 Draft Plan Comparison

The 2023 Beaverbrook Community resubmission comprises a coordinated set of revisions in response to comments received from the City of London and various agencies throughout 2022, as well as multiple working meetings and site walks with City staff and the UTRCA, and some design considerations led by the applicant.

As seen in Figure 9b: 2021 to 2023 Draft Plan Comparison, the major changes to the Draft Plan include the road alignment of Street A and Street B, various road dimensions and geometries, revisions to the size and dimensions of the Neighbourhood Park (Block 10), and the separation of the original Block 8 into a developable and environmental block (Block 7 and Block 8, respectively). Revisions to the Draft Plan were also driven by three design considerations. The first design consideration includes combining original Block 1 and 2 into one rapid transit corridor development block. The second includes the separation of the multi-use pathway adjacent to the channel into a dedicated Open Space / Trail Block or within the Park Block. The third includes squaring off of the original Block 3 (now Block 2) in order to add a northern portion to Park Block 9. Additionally, Park Block 9 was re-envisioned, with direction from the City, to provide community garden spaces as part of compensation efforts and community benefits. In addition, the revised Draft Plan includes an increase in the unit count to represent higher density targets which are primarily focused on the rapid transit corridor development (Block 1) and blocks covered by the remnant High Density Overlay.

6.2 Mud Creek Natural Corridor and Significant Valleyland

The re-alignment of Mud Creek and creation of a natural corridor, designated Significant Valleyland in the London Plan (Map 5), is described in detail in the Conceptual Design of Mud Creek Valley (TMIG, 2017a). The conceptual design is shown on Figure 11 of this EIS. A summary of key features from this report is provided here.

The total natural corridor width varies from 60m to 86m (Figure 9a), including a valley floor of 25m to 59m, valley side-slopes of maximum 3:1 slope, and vegetated upland at the top of the valley walls of 5m to 10m in width (Figure 10). This valley provides a minimum 0.3m freeboard for the Regulatory Storm (250yr). Within the corridor, the channel should be designed according to natural channel principles with a meandering low flow channel varying from 4m to 9m wide and 0.6m to 0.9m deep. Valley toe protection and bioengineering techniques are to be implemented to stabilize the channel and limit lateral migration. With implementation of these channel realignment works, as well as public works downstream, as described in the EA (CH2M, 2017), the ESAM lands will be out of the Regulated floodplain (TMIG, 2021).

Ecological enhancements proposed within the natural corridor include wetland and terrestrial habitat re-creation for Species at Risk, and other wildlife; and pools and riffles within the stream corridor to enhance the aquatic habitat (more detail is provided in Section 7.0). A 3 m wide multi-use pathway (with a 1 m mowed strip to either side) is proposed to be constructed along the length of the corridor within the west side of the valley buffer [Figure 9a]. The west buffer varies from 5 to 13 m and the east valley buffer varies from 5 to 10 m (MBTW, 2023). Up to three stream crossings of the proposed Beaverbrook Avenue extension are proposed to connect residents with amenities (e.g., active transportation system, transit, and commercial development within the Rapid Transit Corridor) in the future neighbourhood.

6.3 Protection of Significant Woodlands and Public Land Dedication

The Significant Woodland on the Subject Lands, as shown on Figure 8 of this EIS, is proposed to be largely retained in Block 8 (OS) and Block 10 (Park). Protection and compensation for removal of a portion of this feature will be addressed in the impact assessment (Section 7.0).

The development proposal also includes the proposal to dedicate an additional portion of the Significant Woodland on adjacent lands (Fleetway) to the City (currently OS1). This will be discussed further in the context of woodland compensation in Section 7.0 of this EIS.

7.0 Impacts and Mitigation

This section reviews the development and proposed Mud Creek corridor realignment [Figures 9, 10, 11] and identifies potential direct and indirect impacts to the significant natural heritage features within and adjacent to the development footprint. Appropriate avoidance, protection, and mitigation measures for the impacts, as well as recommended enhancement measures, are also presented.

Natural heritage features to be considered for protection and/or compensation - as determined through the Mud Creek EA (CH2M, 2017), negotiated settlement, and MTE field investigations - are summarized in Table 5 above. The potential direct impacts of the proposed development on the identified natural heritage features will be discussed in the following Section 7.1. The potential for indirect impacts is discussed in Section 7.2.

At the conclusion of this section, a table [Table 7] is provided summarizing potential impacts and overall improvements in the 2023 proposed Draft Plan revision relative to the approved Draft Plan of Subdivision (1999). This table will also summarize proposed mitigation, compensation, and enhancement measures.

7.1 Direct Impacts

7.1.1 Wetlands

The 1.96 ha marsh/thicket wetland community (polygon 10) is proposed for removal and replacement within the Mud Creek corridor [Figure 12]. A portion of this community (0.21 ha) is designated Significant Woodland in the London Plan, as determined in the 2019 LPAT settlement, therefore the removal and replacement of this portion of wetland will be addressed in Section 7.1.2 (Significant Woodlands and Woodlands). Excluding the portion of wetland designated as Significant Woodland, a total of 1.75 ha of polygon 10 is proposed for removal. A 0.03 ha SWT2 inclusion (8a) is also proposed for removal, bringing the total wetland area to be removed to 1.78 ha as measured on satellite imagery.

Polygon 10 is currently dominated by the invasive shrub Glossy Buckthorn in some areas. The hydrogeology study (Palmer, 2021) notes that this wetland appears to be perched above the water table and is therefore not receiving groundwater inputs (refer to Section 4.1.4). No amphibian breeding was detected in this community and no SWH or habitat for Protected Species is present. Although Eastern Wood-Pewee was recorded in this community, it does not represent suitable breeding habitat for the species.

Extensive wetland creation, enhancement, and restoration in the natural corridor for Mud Creek will result in the creation of about 2.5 ha of high-quality wetland habitat post-development [Figure 13]. This area was calculated as the valley floor minus the channel area from the corridor concept from TMIG (2017). This provides greater than 1:1 compensation by area with a net increase of 0.73 ha of high-quality floodplain wetland habitat. Compensation calculations are summarized in Table 6 of Section 7.1.2, below. The proposed wetlands are proposed within the valley floor of the Mud Creek corridor, with deeper pools interspersed within a floodplain meadow marsh. Wetlands in the north of the corridor may receive groundwater input, while wetlands in the mid and lower reaches of the corridor will be fed by overland flow from the creek after rainfall events or where deeper pools (>0.5

mbgs) intercept shallow groundwater. The created wetland habitat should provide an interconnected system populated by native wetland plants that supports amphibian and other wildlife habitat. This is expected to result in a net positive impact to wetland habitat within the Subject Lands.

7.1.2 Significant Woodlands and Woodlands

A total of approximately 6.2 ha of designated Significant Woodland is present within the Subject Lands. The Significant Woodlands are predominantly cultural thicket/woodland, but also include a small FOD7 community (polygon 9) and part of the wetland (polygon 10) identified as Significant through the 2019 negotiated settlement (shown on Map 5 of the London Plan). The proposed development requires the removal of approximately 0.70 ha of the Significant Woodland shown on Map 5, and 0.36 ha of polygon 6 (CUW1), resulting in the total removal of 1.1 ha of Significant Woodland in the Subject Lands. The removal of inclusion 6a (CUT1) is not included in this total but will be discussed later. The orientation of the active park space in Block 10 has been designed to minimize removal of the Significant Woodland and, where avoidance is not possible in order to attain the preferred park size, the higher quality Community 9 (FOD7) has been prioritized for retention.

In addition to Significant Woodland removal, a total of 7.2 ha of non-significant Woodland is proposed for removal [Figure 12]. This is largely cultural woodland located along the existing Mud Creek and its tributaries. The woodlands to be removed are generally urban in nature with dominant non-native or invasive species, such as Black Locust and Manitoba Maple.

Sensitive natural features associated with the woodlands are proposed to be protected within the retained Significant Woodland or re-established in the new Mud Creek corridor. Candidate bat maternity roost SWH in polygon 9 (FOD7) is retained within 0.31 ha of this 0.39 ha community. This is not expected to significantly decrease potential bat roost habitat as the suitable tree identified in this community is to be retained. Breeding habitat for Eastern Wood-Pewee is assumed to present in Polygon 9, 7, and the adjacent mature woodland valley running northeast/southwest to Proudfoot Lane; these features will be largely retained. Foraging and/or movement habitat for SAR bats (Little Brown Myotis) is also assumed present in the existing Mud Creek corridor and will remain in the retained areas of Significant Woodland. Foraging habitat over the creek and wetlands will also be created as part of the Mud Creek corridor along with the creation of a movement corridor linking the Subject Lands to adjacent natural areas to the south.

According to the Mud Creek EA (CH2M, 2017), woodlands within the Subject Lands qualify as significant due to the presence of a watercourse (Mud Creek), the landscape richness in the region, the size of the patch (>4 ha), the perimeter to area ratio, and the presence of SAR bats. All of these features will be maintained in the retained Significant Woodland in combination with the new Mud Creek corridor.

Compensation measures for the removal of woodlands within the Subject Lands will be addressed according to level of significance of features and taking into account the recommendations for woodland compensation from the EA (CH2M, 2017) for the area of the preferred alternative for the channel works. As discussed in Section 1.0 of this EIS, the EA recommended 1:1 compensation by area for removed woodland vegetation to specifically address the impacts of the preferred alternative, which included the Mud Creek corridor and the main road extensions (Beaverbrook Avenue and Westfield Drive). The EA (CH2M, 2017) did not provide recommendations for compensation measures related to private development within the Subject Lands. Therefore, 1:1 compensation by land area is recommended in this EIS for Significant Woodland removed from the Subject Lands as well as Woodlands removed from within the EA preferred alternative area [Figure 12].

Compensation for the remaining Woodlands, which were deemed non-significant in the 2019 settlement, and which contain widespread and abundant non-native and invasive species, is recommended to be achieved through additional planting (0.18 ha), as well as substantial

ecological restoration activities to increase the overall quality of woodlands on site, supplemented by natural lands dedication to the City and the provision of high-demand community gardens.

Compensation calculations are summarized in Table 6, below. Significant Woodlands and Woodlands proposed for removal are illustrated on Figure 12. Compensation areas are shown on Figure 13.

Table 6: Wetland and Woodland Compensation Calculations

Natural Heritage Feature	Feature Component	Area Removed (ha)	Total Area Removed (ha)	Total Area Created (ha)	Net Compensation by Feature
Wetland	Polygon 10 (SWT3/MAM3-5)	1.75	1.78	2.5 ha in Mud Creek valley	• Compensation of greater than 1:1 by land area
	Inclusion 8a (SWT2)	0.03			
Significant Woodland (2019 Settlement)	Polygon 4 (CUT1)	0.06	1.05	4.83 ha of native woodland proposed to be planted	• Compensation of 1:1 by land area for Significant Woodlands and other Woodlands in the EA preferred alternative • Surplus of 0.18 ha accounted for in "Other Non-significant Woodland" calculations below
	Polygon 7 (CUW1)	0.43			
	Polygon 10 (SWT3/MAM3-5)	0.20			
Significant Woodland (Outside the 2019 Settlement Area)	Polygon 6 (CUW1)	0.36			
Non-Significant Woodland in EA Preferred Alternative Area	Polygon 6 (CUW1)	0.10	3.60		
	Polygon 7 (CUW1)	0.83			
	Polygon 8 (CUW1)	2.59			
	Polygon 9 (FOD7)	0.08			
Other Non-Significant Woodland	Polygon 7 (CUW1)	0.37	3.57	0.18 ha of direct compensation planting (accounted for in 4.83 ha noted above) Alternative compensation forms for consideration: • 0.47 ha of community garden, a vegetated land use greatly desired by the City and community • Dedication of 1.66 ha of privately-owned Significant Woodland to the City • Restoration of 2.00 ha of low-quality woodlands within the retained Significant Woodland	• Compensation of greater than 1:1 land area for non-significant woodland through direct planting and alternative compensation forms such as dedication of private natural lands for long-term conservation, establishment of community gardens and restoration of low-quality woodland
	Polygon 8 (CUW1)	3.20			
Net All Features			**10.00**	**7.33 ha direct area compensation + 4.13 ha alternative compensation**	• **Net increase in quality of the natural heritage system**

The primary areas of woodland creation are along the Mud Creek valley slopes and within the valley buffers, which provide approximately 3.70 ha for high-quality native woodland restoration. Woodland planting is also proposed in Block 8 (0.26 ha) and Block 9 (0.73 ha) to expand the existing Significant Woodland [Figure 13]. An open area (0.15 ha) off-site to the southwest on the Fleetway property inside the existing Significant Woodland is also proposed to be planted with woodland species. Overall, the total area of compensation woodland planting is 4.83 ha. This compensates at a 1:1 ratio for removal of 1.05 ha of Significant Woodland and 3.60 ha of non-significant woodlands in the area of the EA preferred alternative (CH2M, 2017), and provides some compensation for the removal of non-significant Woodlands.

In addition to direct compensation through planting, land dedication and ecological improvements to existing features are proposed to further mitigate impacts to the natural heritage system. A 1.66 ha area of Significant Woodland on adjacent lands (Fleetway property) and owned by the Proponent will be dedicated to the City [Figure 13]. Although this does not provide additional woodland area, it should help ensure the long-term protection of this section of the Significant Woodland and completes the habitat corridor through Proudfoot Park. The community garden also provides about 0.47 ha of open vegetated space which is highly desired by the community and strongly supported by the City.

Restoration and invasive species management is also recommended in the most heavily disturbed areas of the retained Significant Woodlands in Block 10. Although designated significant through the 2019 settlement, polygons 3 (CUM1) and 4 (CUT1) are heavily disturbed by invasive species (particularly Buckthorn in polygon 4) and include cultural thicket and meadow rather than treed woodland. An opportunity exists here for restoration of 2.0 ha of low-quality Significant Woodland. Removal of invasive or non-native species should be followed by supplemental planting of native woodland species. Habitat restoration and invasive species management measures are described further in Sections 7.3 and 7.4.

In addition to the impacts of the subdivision and corridor realignment, the Landscape Plan (RKLA, 2022; Figure 10] also shows a series of trails in Block 10 to connect the park to Block 6 to the west and Proudfoot Park East to the south. The location and design of these pathways are not finalized and consequently have not been incorporated in the area calculations for woodland impacts. This area of the Significant Woodland already contains a widespread system of frequently used ad-hoc trails, therefore the formalization of appropriate trails outside the more sensitive areas of the woodland, especially if designed in coordination with restoration efforts, is not considered a net negative impact on the overall Significant Woodland.

Where vegetation removal will occur, timing restrictions are recommended to avoid disturbance to wildlife that may be using natural areas, including breeding birds and bats. See Section 7.1.7 for details.

Through retention of important wildlife functions, maximized woodland compensation planting, dedication of adjacent Significant Woodlands to the City, and targeted restoration activities, it is our opinion that the woodland component of the natural heritage system in the Subject Lands will not be significantly impacted by the proposed development.

Recommendation 1:
Stake the limits of forest and woodland communities to be retained.

Recommendation 2:
A site restoration or re-vegetation plan should be developed, using native species appropriate for the site. The compensation areas and buffer areas between the proposed development and the designated setbacks should be actively naturalized with native tree and shrub species to improve the ecological function of the area and to provide a natural buffer to the woodland. More details on the compensation planting proposed within the Mud Creek corridor is provided in Section 7.3.

Recommendation 3:
Incorporation of recommended LID measures from the functional servicing and stormwater management report (grassed swales, rear yard ponding, infiltration trenches, etc.) should be screened with vegetation to minimize visual impact. This detail can be finalized as part of the site plan approval process.

Recommendation 4:
Invasive plant species that are identified within the proposed naturalization area should be removed and best management practices for limiting the spread of floral invasive species should be followed during development. See Section 7.4 for details.

Recommendation 5:
Prepare and implement a Tree Management Plan in accordance with City guidelines for tree protection.

Recommendation 6:
Prepare an Environmental Management Plan to summarize protective measures and actions during construction.

Recommendation 7:
Develop an ecological monitoring program for newly vegetated or enhanced areas, as well as the Significant Woodland. Include wildlife and fish habitat monitoring.

Recommendation 8:
Appropriate buffers for Significant Woodlands retained in/adjacent to Blocks 6 and 7 can be considered as part of the Site Plan process.

7.1.3 Significant Valleylands

The proposed Mud Creek corridor is already designated a Significant Valleyland as shown on Map 5 of the London Plan (2021). The realigned corridor is expected to retain and improve the functions (water conveyance, riparian habitat) of the existing Mud Creek valleyland. Details for the Significant Valleyland restoration are provided in Section 7.3.

7.1.4 Significant Wildlife Habitat

As discussed in Section 7.1.2 above, SWH associated with woodlands (i.e., Eastern Wood-Pewee, bat maternity colonies) is proposed to be protected within the retained areas of the Significant Woodland, therefore significant direct impacts to these species or functions are not anticipated.

Stiff Goldenrod (S3) was observed on the Subject Lands in a cultural woodland along Oxford Street West (polygon 8). This cultural woodland community will be removed as part of the site development. In order to retain Stiff Goldenrod on site, salvage and reuse of the species in the restoration design is recommended.

Recommendation 9:
Identify significant plant species (Stiff Goldenrod) for salvage and reuse in habitat enhancement works. See Section 7.3.2 for additional details.

7.1.5 Fish Habitat

Currently Mud Creek is a degraded watercourse with low dissolved oxygen, providing limited habitat for aquatic species including fish. Fish species observed upstream of Oxford Street were common and secure and reflect a warm water system and were observed only within deep pools along Oxford Street outside the proposed limits of work, and in a deep pool at the mouth of Tributary C within the Subject Lands. Direct impacts to aquatic habitat and fish may occur during construction resulting from sedimentation, or during dewatering to construct the new Mud Creek channel and corridor. Standard mitigation measures to avoid direct impacts are recommended below.

The proposed realignment will be designed as a low flow channel of 0.5 to 1 m depth within a larger floodplain. Where the corridor approaches Oxford St. and the channel gradient is reduced, the

floodplain widens to include offline pools that may provide refuge to fish moving upstream of Oxford St. Improvements to aquatic habitat, including fish habitat, are anticipated as a result of the proposed project. Detailed recommendations on features to improve aquatic habitat are provided in Section 7.3.3.

Recommendation 10:
Obtain approval from Fisheries and Oceans Canada (DFO) for the realignment of Mud Creek.

Recommendation 11:
Work should be conducted during low flow conditions and during the approved in-water timing window set by MNRF.

Recommendation 12:
Dewatering discharge should be directed to a filter bag to remove sediments.

Recommendation 13:
Store hazardous materials away from sensitive natural features. Equipment refueling should occur a minimum of 30m away from the natural valley or any existing tributaries of Mud Creek.

Recommendation 14:
Any pumps used during dewatering should be appropriately screened to prevent entrainment of fish.

Recommendation 15:
Although few fish were detected in Mud Creek upstream of the pooled reach along Oxford Road, it is recommended that a License to Collect Fish for Scientific Purposes from the MNRF be obtained and a fish rescue plan be implemented by a qualified professional.

7.1.6 Habitat of Endangered and Threatened Species

Direct impacts to SAR bats are not anticipated, as vegetation clearing is recommended to occur outside the bat roosting period of May 1 to September 31 (see Recommendation 20), and acoustic surveys suggest that communal maternity roosting for SAR species is not present in the Subject Lands. Five of seven suitable bat maternity roost trees are to be retained within the Significant Woodland [Figure 13]. Four low quality maternity roost trees identified during the Mud Creek EA (LGL, 2016; CH2M, 2017) will be removed [Figure 6]. The loss of these six trees in proximity to a large, retained Significant Woodland feature should not result in a negative impact to roosting habitat for the species. The creation of a large, natural, wetland corridor around the re-aligned Mud Creek is expected to maintain or improve foraging and fly-over habitat for SAR bats.

Recommendation 16:
Four artificial bat maternity roost boxes (rocket box design) should be placed within the Mud Creek natural corridor as net positive compensation for the removal of eight suitable maternity roost trees. Rocket-style bat boxes are generally considered by MECP to compensate at a rate of one box per five to ten trees removed, therefore the placement of four boxes will provide habitat over and above existing.

Recommendation 17:
No Bank Swallow [THR] were observed within or adjacent to the Subject Lands, however creation of suitable habitat (e.g., soil stockpiles) during construction should be avoided. Best management practices for deterring nesting during construction activities should be implemented (OMNRF, 2017). These measures should include stockpile slope management (i.e., grading stockpiles, eliminating vertical extraction faces, reducing slopes to 70 degrees or less) until at least July 15.

Recommendation 18:
Any observation of a Protected Species should be reported to MECP. Protected Species should not be handled, harassed, or moved unless they are in immediate danger.

7.1.7 Migratory Birds and Wildlife

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

Wildlife may also experience disturbance during construction when crossing roads or moving through active construction areas. Timing restrictions on vegetation removal are recommended to avoid disturbance to wildlife that may be using natural areas on the site, including breeding birds and bats.

Recommendation 19:
Avoid vegetation clearing and site disturbance during migratory bird breeding season (April to August 31) to ensure that no active nests will be removed or disturbed, in accordance with the *Migratory Birds Convention Act* and/or Regulations under that Act. If works are proposed within the breeding season, prior to any vegetation removal or ground disturbance, the area should be checked for nesting birds by a qualified professional. If there are any nesting birds, works within the nesting area should not proceed until after August 31 or the nest is confirmed inactive.

Recommendation 20:
Removal of trees (>10 cm DBH) should occur outside the bat maternity roost period, which is approximately May 1 to September 31. This avoidance measure includes dead standing trees.

Recommendation 21:
Plan major site grading activities to avoid breeding, nesting and migration periods of amphibians and turtles (generally April 1 to September 31). Site personnel should be advised to take particular care when working in this active period for wildlife and instructed how to respond appropriately to wildlife encounters.

Recommendation 22:
If an animal enters the work site, work at that location should stop and the animal should be permitted to leave without being harassed. If there are repeat observations of wildlife in the work area, barrier fencing (e.g., silt fence) may be used to direct wildlife away from active construction and toward natural areas.

7.1.8 Water Resources - Groundwater and Stormwater Management

The following section summarizes potential effects related to dewatering and stormwater management, as described in the following reports:

- Hydrogeological Assessment – 323 Oxford Street West, City of London (Palmer, 2021)
- Functional Servicing and Stormwater Management Report (TMIG, 2021)

The water table at the site was found to range between 0.26 and 3.41 mbgs between October 2018 and October 2019 (Palmer, 2021). The high-water levels were found in the northwest portion of the site. The central and east portion of the site have sufficient unsaturated thickness to accept infiltration and for the implementation of LIDs. The water table depth and the high permeability soils at the site will support a wide variety of LID measures to balance the pre-to-post development water budget.

The groundwater study (Palmer, 2021) has concluded that the proposed realigned path of Mud Creek will continue to receive groundwater discharge and intercept the seasonal water table if constructed at a similar elevation and grade as the existing channel. No hydrogeological impacts to Mud Creek are expected from the proposed realignment [see report excerpts, Appendix B].

Under existing site conditions no restrictions to land use are required under Source Water Protection policies, but pre-development infiltration should be maintained in post-development (Palmer, 2021).

Recommendation 23:
Infiltration-based LID measures should focus on the central and eastern portions of the site where highly permeable soils are present, and which are best situated to balance the pre-to-post development water budget.

Recommendation 24:
Pre-development infiltration should be maintained in post-development (Palmer, 2021).

Recommendation 25:
According to Source Water Protection policies, a Salt Management Plan should be prepared for the development (Palmer, 2021).

The Functional Servicing and Stormwater Management Report (FSR) for the Beaverbrook Lands in London, Ontario was prepared in support of a redlined version of the approved 1999 Draft Plan for the site. The analyses and results described in that report demonstrate that stormwater management, sanitary servicing, and water supply infrastructure can adequately service the proposed development (TMIG, 2021). A summary of recommendations from the FSR which are applicable to natural heritage features includes:

Recommendation 26:
At the detailed design stage, the stormwater management plan will be refined to include the design of major and minor system based on detailed grading and LID facilities along ROWs. Technical analysis will be completed for the components of the SWM plan to assess the final design parameters for the proposed SWM facilities, based on the City, UTRCA and other applicable standards and guidelines. Groundwater barriers will be constructed in adequate numbers to prevent groundwater migration down sewer trenches.

Recommendation 27:
Best Management Practices (BMPs) for the protection of aquatic habitat and source water protection will be reviewed at the detailed design stage and incorporated into an Erosion and Sediment Control (ESC) plan. The use of erosion and sediment control devices and techniques should adhere to the principles limiting soil mobilization and trapping sediment as close to the source as possible. The Erosion and Sediment Control Guide for Urban Construction (TRCA, 2019) will be followed for the development and implementation of the comprehensive ESC plan. See also Recommendation 26.

Recommendation 28:
Construction mitigation plans will be prepared as part of the permitting and approvals for construction of the proposed works, which include permitting from UTRCA and, where applicable, approvals or letters of advice from the Ministry of Natural Resources and Forestry (MNRF) and/or the Department of Oceans and Fisheries (DFO).

7.2 Indirect Impacts

Natural heritage features may also experience indirect effects during construction, including sedimentation and erosion, or post-construction, such as inadvertent encroachment. Indirect impacts on natural features are recommended to be mitigated through the implementation of standard environmental protection measures, discussed below.

7.2.1 Construction Related Impacts

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

Recommendation 29:
A multi-barrier approach for sediment and erosion control should be used for this development adjacent to wetlands and the watercourse. Prior to works on site, robust sediment and erosion control fencing should be installed along the limits of the development adjacent to the Mud Creek valley [Figure 10]. The fence will act as a barrier to keep construction equipment and spoil away from the slope and vegetation to remain and prevent erosion and sedimentation of the adjacent watercourse and valley feature.

Recommendation 30:
Sediment and erosion control fencing will be installed to the City of London Design Specifications and Requirements Manual specifications (2019b) and other applicable guidelines provided in Recommendation 23.

Recommendation 31:
Sediment and erosion control fencing should be inspected prior construction to ensure it was installed correctly and during construction to ensure that the fencing is being maintained and functioning properly. Any issues that are identified are resolved in the same day.

Recommendation 32:
All disturbed areas should be re-seeded as soon as possible to maximize erosion protection and to minimize volunteer populations of invasive species which may spread to the adjacent feature.

Recommendation 33:
Sediment and erosion control fencing should not be removed until adequate re-vegetation and site stabilization has occurred. Additional re-vegetation plantings and/or more time for vegetation to establish may be required; however, two growing seasons are typically sufficient to stabilize most sites.

Recommendation 34:
Soil stockpiles should be established on the tableland in locations where natural drainage is away from the valleyland and associated wetlands. If this is not possible, and there is a possibility of any stockpile slumping and moving toward sensitive natural features, these stockpiles should be protected with robust sediment and erosion control. Access to the stockpile should be confined to the up-gradient side. The stockpile locations should be reviewed at detailed design.

Recommendation 35:
Regular cleanup of the Subject Lands must be completed during construction and post-construction to ensure the adjacent natural heritage features are not degraded.

7.3 Habitat Restoration and Enhancement

7.3.1 Restoration within the Mud Creek Valley

Throughout the Subject Lands, but particularly within the Mud Creek natural corridor and adjacent to natural heritage features, landscape plans should be prepared and implemented to restore areas disturbed during construction. These plans should apply established ecological restoration principles in order to establish self-sustaining native vegetation assemblages and create an opportunity to support increased biodiversity. A conceptual design for the different reaches of the realigned corridor (TMIG, 2017) is shown on Figure 11.

The existing Mud Creek valley is primarily woodland or thicket, with an area of meadow marsh-thicket. These dominant vegetation communities should be used to guide the restoration plan for the constructed corridor. The proposed Mud Creek valley planting plan should consist of tree and shrub groupings within a naturalized valley. Tree and shrub groupings will allow for more efficient planting, and gradual spread of woody vegetation throughout the corridor. The planting plan will increase vegetation diversity on the Subject Lands, increase shade to the creek and provide bank stability once root systems are established.

All plant species selected for the natural corridor and enhancement areas should be native to the Ecoregion (7E) and, preferably, included in the UTRCA recommended plant lists (UTRCA, 2021). Common Milkweed and Swamp Milkweed will be added to the seed mixes in low percentages (1%) or as plugs (500 plugs/ha) to provide egg-laying and caterpillar foraging habitat for Monarch. A diversity of flowering plants in the seed mix will provide nectaring habitat for adult Monarch butterflies. Woody plant selection should consider how the species are adapted to the site conditions, including soil type, moisture, slope and sun exposure, as well as additional wildlife benefits (e.g., berry production).

Groupings of wetland shrubs will be introduced within the floodplain as live stakes or small potted stock. Upland tree and shrub planting along valley walls and within the upland buffer will enhance the adjacent Significant Woodland and provide an ecological buffer between the proposed recreational trail system and the natural corridor.

The Mud Creek corridor has been designed with a low flow channel of 0.5-1 m which will overflow into an adjacent low-lying meadow marsh zone. As the valley gradient becomes shallower toward Oxford Street West, deeper pools (max. 0.5 m deep) will be graded within the meadow marsh floodplain to provide seasonal breeding habitat for amphibians. Live stake shrubs will be planted along the banks of Mud Creek for stabilization. Wetland emergent plants may be installed as plugs within deeper pools (e.g., cattail) in the floodplain of Mud Creek.

Wildlife habitat features will be incorporated into the restoration design, such as brush/rock piles, bird nesting boxes and bat roosting boxes. Design of road bridges over the realigned channel may consider how the structure can support Barn Swallow nesting, as this Protected Species frequently nests on human-made structures near or over water.

Recommendations for maintenance, including invasive species management, and monitoring during the plant establishment period, as described in Sections 7.4 and 7.5 will be incorporated into the landscape plan.

7.3.2 Stiff Goldenrod

Stiff goldenrod occurs in dry, open ground and is occasionally found in disturbed areas such as roadsides and railways. It is sometimes introduced in restoration and roadside plantings (NHIC 2021). Individual plants or plant clusters present on the Subject Lands (polygon 8) should be marked in the field prior to site clearing and seed collected at the appropriate time of year for use in restoration along the Mud Creek corridor (upland habitats). If the timing of restoration coincides with site clearing, plants or plant clusters could be directly transplanted on site to upland areas of the Mud Creek valley. Alternatively, if restoration timing lags behind site clearing, seed collection may be appropriate for future incorporation into restoration seed mixes on the Subject Lands.

7.3.3 Creek Channel and Aquatic Habitat Features

The Mud Creek channel will be designed to enhance aquatic habitat quality and diversity on the Subject Lands, as well as improve fish habitat. Aquatic habitat features will include:

- a meandering watercourse stabilized by bank vegetation
- sequences of step pools providing a range of water velocities and establishing natural sediment transport processes
- deeper refuge pools (>0.5 m to 2.0 m depth) which retain water during periods of low/no flow and may support turtle overwintering
- riffle features constructed using logs or rocks for fish and benthic organisms
- a variety of in-stream and bank structures, such as log tangles
- a floodplain connection through overflow into meadow marsh and wetland pools during high flow events

Shade over the low-flow channel will be achieved through shrub and tree planting. A comprehensive aquatic habitat restoration plan will be developed at the detailed design stage.

7.3.4 Construction Staging

A construction staging plan is required to limit off-site earth moving requirements, clear vegetation during suitable timing windows, ensure channel stability prior to connecting flow, and provide locations for fish, wildlife and plant relocation during salvage activities. Construction of the upstream reaches first, prior to clearing and grading elsewhere, would provide time for channel stabilization and provide a relocation site for fish, wildlife and plants salvaged during downstream construction where the new and old channels overlap. Relocation of fish in Mud Creek to a location downstream of Oxford Street West may also be appropriate for fish requiring slower-moving water or deeper pools than will be found in the new upper reaches of Mud Creek.

Construction staging will be determined during the detailed design phase of the project, with the objectives of creating habitat areas for wildlife transfer and timing the channel construction so flow can be transferred to new channel/channel sections when the flow path has stabilized.

7.4 Invasive Species Management

Several priority invasive plant species from the City of London Invasive Plant Management Strategy have been identified on the Subject Lands, including Common Buckthorn and Black Locust. Policy 1417 of the London Plan states that management of invasive plant species will focus on key components of the natural heritage system, including Significant Valleylands and Significant Woodlands. As such, an invasive species management strategy should be developed for the Subject Lands.

Inventory and mapping of invasive plants will be incorporated into the monitoring plan. Removal and control of invasive species should follow published Best Management Practices, such as those published by the Ontario Invasive Plant Council (2020). Once invasives are controlled, restoration using native species as well as quick-establishing cover crops should be undertaken to avoid reestablishment of invasives or other nuisance plant species.

7.5 Monitoring Plan

The proposed Mud Creek natural corridor and Significant Valleyland, and Significant Woodland to be protected, were approved in the Mud Creek EA and are presented in the current London Plan Map 1 (City of London, 2021). Mitigation, compensation, and restoration measures recommended in this EIS are intended to protect or replicate the features and functions of significant natural heritage features on the Subject Lands, and to minimize impacts to these features. Development of a monitoring plan is recommended to document the implementation of the mitigation, compensation, and restoration measures during construction and post-construction.

The monitoring plan will be 2-phase and will consist of a construction monitoring plan and a long-term post-construction plan. The construction monitoring plan will monitor for construction-related impacts, document successes or deficiencies of the implemented mitigation measures and provide guidance on remedial actions for circumstances when mitigation is not successful [e.g., Erosion and Sedimentation Control (ESC) measures]. This plan should continue from clearing and grubbing through to home and commercial building construction until rear yards and grounds adjacent to natural features are vegetated and stabilized. This plan will be developed during the detailed design stage. Reports should be made available to the UTRCA and City design services staff.

Long-term post-construction monitoring shall evaluate the success of the proposed active restoration efforts within the Mud Creek corridor and any other areas designated for naturalization, as well as areas of invasive species management. This plan should include remedial actions that are triggered if effects exceed pre-determined thresholds (e.g., supplemental plantings if survival rates are low). Monitoring requirements should be determined at the detailed design stage in consultation with agency staff. Recommendations for monitoring include, but are not limited to:

- Encroachment activities and correction – once the development is at 80% build-out, annual reporting to the City of London should be completed for two years.

- Encroachment into the adjacent Significant Woodlands should be monitored for two years post-construction (e.g., litter present in natural features, informal trail creation) and additional strategies should be implemented if required.
- Vegetation monitoring completed for two years after planting to document compliance with the plans (e.g., the correct species and quantities were planted), and establishment of planted material. Implementation of adaptive management to correct deficiencies.
- Adaptive management strategies such as supplemental plantings, and/or control of non-native invasive species. Adaptive management may be triggered by poor survival of planted material, insufficient vegetation cover and the presence of unacceptable non-native and invasive species.
- Longer-term ecological monitoring at 2-year intervals, beginning in year 3 post-planting and continuing until the time of assumption by the City of London, documenting the target ecological functions are achieved (e.g., increased habitat diversity, a vegetation community established and progressing ecologically toward woodland within the Mud Creek corridor, and enhanced aquatic habitat quality within Mud Creek).
- Invasive plant inventory and mapping throughout the longer-term ecological monitoring period.

7.6 UTRCA Regulation

UTRCA regulates a portion of the Subject Lands under Ontario Regulation 157/06 based on UTRCA regulation mapping (UTRCA, 2022). The regulation area is associated with the existing Mud Creek and its tributaries, as well as the wetland (polygon 10) in the Subject Lands. A Section 28 Permit Application is required for any development or site alteration within the regulated areas.

7.7 Net Change in Natural Heritage System

Table 7, below, summarizes potential impacts to natural heritage features and functions as well as proposed mitigation, compensation or enhancement measures. This table includes a comparison of the proposed Draft Plan revision with the approved 1999 Draft Plan.

Table 7: Comparison of Current (2023) Proposed Draft Plan on Natural Heritage Features or Functions of the Subject Lands through Design and Implementation of the Realigned Mud Creek Natural Corridor Relative to Approved Draft Plan of Subdivision (1999)

Policy Category	Policy-Protected Feature	Natural Heritage Feature on the Subject Lands	Proposed Protection, Mitigation, Replication or Enhancement	Change Relative to Approved Draft Plan of Subdivision, 1999)
London Plan (2021)	Wetlands	• 1.96 ha thicket and marsh wetland community (SWT3/MAM3-5) along Mud Creek (polygon 10) • 0.03 ha SWT2 inclusion (8a)	• Wetland community 10 and inclusion 8a are proposed for removal • 2.51 ha floodplain wetland to be created within the Mud Creek valley floor resulting in a higher quality meadow marsh habitat and greater than 1:1 wetland compensation by area (surplus of 0.72 ha) • Replacement of non-native, invasive plants in the existing wetland with diverse native species in the created floodplain wetlands • Increased diversity of wetland types (floodplain meadow marsh, floodplain pools, wetland thicket) • Opportunity to increase amphibian breeding habitat within the Subject Lands (currently limited)	• Net gain of 2.25 ha wetland relative to the approved 1999 Draft Plan
	Significant Woodlands and Woodlands within EA preferred alternative	• Approximately 6.2 ha of Significant Woodland is present within the Subject Lands (FOD7, CUW1, CUM1-1, CUT1) • 0.39 ha of native-dominated forest (FOD7; Comm 9) • 3.6 ha of Woodlands in the EA preferred alternative area (CH2M, 2017)	• 4.66 ha Significant Woodlands retained in Subject Lands (0.31 ha FOD7 and 4.35 CUW1/CUT1/CUM1-1/SWT3). Retention of 79% of existing native-dominated woodland (FOD7). Significant characteristics (presence of a watercourse, regional landscape richness, patch size >4 ha, perimeter to area ratio, SAR bat habitat) will all be retained • 4.83 ha woodland to be created within the Mud Creek valley system (corridor, valley slopes, buffer) or elsewhere within or adjacent to the Subject Lands [Figure 13], providing > 1:1 area compensation for removal of 4.65 ha Significant Woodlands or Woodlands within EA preferred alternative • No net negative impact on woodland functions (wildlife habitat, candidate bat roost SWH, Eastern Wood-Pewee nesting habitat, linkage, SAR bat habitat)	• 1.02 ha gain in retained woodland relative to approved 1999 Draft Plan and 4.83 ha gain in woodland to be planted

	Other Woodlands	• 3.57 ha of other Woodlands (CUW1) present in the Subject Lands	• 0.0 ha Woodlands retained • 0.47 ha community garden to be established within the natural heritage system. The establishment of a community garden in addition to active and passive parkland has been requested by the City and is highly desired by the community. • Dedication of 1.66 ha existing Significant Woodland on adjacent lands to the City • Invasive plant management and active restoration proposed within 2 ha of existing retained Significant Woodland communities	• See above
	Significant Valleylands	• Mud Creek corridor (altered alignment approved as part of the negotiated settlement and shown on Map 5)	• 1 km long, 60 m wide (6 ha) natural corridor along the realigned Mud Creek	• Net gain in valleyland area • No realigned valleyland corridor was proposed in the 1999 Approved Draft Plan • Widened Mud Creek floodplain and corridor from existing condition • Increased buffer width, with recreational use outside 60m natural corridor
	Habitat of Endangered and Threatened Species	• Foraging and movement corridor for SAR bats through the Mud Creek corridor (Little Brown Myotis [END] detected during MTE acoustic surveys)	• Foraging habitat will be retained or increased in the broad Mud Creek valley system • Four bat roost boxes (rocket box style) will be placed within the natural corridor to provide suitable roosting habitat to compensate for the eight removed trees • Movement habitat will be retained in the retained Significant Woodland and Mud Creek corridor	• Increased foraging habitat • Net increase of artificial roost habitat • Retention of movement habitat • Net habitat gain relative to the approved Draft Plan
	Significant Wildlife Habitat	• Candidate habitat for Bat Maternity Colony (assumed present) in FOD7 • Confirmed habitat for Eastern Wood-Pewee in woodlands on the Subject Lands and adjacent lands • Confirmed habitat for Stiff	• 4.66 ha woodland retained on the Subject Lands, 1.66 ha dedicated to the City on adjacent lands, and 4.83 ha woodland to be created will provide habitat for Bat Maternity Colony SWH and Eastern Wood-Pewee breeding • Through restoration activities, the disturbed Significant Woodland (CUM1-1, CUT1) will become more typical deciduous wooded habitat for Eastern Wood-Pewee nesting	• Habitat for Bat Maternity Colony SWH and Eastern Wood-Pewee will be largely retained and improved • Increase in potential bat roost habitat with placement of artificial

		Goldenrod in CUW1 (polygon 8).	• Stiff Goldenrod will be transplanted or otherwise incorporated into the restoration plan for the Mud Creek corridor	roost boxes within protected valleyland • Net gain in habitat for Stiff Goldenrod through transplant or seed collection and reuse in site restoration
	Fish Habitat	• Warm water fish habitat in Mud Creek with low dissolved oxygen. Fish were observed only within deep pools along Oxford St outside the limits of work and in a deep pool at the mouth of Tributary C.	• Fish habitat will be enhanced through the design of a new natural channel within the Mud Creek valley system • BMPs for sediment and erosion control will be implemented during construction to mitigate potential impacts to the existing watercourse	• Net improvement in fish habitat and water quality • Potential for fish to move upstream of Oxford Street
	Water Resource Systems	• Groundwater discharge and recharge along the Mud Creek Corridor	• The groundwater study (Palmer, 2021) has concluded that the proposed realigned path of Mud Creek will continue to receive groundwater discharge and intercept the seasonal water table if constructed at a similar elevation and grade as the existing channel. • Infiltration-based LID measures will be designed to balance the pre-to-post development water budget.	• Net neutral effect on groundwater discharge and recharge
UTRCA Regulations	Regulation Limit	• Mud Creek and its tributaries, and 1.96 ha wetland (polygon10), on the Subject Lands	• Mud Creek and floodplain to be realigned within 60 m wide (6 ha) natural corridor • Approximately 2.51 ha floodplain wetland to be created along Mud Creek valley floor • Greater than 1:1 wetland compensation by area and increase in floristic quality and diversity of wetland types (floodplain meadow marsh, floodplain pools, wetland thicket)	• Net improvement to Mud Creek channel and associated floodplain (increased flood storage capacity) • Net gain of 2.25 ha of wetland relative to approved 1999 Draft Plan

8.0 Summary and Conclusions

This SLSR/EIS identifies the natural heritage features and functions to be protected or replicated on the Subject Lands, as determined by previous studies and settlements. This SLSR/EIS provides recommendations for how the proposed Mud Creek realignment and surrounding subdivision can be implemented while protecting or enhancing the natural heritage system (NHS) within the Subject Lands.

Mud Creek is proposed to be realigned within the approved 1 km long and 60 m wide (6 ha) Significant Valleyland to mitigate the flooding impacts on developed and undeveloped public and private lands, and to reduce the frequency of flooding of the proposed Oxford Street Rapid Transit Corridor. Rehabilitation of the channel (as proposed in the Mud Creek EA) is intended improve the aquatic habitat in the short term and the terrestrial habitat in the long-term. Ecological enhancements proposed within the natural corridor include wetland and terrestrial habitat re-creation for Species at Risk and other wildlife, and step pools and shading within the stream corridor to enhance the aquatic habitat and water quality.

Wetland removal within the Subject Lands is recommended to be addressed through wetland creation in the realigned Mud Creek valleyland, with greater than 1:1 compensation by area provided, as well as an increase in floristic quality and habitat connectivity. A net positive impact on wetland habitat is anticipated as a result of this project, provided recommendations are implemented.

The compensation strategy for removal of woodlands is recommended to include maximized woodland creation within the Subject Lands, adjacent land dedication for long-term protection of wildlife movement linkages, and restoration activities in retained woodlands in Block 10 to align the floristic quality with its Significant Woodland designation. The approach for woodland compensation in this EIS varies based on significance level and incorporates the requirements of the EA (CH2M, 2017). One-to-one compensation by area is proposed for the area of the preferred alternative outlined in the EA (CH2M, 2017), as well as any additional areas of Significant Woodland. The removal of non-significant woodlands is to be compensated through woodland planting, dedication of adjacent Fleetway lands (1.66 ha) to the City, and restoration of the retained Significant Woodland in Block 10. This combination of native woodland creation and alternative compensation forms is considered appropriate to maintain and/or improve the woodland habitat and its various functions (SWH, potential SAR bat habitat, linkage, landscape richness, tree cover) within the Subject Lands.

Recommendations also include mitigating impacts to fish habitat in Mud Creek, avoiding impacts to wildlife using timing windows and worker awareness, and protection of water resources. Indirect impacts on natural features are recommended to be mitigated through the implementation of standard environmental protection measures such as erosion and sediment control (ESC) measures.

A summary of proposed changes to the natural heritage system relative to existing conditions and to the approved Draft Plan (1999) is included in this SLSR/EIS report. Provided the recommendations within this report are met, it is our opinion that the proposed development can proceed.

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

All of which is respectfully submitted,

MTE Consultants Inc.

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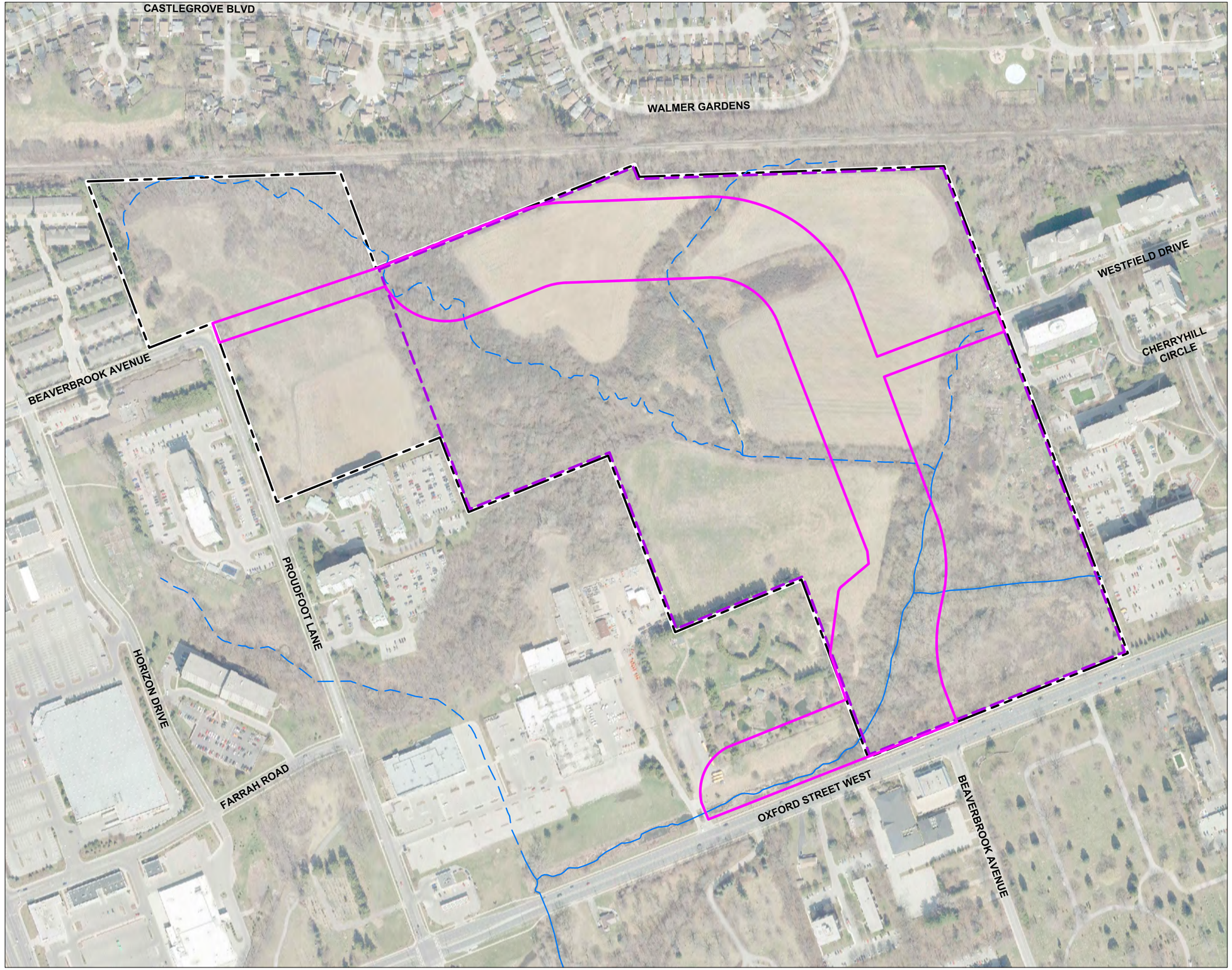
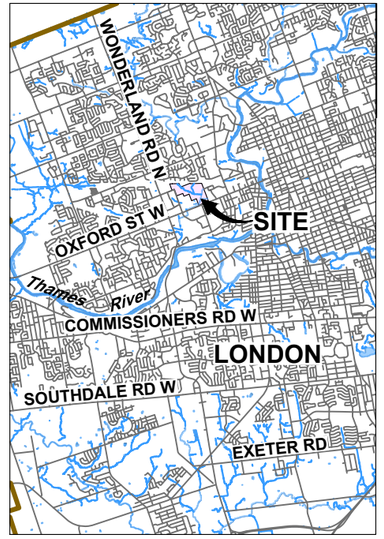
Figures





KEY PLAN (nts)

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LEGEND

- SUBJECT LANDS
- 2019 SETTLEMENT AREA
- EA (CH2M, 2017) PREFERRED ALTERNATIVE AREA

REFERENCES

CITY OF 2021 LONDON PARCEL AND AERIAL IMAGERY, OPEN DATA SET.

NOTES

THIS FIGURE IS SCHEMATIC ONLY AND TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE.

SCALE IN METRES
0 50 100
1:4,000

MTE
Engineers, Scientists, Surveyors

PROJECT

ENVIRONMENTAL IMPACT STUDY
MUD CREEK
LONDON, ONTARIO

TITLE

PROJECT LOCATION

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LEGEND

- SUBJECT LANDS
- RAILWAY
- SIGNIFICANT VALLEYLAND
- SIGNIFICANT WOODLAND
- STREET
- SUBWATERSHED BOUNDARY
- UNEVALUATED VEGETATION PATCH
- WATERCOURSE/POND

REFERENCES

CITY OF 2021 LONDON PARCEL AND AERIAL IMAGERY, OPEN DATA SET; AND
CITY OF LONDON, MAP 5 - NATURAL HERITAGE, MAY 28 - 2021.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

SCALE IN METRES
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1:7,500

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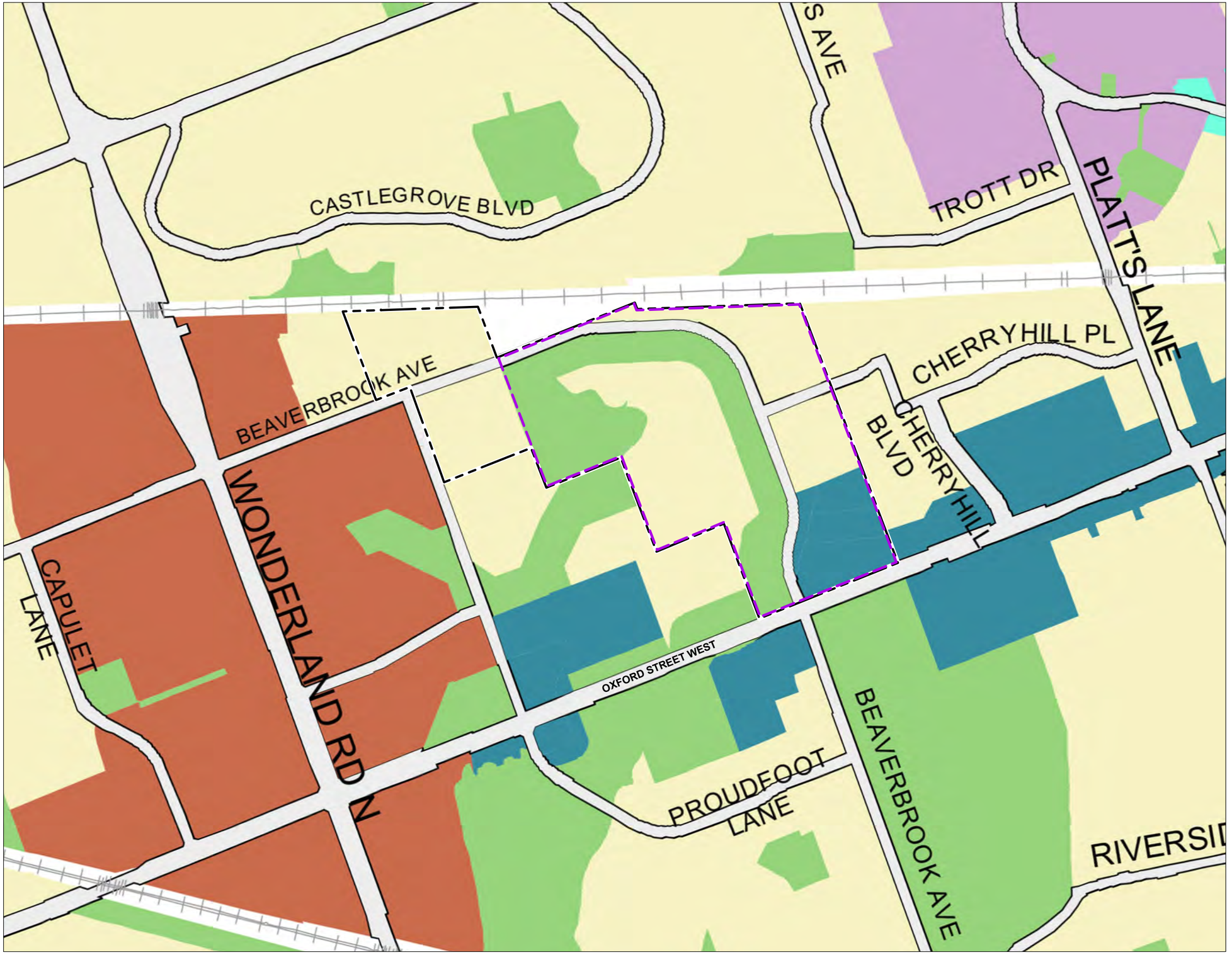
Engineers, Scientists, Surveyors

PROJECT
ENVIRONMENTAL IMPACT STUDY
MUD CREEK
LONDON, ONTARIO

TITLE
NATURAL HERITAGE

Drawn DCH	Scale AS SHOWN
Checked	Project No. 45591-100
Date Oct 11/22	Rev No. 0

FIGURE 2



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LEGEND

- SUBJECT LANDS
- 2019 SETTLEMENT AREA
- GREEN SPACE
- INSTITUTIONAL
- NEIGHBOURHOOD
- RAILWAY
- RAPID TRANSIT CORRIDOR
- TRANSIT VILLAGE
- URBAN CORRIDOR

REFERENCES

CITY OF 2021 LONDON PARCEL AND AERIAL IMAGERY, OPEN DATA SET; AND
IMAGERY, OPEN DATA SET; AND
CITY OF LONDON, MAP 1 - PLACE TYPES, MAY 25 - 2022.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

SCALE IN METRES
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1:7,500

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ENVIRONMENTAL IMPACT STUDY
MUD CREEK
LONDON, ONTARIO

TITLE
PLACE TYPES

Drawn: DCH	Scale: AS SHOWN	**FIGURE 3**
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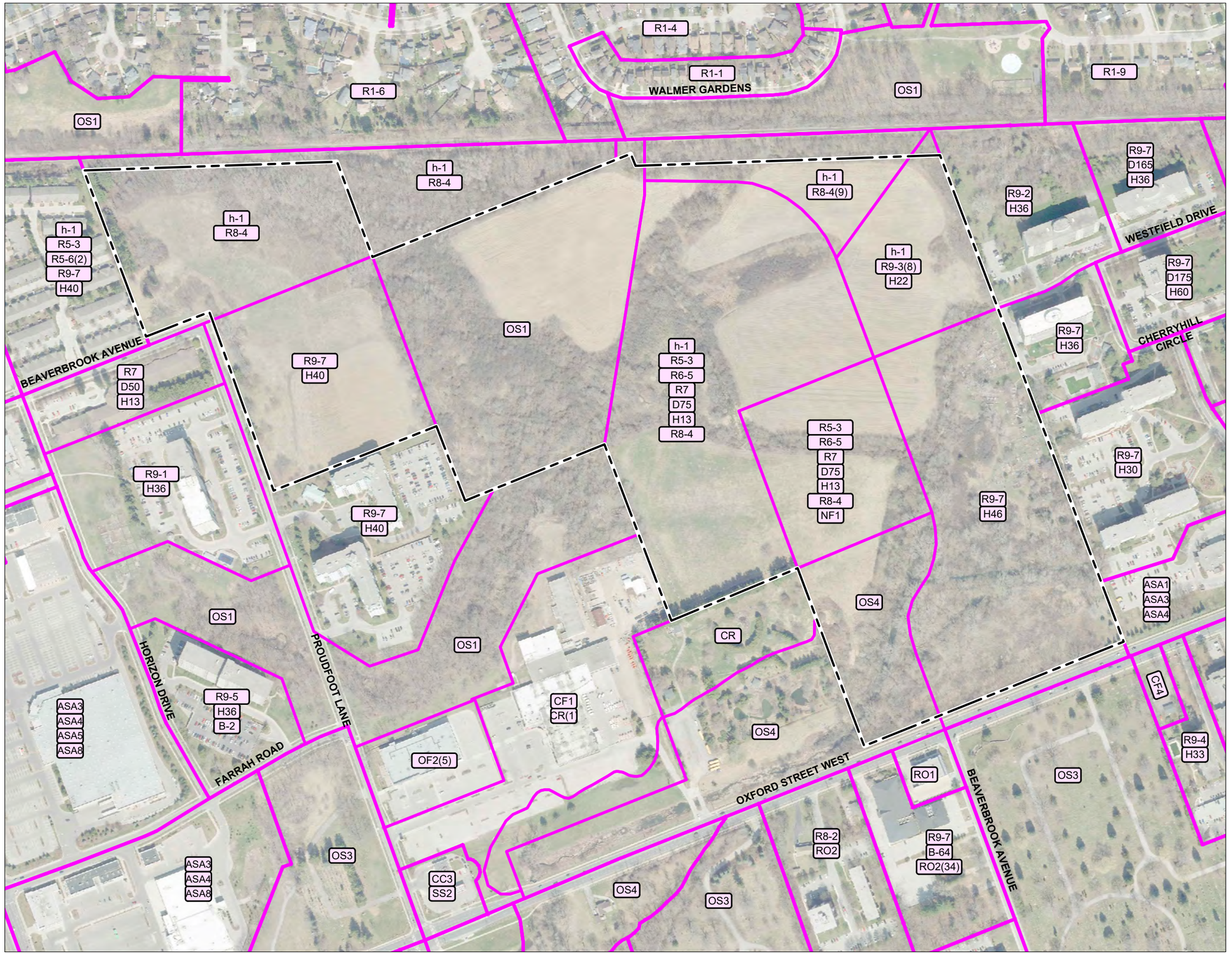

N

LEGEND

- SUBJECT LANDS
- ZONING

ASA	ASSOCIATED SHOPPING AREA COMMERCIAL ZONE
CF	COMMUNITY FACIILITY ZONE
CR	COMMERCIAL RECREATION ZONE
D	DENSITY UNITS/HECTARE
h	HOLDING ZONE PROVISION
H	HEIGHT MAXIMUM
HS	HIGHWAY SERVICE COMMERCIAL ZONE
NF	NEIGHBOURHOOD FACILITY ZONE
OF	OFFICE ZONE
OS	OPEN SPACE ZONE
R	RESIDENTIAL ZONE
RO	RESTRICTED OFFICE ZONE
SS	AUTOMOBILE SERVICE STATION ZONE

REFERENCES

CITY OF 2021 LONDON PARCEL AND AERIAL IMAGERY, OPEN DATA SET; AND
CITY OF LONDON INTERACTIVE ZONING MAP.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

SCALE IN METRES
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1:4,000

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ENVIRONMENTAL IMPACT STUDY
MUD CREEK
LONDON, ONTARIO

TITLE
ZONING

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LEGEND

- SUBJECT LANDS
- UTRCA SCREENING AREA
- WATERCOURSE (Permanent)
- WATERCOURSE (Intermittent)
- MINI-PIEZOMETER (Palmer)

REFERENCES

CITY OF 2021 LONDON PARCEL AND AERIAL IMAGERY, OPEN DATA SET;
UPPER THAMES RIVER CONSERVATION AUTHORITY (UTRCA), REGULATED SCREENING MAP AND WATERCOURSE; AND
PALMER ENVIRONMENTAL CONSULTING GROUP, PROJECT No. 180261, BOREHOLE AND MONITORING WELL LOCATION PLAN, FIGURE 1, MAY 17 - 2019.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

SCALE IN METRES
0 50 100
1:4,000

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PROJECT
ENVIRONMENTAL IMPACT STUDY
MUD CREEK
LONDON, ONTARIO

TITLE
MUD CREEK HYDROLOGY AND UTRCA REGULATED LANDS

Drawn: DCH	Scale: AS SHOWN	**FIGURE 5**
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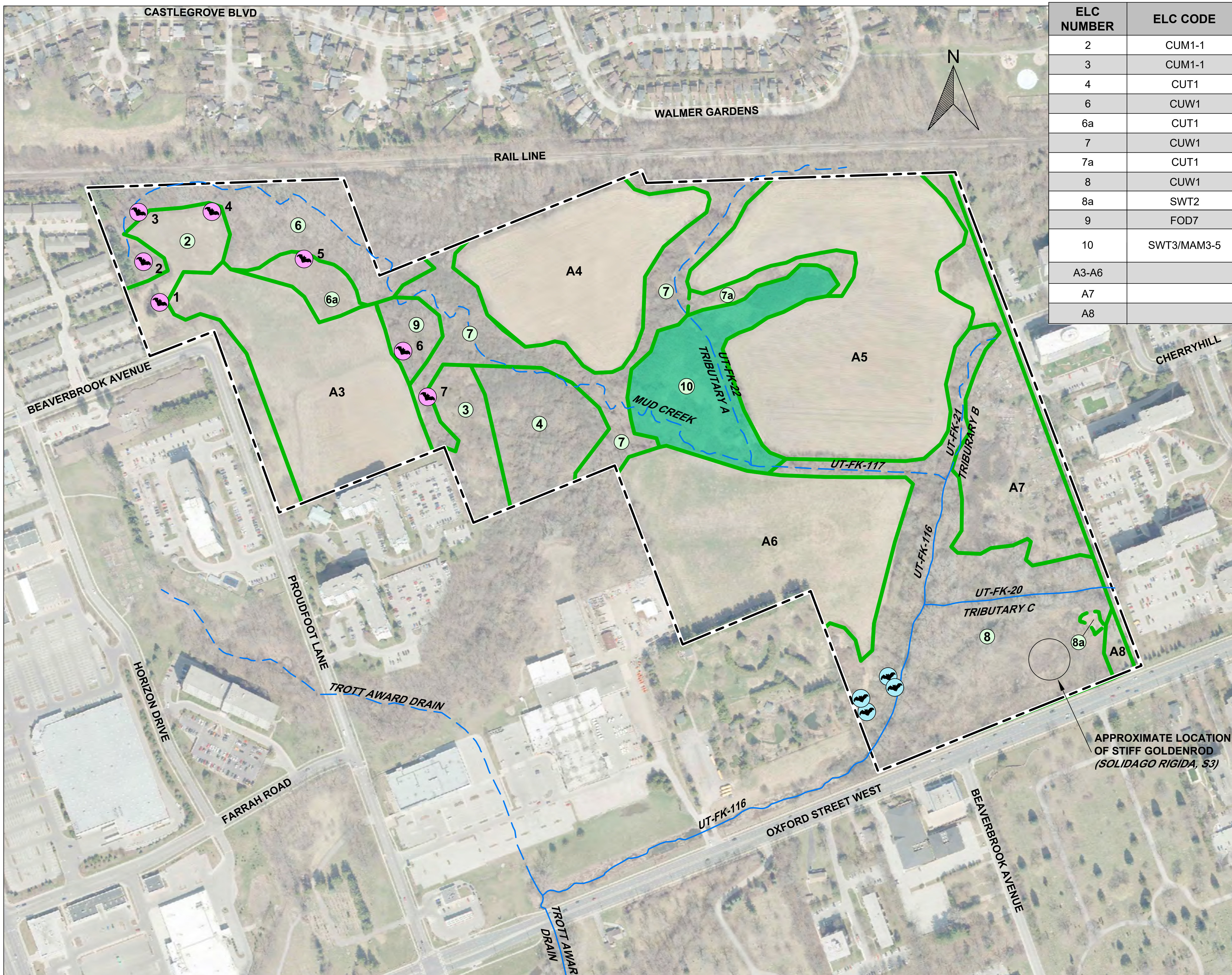

ELC NUMBER	ELC CODE	Description
2	CUM1-1	Dry-Moist Old Field Meadow Type (1.46ha)
3	CUM1-1	Dry-Moist Old Field Meadow Type (0.77ha)
4	CUT1	Mineral Cultural Thicket Ecosite (1.32ha)
6	CUW1	Mineral Cultural Woodland Ecosite (2.10ha)
6a	CUT1	Mineral Cultural Woodland Ecosite (0.44ha)
7	CUW1	Mineral Cultural Woodland Ecosite (2.52ha)
7a	CUT1	Mineral Cultural Thicket Ecosite (0.36ha)
8	CUW1	Mineral Cultural Woodland Ecosite (5.81ha)
8a	SWT2	Mineral Swamp Thicket Inclusion (0.03ha)
9	FOD7	Fresh-Moist Deciduous Forest Ecosite (0.39ha)
10	SWT3/MAM3-5	Organic Thicket Swamp/Narrow-leaved Sedge/ Organic Meadow Marsh Type (1.96ha)
A3-A6		Active Agriculture
A7		Community Gardens/Maintained Landscape
A8		Maintained Landscape

LEGEND

- SUBJECT LANDS
- PERMANENT WATERCOURSE (UTRCA)
- INTERMITTENT WATERCOURSE (UTRCA)
- 1 VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Inclusion)
- WETLAND

CANDIDATE MATERNITY ROOST TREES:

- BIOLOGIC, 2018
- LGL, 2016

REFERENCES

CITY OF 2021 LONDON PARCEL AND AERIAL IMAGERY, OPEN DATA SET; UPPER THAMES CONSERVATION AUTHORITY (UTRCA), WATER COURSE; AND LGL LIMITED, MUD CREEK EA, PROJECT No. TA8479, FIGURE 5, JUNE 2015.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

SCALE IN METRES
0 50 100
1:4,000

MTE
Engineers, Scientists, Surveyors

PROJECT
ENVIRONMENTAL IMPACT STUDY
MUD CREEK
LONDON, ONTARIO

TITLE
VEGETATION COMMUNITIES

Drawn	DCH	Scale	AS SHOWN
Checked		Project No.	45591-100
Date	Jan 17/23	Rev No.	0

FIGURE 6

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3	CUM1-1	Dry-Moist Old Field Meadow Type (0.77ha)
4	CUT1	Mineral Cultural Thicket Ecosite (1.32ha)
6	CUW1	Mineral Cultural Woodland Ecosite (2.10ha)
6a	CUT1	Mineral Cultural Woodland Ecosite (0.44ha)
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A3-A6		Active Agriculture
A7		Community Gardens/Maintained Landscape
A8		Maintained Landscape

WALMER GARDENS
RAIL LINE
BEAVERBROOK AVENUE
A3
A4
A5
A6
A7
A8
UT-FK-22 TRIBUTARY A
MUD CREEK
UT-FK-117
UT-FK-21 TRIBURARY B
UT-FK-116
UT-FK-20 TRIBUTARY C
PROUDFOOT LANE
TROTT AWARD DRAIN
HORIZON DRIVE
FARRAH ROAD
OXFORD STREET WEST
BEAVERBROOK AVENUE
TROTT AWARD DRAIN
APPROXIMATE LOCATION OF STIFF GOLDENROD *(SOLIDAGO RIGIDA, S3)*

N

LEGEND

- SUBJECT LANDS
- PERMANENT WATERCOURSE (UTRCA)
- INTERMITTENT WATERCOURSE (UTRCA)
- (1) VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Inclusion)
- WETLAND

CANDIDATE MATERNITY ROOST TREES:
- BIOLOGIC, 2018
- LGL, 2016

BAT ACOUSTIC BOXES:
- BIOLOGIC, 2018
- LGL, 2016

- FROG BREEDING STATION (100m RADII SHOWN)

REFERENCES

CITY OF 2021 LONDON PARCEL AND AERIAL IMAGERY, OPEN DATA SET; UPPER THAMES CONSERVATION AUTHORITY (UTRCA), WATER COURSE; AND LGL LIMITED, MUD CREEK EA, PROJECT No. TA8479, FIGURE 5, JUNE 2015.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

SCALE IN METRES
0 50 100
1:4,000

MTE
Engineers, Scientists, Surveyors

PROJECT
ENVIRONMENTAL IMPACT STUDY
MUD CREEK
LONDON, ONTARIO

TITLE
SURVEY STATION LOCATIONS

Drawn	DCH	Scale	AS SHOWN
Checked		Project No.	45591-100
Date	Jan 17/23	Rev No.	0

FIGURE 7

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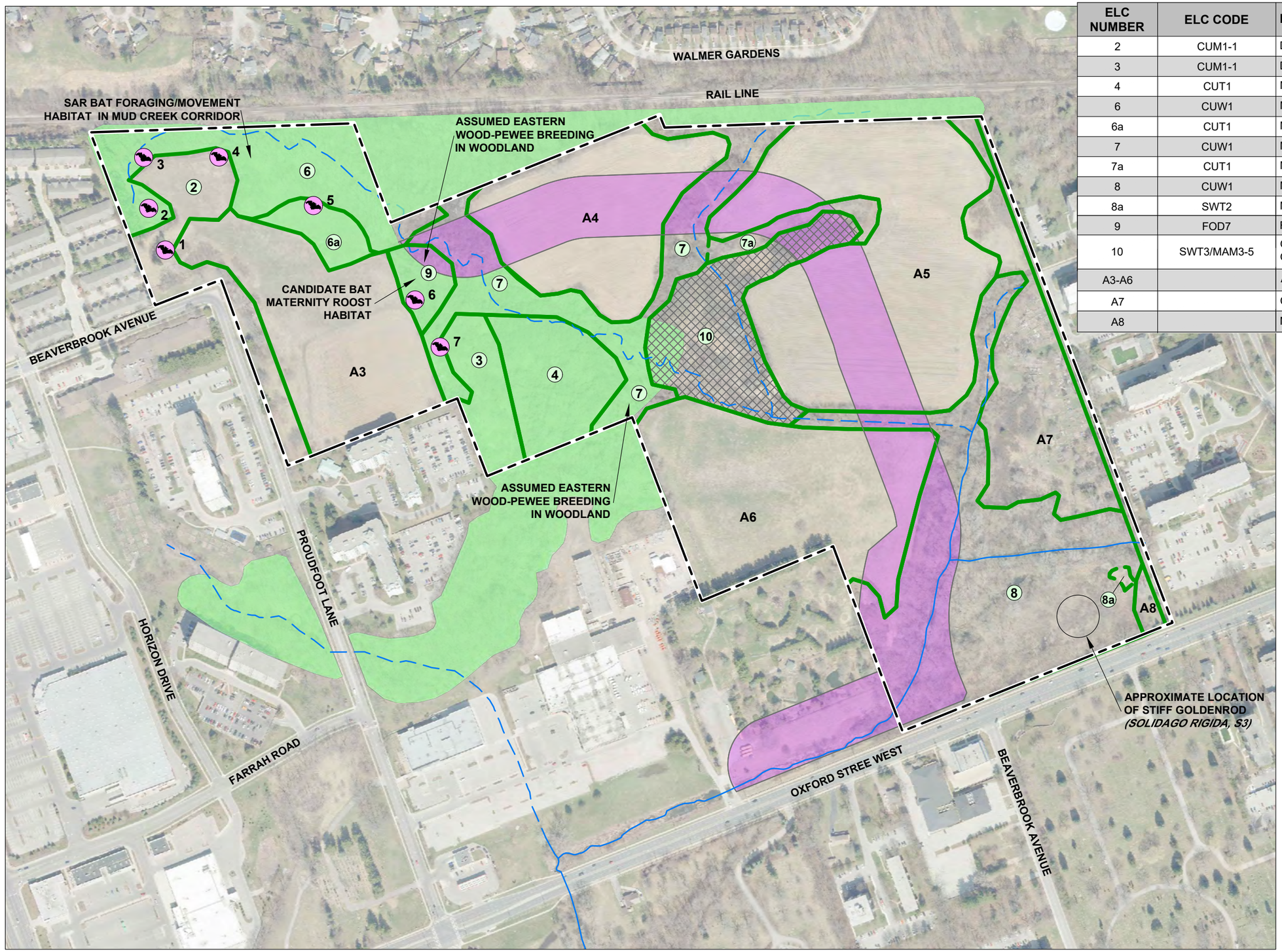

ELC NUMBER	ELC CODE	Description
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A3-A6		Active Agriculture
A7		Community Gardens/Maintained Landscape
A8		Maintained Landscape

N

LEGEND

- SUBJECT LANDS
- PERMANENT WATERCOURSE (UTRCA)
- INTERMITTENT WATERCOURSE (UTRCA)
- (1) VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Inclusion)
- WETLAND
- SIGNIFICANT WOODLAND
- NEW MUD CREEK VALLEYLAND
- CANDIDATE MATERNITY ROOST TREE (BIOLOGIC, 2018)

REFERENCES

CITY OF 2021 LONDON PARCEL AND AERIAL IMAGERY, OPEN DATA SET;
UPPER THAMES CONSERVATION AUTHORITY (UTRCA), WATER COURSE;
MBTW WAI,, BEAVERBROOK DRAFT PLAN, PROJECT No. EGP001, OCTOBER 13 - 2022; AND
LGL LIMITED; MUD CREEK EA - VEGETATION COMMUNITIES, PROJECT No. TA8479, FIGURE No. 3, MARCH 2016.

NOTES

THIS FIGURE IS SCHEMATIC ONLY AND TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE.

SCALE IN METRES
0 50 100
1:4,000

MTE
Engineers, Scientists, Surveyors

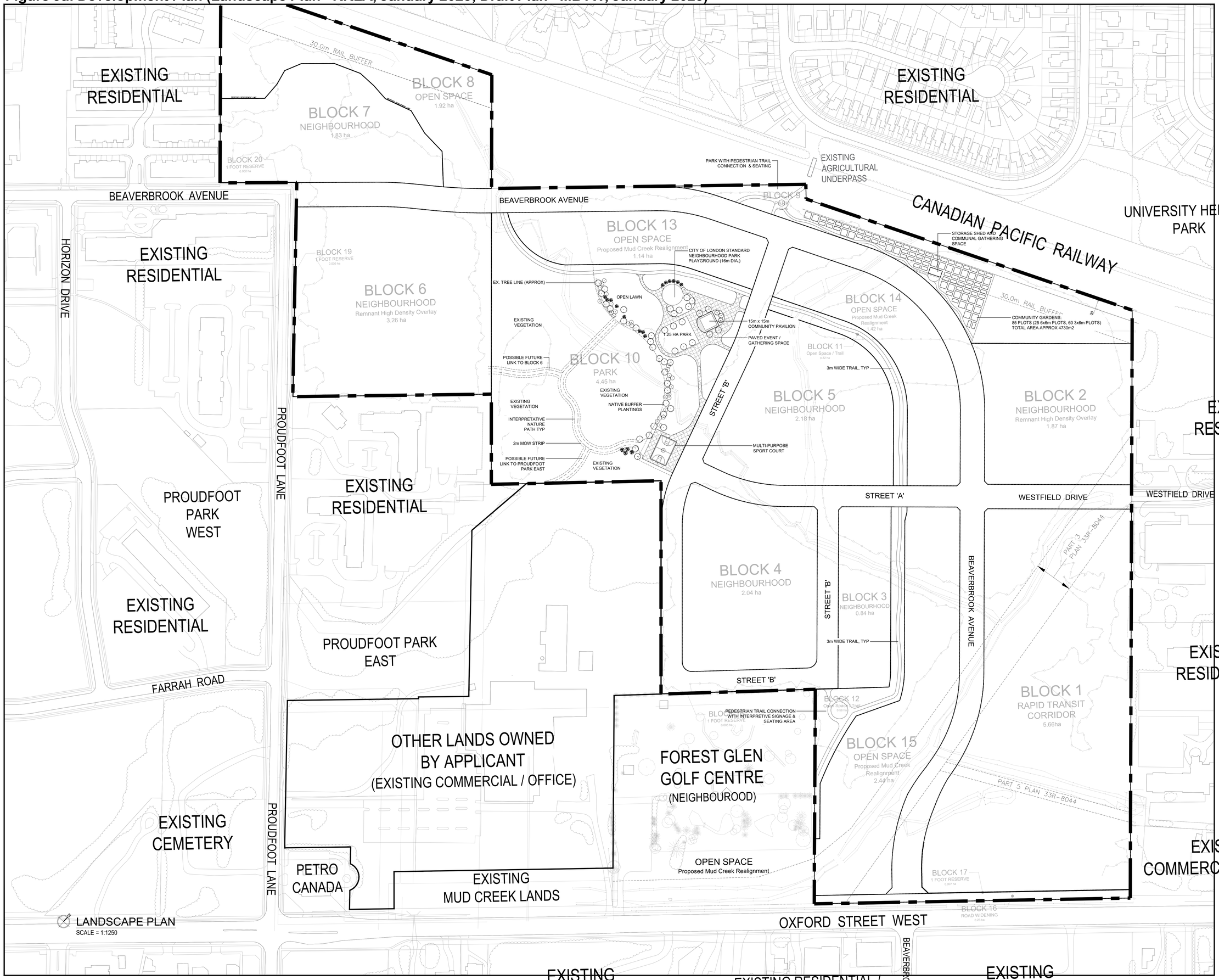
PROJECT
ENVIRONMENTAL IMPACT STUDY
MUD CREEK
LONDON, ONTARIO

TITLE
NATURAL HERITAGE FEATURES

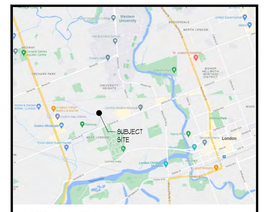
Drawn: DCH	Scale: AS SHOWN
Checked:	Project No.: 45591-100
Date: Jan 18/23	Rev No.: 0

FIGURE 8

Figure 9a: Development Plan (Landscape Plan - RKLA, January 2023; Draft Plan - MBTW, January 2023)



LANDSCAPE PLAN
SCALE = 1:1250



KEY MAP

RON KOUDYS LANDSCAPE ARCHITECTS INC.

Barry R. Murphy, O.A.L.A. C.S.L.A. DATE

No.	DESCRIPTION	DATE
7.	ISSUED FOR REVIEW	JAN. 6, 2023
6.	ISSUED FOR COORDINATION	NOV. 22, 2022
5.	ISSUED FOR REVIEW	NOV. 7, 2022
4.	ISSUED FOR REVIEW	OCT. 21, 2022
3.	ISSUED FOR COORDINATION	OCT. 20, 2022
2.	ISSUED FOR REVIEW	OCT. 18, 2022
1.	ISSUED FOR REVIEW	SEPT. 27, 2022

PLOTTING INFORMATION:
PLOTTED DATE = JAN. 6, 2023
PLOTTED SCALE = 1:1

FOR REVIEW ONLY

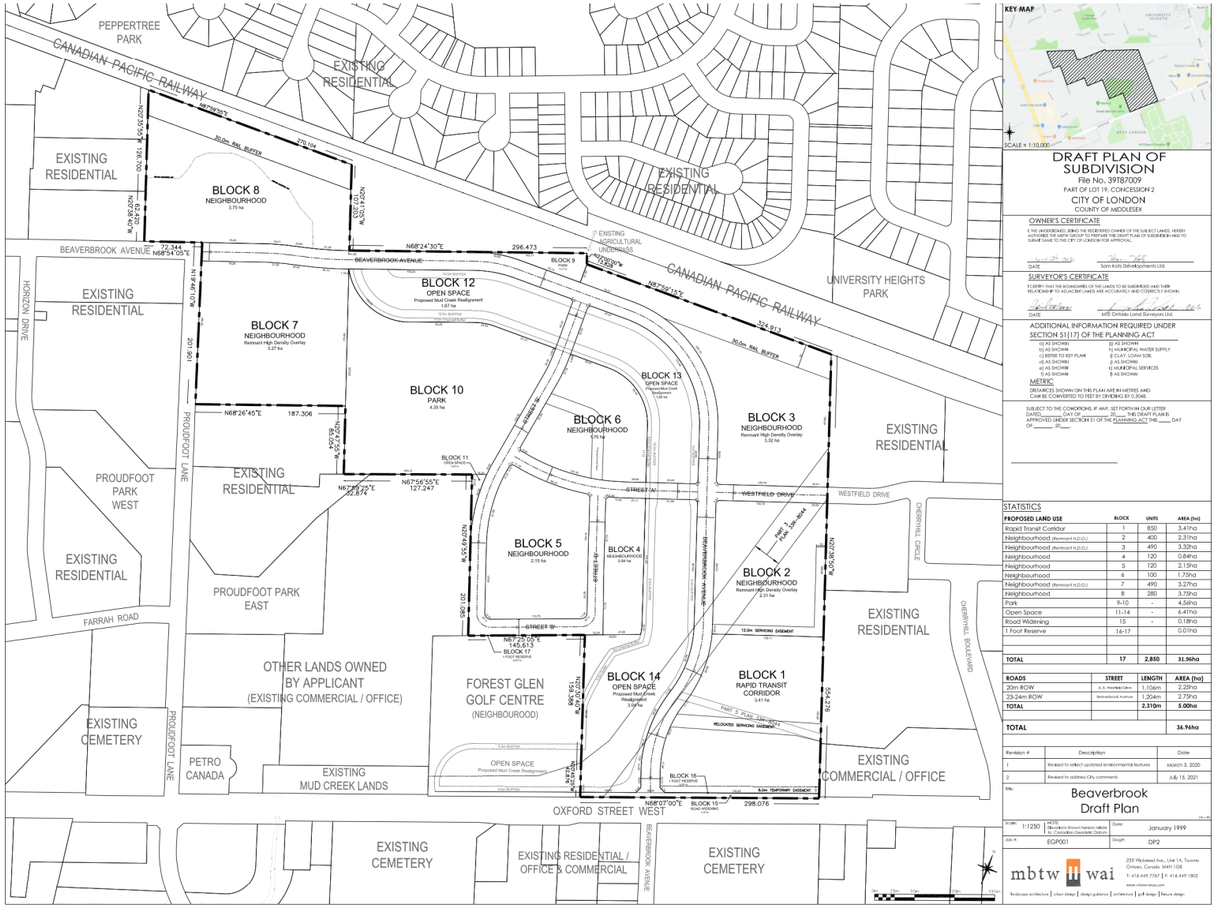
PROJECT TITLE:
YORK BEAVERBROOK SUBDIVISION
LONDON, ONTARIO

DRAWING TITLE:
DRAFT
LANDSCAPE PLAN

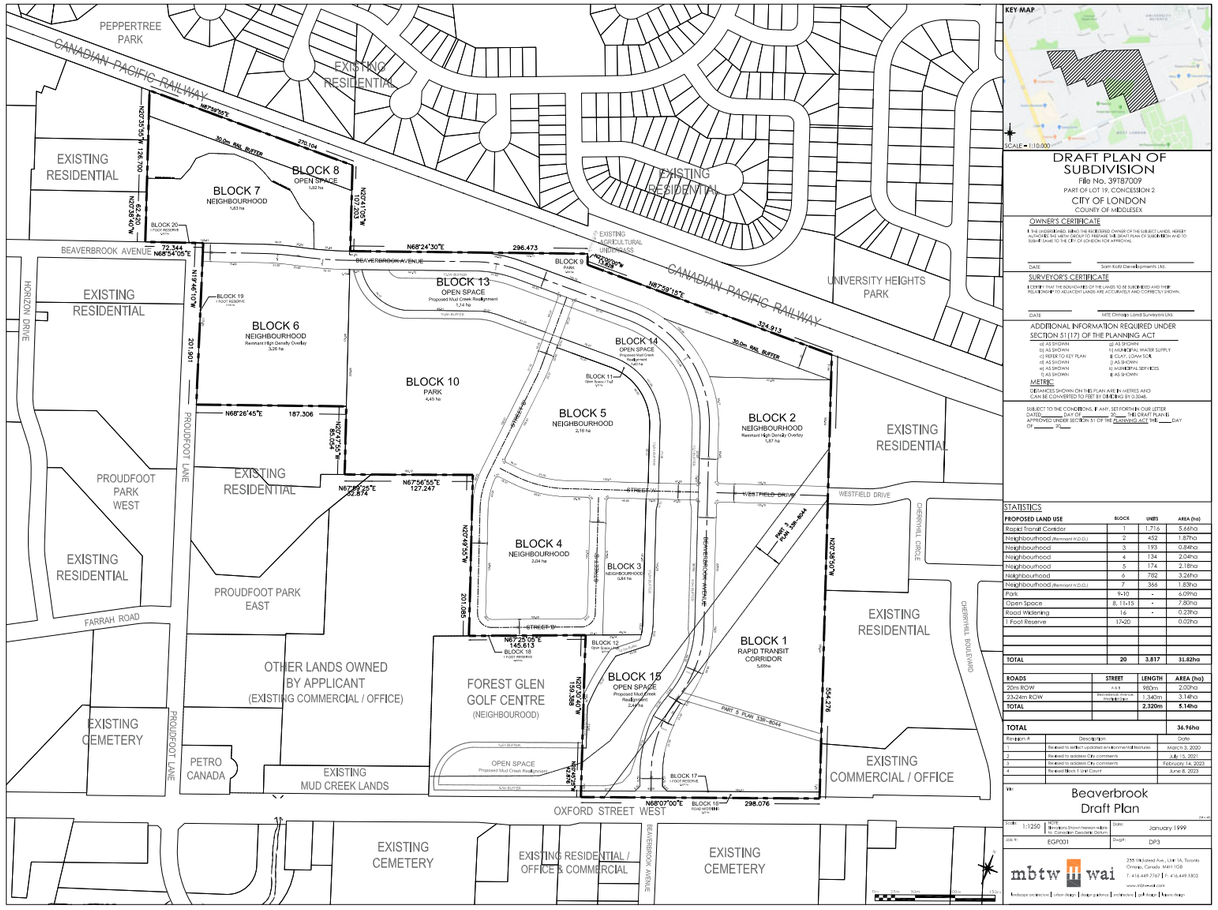
DATE:	SCALE:	DRAWING No.
SEPTEMBER 2022	AS NOTED	L-1
DRAWN: RKLA Inc.	CHECKED BY: B.R.M.	
PROJECT No. 22-236Lo		

Figure 9b: 2021 to 2023 Draft Plan Comparison (MBTW, 2023) - REVISED JUNE 2023

2021 Draft Plan Submission

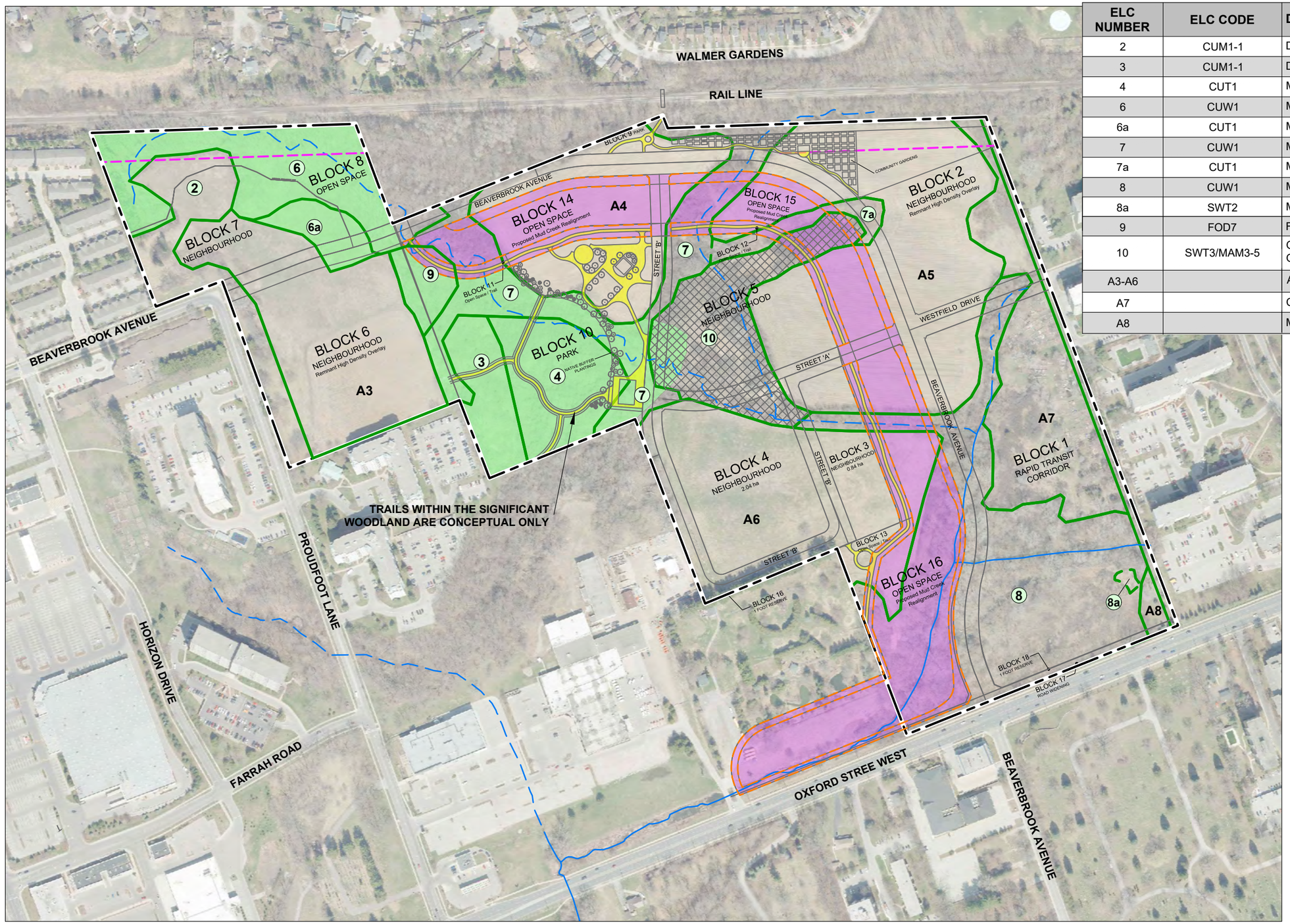


2023 Draft Plan Submission



2021 Draft Plan	2023 Draft Plan	Notes
Block 1	Block 1	Combined into one Rapid Transit Corridor Block
Block 2		
Block 3	Block 2	Shifted block number & revised block shape
Block 4	Block 3	Shifted block number
Block 5	Block 4	Shifted block number
Block 6	Block 5	Shifted block number
Block 7	Block 6	Shifted block number
Block 8	Block 7	Developable area of original block
	Block 8	Environmental Area of original block
Block 9	Block 9	Expanded block area
Block 10	Block 10	Combined due to revised block and road layout
Block 11		

2021 Draft Plan	2023 Draft Plan	Notes
Block 12	Block 13	Shifted block number
Block 13	Block 11	Open Space / Trail removed from channel
	Block 14	Channel only
Block 14	Block 12	Open Space / Trail removed from channel
	Block 15	Channel only
Block 15	Block 16	Shifted block number
Block 16	Block 17	Shifted block number
Block 17	Block 18	Shifted block number
N/A	Block 19	Added Reserve Block
N/A	Block 20	Added Reserve Block



ELC NUMBER	ELC CODE	Description
2	CUM1-1	Dry-Moist Old Field Meadow Type (1.46ha)
3	CUM1-1	Dry-Moist Old Field Meadow Type (0.77ha)
4	CUT1	Mineral Cultural Thicket Ecosite (1.32ha)
6	CUW1	Mineral Cultural Woodland Ecosite (2.10ha)
6a	CUT1	Mineral Cultural Woodland Ecosite (0.44ha)
7	CUW1	Mineral Cultural Woodland Ecosite (2.52ha)
7a	CUT1	Mineral Cultural Thicket Ecosite (0.36ha)
8	CUW1	Mineral Cultural Woodland Ecosite (5.81ha)
8a	SWT2	Mineral Swamp Thicket Inclusion (0.03ha)
9	FOD7	Fresh-Moist Deciduous Forest Ecosite (0.39ha)
10	SWT3/MAM3-5	Organic Thicket Swamp/Narrow-leaved Sedge/ Organic Meadow Marsh Type (1.96ha)
A3-A6		Active Agriculture
A7		Community Gardens/Maintained Landscape
A8		Maintained Landscape

N

LEGEND

- SUBJECT LANDS
- PERMANENT WATERCOURSE (UTRCA)
- INTERMITTENT WATERCOURSE (UTRCA)
- (1) VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Inclusion)
- WETLAND
- SIGNIFICANT WOODLAND (only shown within Subject Lands)
- NEW MUD CREEK VALLEYLAND
- PROPOSED PATH/WALKING AREA
- 30m RAIL BUFFER
- MUD CREEK BUFFER ZONE (Varies 6.5-13.0m)

REFERENCES

CITY OF 2021 LONDON PARCEL AND AERIAL IMAGERY, OPEN DATA SET;
UPPER THAMES CONSERVATION AUTHORITY (UTRCA), WATER COURSE; AND
RON KOUDYS LANDSCAPE ARCHITECTS INC., LANDSCAPE PLAN,
PROJECT No. 22-236LK, DWG FILE 22-236Lo.dwg, JANUARY 9 - 2023.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

SCALE IN METRES
0 50 100
1:4,000

MTE
Engineers, Scientists, Surveyors

PROJECT
ENVIRONMENTAL IMPACT STUDY
MUD CREEK
LONDON, ONTARIO

TITLE
DEVELOPMENT OVERLAY

Drawn: DCH	Scale: AS SHOWN	**FIGURE 10**
Checked:	Project No.: 45591-100	
Date: Jan 17/23	Rev No.: 0	

Figure 11: Conceptual Mud Creek Corridor Details (TMIG, 24 May 2017)

*Note that the corridor details below have not been fully updated with the most recent Draft Plan (MBTW, 2023), however the concepts for the channel reaches, valley slopes, and vegetated buffers remain relevant.

0 50 100 Meters

CASTLEGROVE BLVD
ASTORIA CRT
ASTORIA PL
WALMER GROVE
WALMER GDNS
CP RAILWAY
CP Rail
30m SETBACK FROM RAILWAY
(30m SETBACK FROM RAILWAY)
0.3 RESERVE
EXISTING STORM SEWER
FUTURE PROPOSED CROSSING
BEAVERBROOK AVE. EXTENSION
6.0m BOULEVARD
10.0m VEGETATED OPEN SPACE
3:1
60.0m
40.0m
25.0m
POTENTIAL FUTURE CROSSING / ACCESS TO SUBJECT SITE
REACH 1
4.0m x 0.6m BANKFULL CHANNEL
25.0 m MEANDER BELT / VALLEY FLOOR
3.0m MAX DEPTH WITH 3:1 SIDE SLOPES
2.3% AVERAGE CHANNEL SLOPE
10.0 m VEGETATED OPEN SPACE AT TOP OF EMBANKMENT
60.0 m CORRIDOR WIDTH
REACH 2
9.0m x 0.9m BANKFULL CHANNEL
27.0 m MEANDER BELT / VALLEY FLOOR
3.0m MAX DEPTH WITH 3:1 SIDE SLOPES
0.8% AVERAGE CHANNEL SLOPE
8.0 m VEGETATED OPEN SPACE AT TOP OF EMBANKMENT
60.0 m CORRIDOR WIDTH
REACH 3
9.0m x 0.9m BANKFULL CHANNEL
UP TO 59.0 m MEANDER BELT / VALLEY FLOOR
3.0m MAX DEPTH WITH 3:1 SIDE SLOPES
0.9% AVERAGE CHANNEL SLOPE
5.0 m VEGETATED OPEN SPACE AT TOP OF EMBANKMENT
UP TO 87.0 m CORRIDOR WIDTH
REACH 4
9.0m x 0.9m BANKFULL CHANNEL
27.0 m MEANDER BELT / VALLEY FLOOR
3.0m MAX DEPTH WITH 3:1 SIDE SLOPES
0.1% AVERAGE CHANNEL SLOPE
6.5 m VEGETATED OPEN SPACE AT TOP OF EMBANKMENT
60.0 m CORRIDOR WIDTH
PROPOSED STORM SEWER EXTENSION
WESTFIELD DR
WESTFIELD DR. EXTENSION ROW
8.0m VEGETATED OPEN SPACE
BEAVERBROOK AVE. EXTENSION ROW
5.0m VEGETATED OPEN SPACE
86.0m
76.0m
59.0m
6.0m BOULEVARD
6.5m VEGETATED OPEN SPACE
6.5m VEGETATED OPEN SPACE
6.0m OXFORD ST. WIDENING
OXFORD ST W
PROUDFOOT LANE
EXISTING STORM SEWER
FUTURE PROPOSED CROSSING (EA PREFERRED ALTERNATIVE FOR OXFORD ST. CROSSING)
PROPOSED MUD CREEK (EA PREFERRED ALTERNATIVE)
BEAVERBROOK AVE
PARKING GARAGE
BOWLING ALLEY
DRAFT

LEGEND:

- SUBJECT SITE (ESAM LANDS - 323 OXFORD STREET WEST)
- EXISTING MUD CREEK

TMIG
The Municipal Infrastructure Group Ltd
8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700
f: 905.738.0065

PROPOSED REALIGNED VALLEY
CONCEPTUAL PLAN
CONCEPTUAL DESIGN OF MUD CREEK VALLEY

SCALE: 1:1500		PROJECT No. 16126
DATE: MAY 2017		
DESIGNED BY: T.D	DRAWN BY: M.M.	FIGURE No. 3-1
CHECKED BY: S.H	CHECKED BY:	

File : G:\Projects\2016\16126 - Mud Creek\4 Drawings\SWM\FIG 3-1 to 3-4 rev.dwg, Layout : 3-1 Date :May 23, 2017 - 1:20pm, Edit By : mmoryakina

ELC NUMBER	ELC CODE	Description
2	CUM1-1	Dry-Moist Old Field Meadow Type (1.46ha)
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A3-A6		Active Agriculture
A7		Community Gardens/Maintained Landscape
A8		Maintained Landscape

WALMER GARDENS

RAIL LINE

BEAVERBROOK AVENUE

BLOCK 8 OPEN SPACE

BLOCK 7 NEIGHBOURHOOD

BLOCK 6 NEIGHBOURHOOD Remnant High Density Overlay A3

BLOCK 14 OPEN SPACE Proposed Mud Creek Realignment A4

BLOCK 15 OPEN SPACE Proposed Mud Creek Realignment

BLOCK 11 Open Space Trail

BLOCK 12 Open Space Trail

BLOCK 10 PARK NATIVE BUFFER PLANTINGS

BLOCK 5 NEIGHBOURHOOD

BLOCK 2 NEIGHBOURHOOD Remnant High Density Overlay A5

COMMUNITY GARDENS

WESTFIELD DRIVE

STREET 'A'

STREET 'B'

BLOCK 4 NEIGHBOURHOOD 2.04 ha A6

BLOCK 3 NEIGHBOURHOOD 0.04 ha

BLOCK 13 Open Space Trail

BLOCK 16 1 FOOT RESERVE

BLOCK 16 OPEN SPACE Proposed Mud Creek Realignment

BLOCK 1 RAPID TRANSIT CORRIDOR A7

A8

BLOCK 18 1 FOOT RESERVE

BLOCK 17 ROAD WIDENING

BEAVERBROOK AVENUE

TRAILS WITHIN THE SIGNIFICANT WOODLAND ARE CONCEPTUAL ONLY

PROUDFOOT LANE

HORIZON DRIVE

FARRAH ROAD

OXFORD STREE WEST

BEAVERBROOK AVENUE

N

LEGEND

- SUBJECT LANDS
- 2019 SETTLEMENT AREA
- EA (CH2M, 2017) PREFERRED ALTERNATIVE AREA
- PERMANENT WATERCOURSE (UTRCA)
- INTERMITTENT WATERCOURSE (UTRCA)
- VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Inclusion)
- SIGNIFICANT WOODLAND REMOVAL (2019 Settlement)
- SIGNIFICANT WOODLAND REMOVAL (Mud Creek EA 2017)
- NON-SIGNIFICANT WOODLAND VEGETATION REMOVAL IN EA (CH2M, 2017) PREFERRED ALTERNATIVE AREA
- OTHER WOODLAND VEGETATION REMOVAL
- WETLAND REMOVAL
- CANDIDATE MATERNITY ROOST TREE (BIOLOGIC, 2018)

REFERENCES

CITY OF 2021 LONDON PARCEL AND AERIAL IMAGERY, OPEN DATA SET;
UPPER THAMES CONSERVATION AUTHORITY (UTRCA), WATER COURSE; AND
RON KOUDYS LANDSCAPE ARCHITECTS INC., LANDSCAPE PLAN,
PROJECT No. 22-236LK, DWG No. L-1, NOVEMBER 11 - 2022.

SCALE IN METRES
0 50 100
1:4,000

NOTES

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MTE
Engineers, Scientists, Surveyors

PROJECT
ENVIRONMENTAL IMPACT STUDY
MUD CREEK
LONDON, ONTARIO

TITLE
PROPOSED VEGETATION REMOVAL AREAS

Drawn: DCH	Scale: AS SHOWN
Checked:	Project No.: 45591-100
Date: Jan 18/23	Rev No.: 0

FIGURE 12

Client: Sam Katz Holdings Limited
Time: 10:13:52
Plot Date: 18 January 2023
CAD: P:\45591\100\2_PROD\45591-100-R01 ENVIRONMENTAL IMPACT STUDY\45591-100-R01012.DWG
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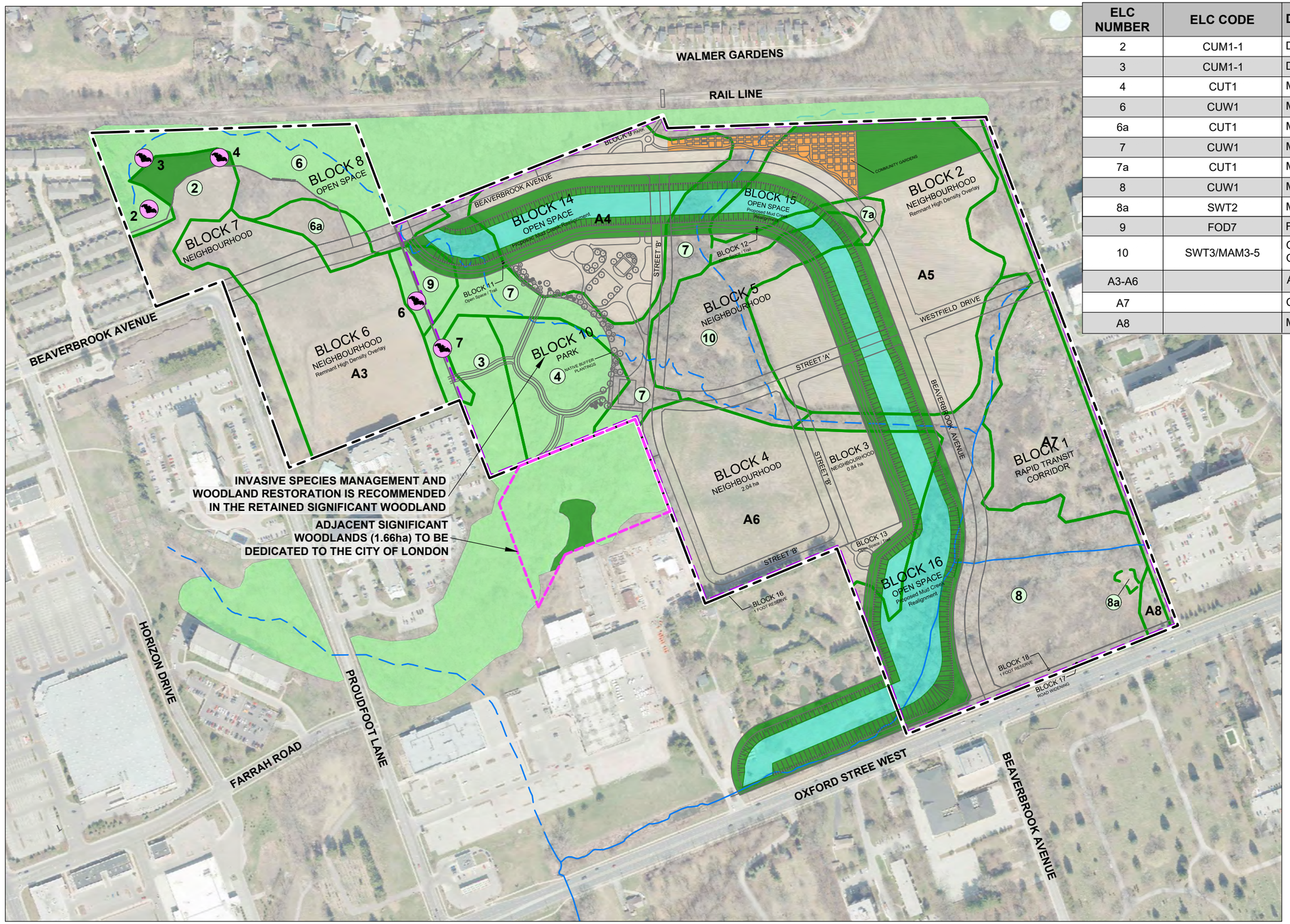

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A3-A6		Active Agriculture
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A8		Maintained Landscape

LEGEND

- SUBJECT LANDS
- 2019 SETTLEMENT AREA
- PERMANENT WATERCOURSE (UTRCA)
- INTERMITTENT WATERCOURSE (UTRCA)
- VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Inclusion)
- WOODLAND CREATION
- WOODLAND AND WETLAND CREATION
- ADJACENT SIGNIFICANT WOODLAND
- RETAINED SIGNIFICANT WOODLAND (only shown within Subject Lands)
- COMMUNITY GARDEN
- CANDIDATE MATERNITY ROOST TREE (BIOLOGIC, 2018)

REFERENCES

CITY OF 2021 LONDON PARCEL AND AERIAL IMAGERY, OPEN DATA SET;
UPPER THAMES CONSERVATION AUTHORITY (UTRCA), WATER COURSE;
RON KOUDYS LANDSCAPE ARCHITECTS INC., LANDSCAPE PLAN, PROJECT No. 22-236LK, DWG FILE 22-236Lo.dwg, JANUARY 9 - 2023; AND
LGL LIMITED; MUD CREEK EA - VEGETATION COMMUNITIES, PROJECT No. TA8479, FIGURE No. 3, MARCH 2016.

SCALE IN METRES
0 50 100
1:4,000

NOTES

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MTE
Engineers, Scientists, Surveyors

PROJECT
ENVIRONMENTAL IMPACT STUDY
MUD CREEK
LONDON, ONTARIO

TITLE
PROPOSED NATURAL HERITAGE SYSTEM WITH COMPENSATION AREAS

Drawn: DCH	Scale: AS SHOWN
Checked:	Project No.: 45591-100
Date: Jan 18/23	Rev No.: 0

FIGURE 13

Appendix A

Record of Pre-Application Consultation

PROPOSAL REVIEW MEETING SUMMARY &
RECORD OF CONSULTATION

Date: June 23, 2020

Subject: Proposal Review Meeting
323 Oxford Street West, 92 Proudfoot Lane & 825 Proudfoot Lane

Meeting Date: June 10, 2020 (Online Zoom meeting)

Meeting Participants:

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

Owner/Applicant: Sam Katz Holdings Limited
Authorized Agent: Michael Hannay (MBTW Group)
File Reference: File #TS2020-004
Type of Application: Proposed Draft Plan of Subdivision
Location: 323 Oxford Street West, 92 Proudfoot Lane & 825 Proudfoot Lane
File Manager: Lou Pompilii
Planner: Mike Corby

DEPARTMENT & AGENCY COMMENTS

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

DEVELOPMENT PLANNING:

Lou Pompilii *Manager, Development Services Planning*
Mike Corby *Senior Planner*

- The subject site was previously appealed through The London Plan process.
- A decision was rendered on December 19, 2019 confirming future place types and specific policies largely in relation to the height permissions on the site.
- The applicant shall ensure all relevant OMB approved/London Plan policies are referenced within the Planning Justification report.
- The current 1989 Official Plan needs to be referenced as they are the in force policies.
    - This means many of the blocks exceed density permissions of the plan and would require justification for the increase in density.

- The applicant shall identify how affordable housing will be incorporated into the overall development.
- Consideration should be given to changing the location of the 6 storey building in Block 7 as the lower heights should abut the neighbouring townhomes.
- Consideration should be given to wrapping Street 'B' back up to Street 'A'.
- The proposed concept plan shows several positive site layouts, limited parking areas and enhanced/large open space areas within the proposed blocks.
- Staff would like the applicant to consider how these elements can be caputred through the rezoning process i.e. zoning regulations, design guidelines or the use of a bonus zone.
- The lands are located between the a main rail line and Oxford Street West. A noise and vibration study is required as part of the complete application.

London Plan

Our Strategy:

Key Direction's

55_ Direction #1 Plan strategically for a prosperous city

- Invest in an infrastructure system that is sustainable, reliable, secure, affordable, and in compliance with regulatory criteria.
- Plan for cost-efficient growth patterns that use our financial resources wisely.
- Invest in, and promote, affordable housing to revitalize neighbourhoods and ensure housing for all Londoners

58_ Direction #4 Become one of the greenest cities in Canada

- Strengthen our urban forest by monitoring its condition, planting more, protecting more, and better maintaining trees and woodlands.
- Continually expand, improve, and connect our parks resources.
- Implement green infrastructure and low impact development strategies.

59_ Direction #5 Build a mixed-use compact city

- Plan to achieve a compact, contiguous pattern of growth – looking "inward and upward"
- Utilize a grid, or modified grid, system of streets in neighbourhoods to maximize connectivity and ease of mobility.

60_ Direction #6 Place a new emphasis on creating attractive mobility choices

- Create active mobility choices such as walking, cycling, and transit to support safe, affordable, and healthy communities.
- Ensure that our mobility infrastructure is accessible and accommodates people of all abilities.
- Focus intense, mixed-use development to centres that will support and be served by rapid transit integrated with walking and cycling.

61_ Direction #7 Build strong, healthy and attractive neighbourhoods for everyone

- Design complete neighbourhoods by meeting the needs of people of all ages, incomes and abilities, allowing for aging in place and accessibility to amenities, facilities and services
- Implement "placemaking" by promoting neighbourhood design that creates safe, diverse, walkable, healthy, and connected communities, creating a sense of place and character.
- Integrate well-designed public spaces and recreational facilities into all of our neighbourhoods.
- Integrate affordable forms of housing in all neighbourhoods and explore creative opportunities for rehabilitating our public housing resources.

62_ Direction #8 Make wise planning decisions

- Ensure that all planning decisions and municipal projects conform with The London Plan and are consistent with the Provincial Policy Statement.
- Think "big picture" and long-term when making planning decisions – consider the implications of a short-term and/ or site-specific planning decision within the context of this broader view.

City Building Policies

Homelessness Prevention and Housing

495_ Providing accessible and affordable housing options for all Londoners is an important element of building a prosperous city. Quality housing is a necessary component of a city that people want to live and invest in. Housing choice is influenced by location, type, size, tenure, and accessibility. Affordability and housing options are provided by establishing variety in these factors.

WHAT ARE WE TRYING TO ACHIEVE?

- Provide an integrated mixture of affordable and adequate housing options for the greatest number of people in need.
- Ensure quality housing is attainable for our most vulnerable populations, including affordable and supportive housing, housing needs of persons requiring specialized care, and related services.

AFFORDABLE HOUSING

516_ The City may assist in the administration of housing programs of the federal and provincial governments.

517_ A target of 25% of new housing, in aggregate, is to be affordable to low- and moderate-income households as defined by the Provincial Policy Statement and this Plan. This target may be met through residential greenfield development and the many forms of intensification identified in the City Structure policies of this Plan.

518_ Secondary plans and larger residential development proposals should include a 25% affordable housing component through a mix of housing types and sizes. In keeping with this intent, 40% of new housing units within a secondary plan, and lands exceeding five hectares in size outside of any secondary plan, should be in forms other than single detached dwellings.

Rapid Transit Corridor Place Type

Vision

- Identify how the development within the transit corridor will be:
    - vibrant, mixed-use, mid-rise communities that border the length of our rapid transit service
    - linked to the Downtown and to the Transit Villages. Most of these corridors will be fundamentally walkable streetscapes, with abundant trees, widened sidewalks, and development that is pedestrian- and transit-oriented

How will we realize our vision?

- Plan for a mix of residential and a range of other uses along corridors to establish demand for rapid transit services.
- Allow for a wide range of permitted uses and greater intensities of development along Rapid Transit Corridors close to transit stations.
- Carefully manage the interface between our corridors and the adjacent lands within less intense neighbourhoods.
- Require transit-oriented and pedestrian oriented development forms along these corridors.
- Plan and budget for neighbourhood amenities along these corridors, including high-quality urban parks, civic spaces, and attractive outdoor seating areas, accessible to the public.
- Support the development of a variety of residential types, with varying locations, size, affordability, tenure, design, and accessibility so that a broad range of housing requirements are satisfied.
- Design guidelines may be established for Corridors or segments thereof.

Neighbourhoods Place Type

Vision

- Identify how the development will create a strong neighbourhood character, sense of place and identity.

How will we realize our vision?

- Neighbourhoods will be planned for diversity and mix and should avoid the broad segregation of different housing types, intensities, and forms.
- Street networks within neighbourhoods will be designed to be pedestrian, cycling and transit-oriented, giving first priority to these forms of mobility
- Neighbourhoods will be designed to protect the Natural Heritage System, adding to neighbourhood health, identity and sense of place.
- Affordable housing will be planned for, and integrated into, all neighbourhoods.

Ensure all relevant use, intensity and form policies are considered through PJR.

City Building Policies

* 202_ Buildings and public spaces at key entry points into neighbourhoods will be designed to help establish a neighbourhood's character and identity.

*212_ The configuration of streets planned for new neighbourhoods will be of a grid, or modified grid, pattern. Cul-de-sacs, dead-ends, and other street patterns which inhibit such street networks will be minimized. New neighbourhood street networks will be designed to have multiple direct connections to existing and future neighbourhoods.

*220_ Neighbourhoods should be designed with a diversity of lot patterns and sizes to support a range of housing choices, mix of uses and to accommodate a variety of ages and abilities.

Requirements for a Complete Application

- Updated FPR with comments above addressed
- Zoning amendment
- Subdivision application
- Noise and Vibration Study
- Planning Justification report.

DEVELOPMENT SERVICES - URBAN DESIGN:

Jerzy Smolarek *Urban Designer*

Urban Design staff have reviewed the proposed Initial Proposal Report for above noted address and provide the following comments:

- Overall the proposed conceptual plan is in keeping with urban design related policies of the London Plan and 1989 Official Plan. The applicant should provide for a zoning framework that will ensure that future development in the various blocks is developed in a manner that closely resembles the concept. In order to achieve this, include zoning provisions that;
    - limit heights of the mid-rise buildings (potentially including differing height limits through the blocks – ie Block 1 has taller mid-rise buildings along Oxford);
    - limit point towers floor plates to a max. square footage, this would apply to anything above the limit of the mid-rise building height on that block;
    - limit of point tower heights;
    - limit the amount of point towers per block or alternatively provide for tower separation of a min of 25m between point towers;
    - provide appropriate interior side yard and/or rear yard setback when adjacent to existing development;
    - limit the amount of surface parking;
    - prohibit front and exterior side yard parking between the building and the street;
    - provide a min. amount of area for amenity space per block, based generally on the concept;
    - Include a min. and max setback for buildings along streets;
    - Include a min. percentage of built form along street frontages for blocks with Mid-rise and taller.
- Maximum heights on Block 7 should ensure an appropriate transition between the existing 1 storey townhomes to the west. The site could be broken up to include a more appropriate heights on the west half and include tallest heights on the east half.
- In order to create an appropriate grid street network, ensure proper pedestrian connectivity, and promote safe streets convert the proposed condo road that begins and ends on Street ‘B’ to a Public Street. The block sizes that remain would be no lesser in size than what is existing in newer subdivisions while actually being developed at a higher intensity.
- The developer should prepare an Urban Design Guideline document for this development as it includes several large blocks that may be developed by several builders/developers. The document should convey the intended vision and planned character of the neighbourhood (including streets and public spaces) and provide guidance for the development of all the different building typologies that are possible within the requested zoning. The guidelines can be developed based off of the framework established by the concept plan. Further discussions may be required if the applicant has questions or would like to scope the document to ensure completeness.
- As there is no request for a bonus zone there will likely be direction to Site Plan Authority including the various design elements that are not captured in the zoning provisions. These can be discussed and finalized through rezoning the process.

Requirements for a Complete Application

- Updated FPR with comments above addressed
- Urban Design Guideline

DEVELOPMENT SERVICES - HERITAGE PLANNING:

Laura Dent *Heritage Planner*

- Archaeological Potential is identified on the subject lands as described in the submitted Initial Proposal Report (IPR). Soil disturbance is anticipated due to development activity. The IPR indicates that a “Stage 1 Archaeological Assessment was completed by Golder Associates (December 2, 2015), as part of the 2017 Mud Creek Subwatershed Class Environmental Assessment. The subject lands are identified as a parcel of the Assessment Area not required to undergo a Stage 2 Archaeological Assessment.”
- The archaeological assessment already completed should be submitted for review – along with the compliance letter from the Ministry – to ensure they meet municipal requirements.

Additional Comments:

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

Requirements for a Complete Application

- Updated FPR with comments above addressed
- Submit archaeological assessment

DEVELOPMENT SERVICES – NATURAL HERITAGE:

James MacKay *Ecologist*

- The applicant will need a SLSR and EIS as per in-force London Plan policies 1429 and 1430, to be scoped with all relevant agencies. I also note that the scope can be substantially reduced as the Mud Creek EA completed a full SLSR/EIS for the study area, the data and analysis does apply to the subject site. In addition, previous discussions with the proponent regarding the new realigned corridor have also taken place.

Requirements for a Complete Application

- Updated FPR with comments above addressed
- SLSR and EIS

PARKS AND RECREATION:

Bruce Page *Senior Planner*

Parks Planning and Design staff have reviewed the submitted IPR and are generally satisfied with the proposed draft plan, however note the following:

- The SWM Section of the report speaks to and EIS. Section 12 of the IPR should speak to the need for an EIS and the establishment of buffers for all natural heritage features within the plan.
- The IPR refers to pathways to be constructed within the 10 meter buffer of the newly constructed Mudd Creek. PP&D support this approach. The above EIS should speak to the incorporation of the pathway within the buffer and seek the approvals of all commenting departments and agencies. If the pathway cannot be accommodated within the buffer, a separate block will be required adjacent to the newly created creek corridor.
- Discussions were held with the applicant to include the wooded portion of lands south of Block 9 to provide a park linkage to Proudfoot Park East and maintain the woodlot in one ownership.

- Multi-use pathway access to the lands north of the CP Rail line are to be provided by the applicant consistent with the agreements within the existing draft plan of subdivision conditions.
- The original plan of subdivision considered an active district park to service the needs of residents north, east and west of this site. The current plan provides a large area of natural heritage lands which are not conducive to district park activities and do not fulfill the need. An EIS is to be undertaken to delineate the boundary of the natural heritage system and the required buffer. Completion of the EIS will better delineate the active parklands within this development.
- CPR safety berm and fence should not be located on City land.

Requirements for a Complete Application
- Updated FPR with comments above addressed

WASTEWATER & DRAINAGE ENGINEERING:
Marcus Schaum *Senior Technologist*

- The proposed lands are bounded by Oxford Street to the south, Proudfoot to the west, CP Railway line, Forest Glen Golf and existing developments. (Site approx. area 29.5 Ha)
- The municipal sanitary sewer available is the existing Mud Creek trunk sanitary sewer within the subject lands, tributary to Greenway WTP.
- As noted in the IPR and as part of a complete application a more comprehensive sanitary analysis complete with area plans, sewer routing, connection locations, more detail on the proposed realignment of the trunk sanitary sewer to match road networks will need to be demonstrated including expected depths, and in an alignment with adequate buffer and safe slope distance outside of the Mudcreek re-alignment and along Oxford Street and Forest Lawn Golf. Provision for adequate easement and maintenance access is required on all sections of sewers not contained within public roads. No buildings or structures will be permitted to be constructed within these easements. Proposed internal sewers are to be sized to accommodate any external lands if expected.
- The proposal report should also speak to the following;
    - The densities and population proposed in this recent IPR exceed the City of London design specifications and a previous draft plan;
    - Provide a more comprehensive sanitary analysis including external areas and flow complete with area plans to demonstrate if there is available capacity;
    - The Applicant is to confirm objectives, confirm population, maximum densities per the Zoning, and what areas and peak flow is expected to be discharged and to what receiving municipal outlet available.
    - Provide more detail on the servicing strategy for the internal sewers using alignments consistent with City of London design specifications and the City of London design manual including pipe inverts, top of MH and crossing clearances, drop structures etc.
    - Include discussion and assumptions on any sewer oversizing and lengths, include discussion on any local sewers proposed within parks and within easements and any expected impacts, constraints and arrangements with adjacent landowners;
    - Provide more detail on a servicing strategy including alignment, proposed depth, any expected constraints or conflict and include justification and any projected impact on the municipal sanitary sewers and easements that bisect the subject lands.
    - Confirm if depth of cover and fill is a concern from a structural perspective, as well as, higher future maintenance and replacement cost as it will be deeper and in a more urbanized setting vs green field and may even require additional width of easement to ensure the future maintenance of the municipal system.
    - SED can confirm at this time that there are no sewer replacement needs of the sewers within the subject lands, and there is nothing budgeted in our 20 year plan to replace or upgrade any of the municipal sewers crossing the subject lands.
    - Provide discussion and any assumptions related to cost to the Applicant requesting to realign the municipal trunk sewer and sub trunk sewers that bi-sects these lands to Oxford Street system.
    - Provide high level discussion on the request to realign live existing municipal sanitary sewers including construction staging, timing and redirecting flows, the need for by pass pumping if required, as well as, required inspections, certifications and final acceptance by the City including security and ‘as-constructed drawings’.
    - It is expected all sanitary connections and roads for access will be to future internal sewers and roads as part of a future plan of subdivision
    - Provide a phasing plan and timing for the proposed development.
    - Enhanced I&I measures are encouraged to mitigate flows within the proposed development.

Requirements for a Complete Application
- Updated FPR with comments above addressed

WATER ENGINEERING:
Patricia Lupton *Environmental & Engineering Services*

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

- The TMIG Beaverbrook Lands Servicing Constraints and Servicing Plan indicates that water servicing would be provided from connections to the existing municipal water distribution system by connections to be made at Beaverbrook and Proudfoot and a connection at Beaverbrook and Oxford, but no connection to the existing Westfield Drive watermain "to avoid crossing large sewer structures". Preliminary Servicing Plans indicate 250mm watermains to be constructed.
- The IPR report section 9.1 indicates that watermain connections would be made to Westfield Drive and to Oxford Street, that a 250mm watermain would be constructed through the development.
- It is not agreed that it would be difficult to engineer a watermain crossing of the sewer, or that having the two parallel each other would pose a difficulty. There are examples of watermain crossing an open watercourse at a road culvert or bridge.
- It is requested that the IPR and servicing plan be updated to include water servicing connections to the two locations indicated in the servicing plan (Oxford/Beaverbrook and Proudfoot/Beaverbrook) as well as to Westfield Drive.
- Hydraulic modelling during detailed design will be necessary to determine the sizing of the watermain to be constructed.
- It is requested that a cross section of the Road ROW with the watermain and sewers be provided to show the cross section of these works and that these can be constructed and reconstructed and maintained/repaired in the future without impacting the adjacent lands or the adjacent Mud Creek Channel.
- If there are specific crossing points of concern that are felt may pose a conflict, please provide further information at a level suitable to confirm whether there is a conflict or not so that the necessary conditions for servicing connections can be properly identified in the draft plan.

Requirements for a Complete Application

- Updated FPR with comments above addressed

STORMWATER MANAGEMENT:
Jaime Chaves *Technologist II*

General Comments – Stormwater Management (SWM)

- The Functional Stormwater Servicing Report in support of the proposed storm drainage and SWM design shall:
    - Demonstrate how stormwater management objectives and targets will be met by each site in accordance with the 2017 Mud Creek EA and current City design standards. The SWM functional report should include but not be limited to such aspects as the realignment of Mud Creek, quantity control with the creek system, incorporation of LID features for water quantity and quality control, assessment and upgrade of existing culverts, realignment and naturalization of Mud Creek channel, etc. all to the satisfaction of the City Engineer, UTRCA and DFO. This report is anticipated to set SWM control targets for each future development site.
    - Include hydrogeological investigation and analysis as described in the current City of London Design Standards (Section 6 – Stormwater Management) including identifying all necessary component to support proposed LID solutions, and complete water balance analysis for the subdivision, incorporating the required elements discussed during the hydrogeological scoping meeting held at the UTRCA office in July 2018.
    - Include geotechnical investigation including detailed soil characteristics and appropriate geotechnical recommendations.
    - Identify hydraulic capacity of any proposed crossings of the realigned Mud Creek and verify crossings alignment with servicing and grading drawings. Verify Regional floodlines.
    - Identify all existing and future external flows and how they will be managed and accommodated within the proposed SWM works.
    - Outline phasing and construction timing coordination in regards to the various SWM related aspects including channel reconstruction, culvert/road crossings, and site plan developments.

    - Summarize how the findings of the EIS have been considered and incorporated in the SWM design. Identify any future monitoring works that will be required during and post construction to verify the system is functioning as intended.
- The Detailed Stormwater Servicing Report will address design details of the Functional Design report in support of the proposed detailed SWM drainage design and shall:
    - Include detailed design for the channel realignment works from upstream of Oxford Street and within external lands (415 Oxford Street West) and the City ROW, including areas currently outside of the limits of the Draft Plan).
    - Coordinate channel construction through the external lands located at 415 Oxford Street West.
    - Identify coordination with and protection measures for the downstream Mud Creek Phase 1 and 2 works (channel construction and CN tunnels south of Oxford Street), to be undertaken by the City starting in 2020 with completion expected by 2022. The developer is to ensure and provide details to the satisfaction of the City Engineer, UTRCA, and DFO.
    - Include Erosion and Sediment Control Plans to inspect, manage and adapt during all phases of construction.
    - Include detailed strategy of temporary bypassing or realigning of Mud Creek flows during construction.
    - Evaluate water taking requirements to facilitate construction (i.e., PTTW or EASR be required to facilitate construction), including sediment and erosion control measure and dewatering discharge locations.
    - Include mitigation measures associated with construction activities specific to the development (e.g., specific construction activities related to dewatering).
    - Develop appropriate short-term and long-term monitoring plans (if applicable).
    - Develop appropriate contingency plans (if applicable), in the event of groundwater or surface water interference related to construction.
    - The construction of the floodway channel (up to the 250-year floodline) and seeding will be eligible for reimbursement through the Mud Creek East Branch Phase 3 – Oxford Street to CP Rail (DC19MS0002) Development Charges project. Any natural heritage compensation features, including but not limited to native plantings and habitat features, are not eligible for reimbursement from the Development Charges.
- The Owner will dedicate the lands to the City associated with the proposed realigned creek channel and corridor within the subject lands.
- The Owner shall enter into an agreement with the external landowner(s) to secure the land and construct the channel corridor across 415 Oxford Street prior to commencing the construction of the proposed realigned channel.

Servicing Comments – Stormwater Management (SWM)
- Site applications shall detail how SWM targets established in the Functional SWM Design Report will be achieved. Details (as applicable) regarding LID design, location, type for soil conditions, local groundwater conditions, water balance analysis etc., will be included.
- The number of headwall outlets should be consolidated where feasible (i.e. 1, 2, and 3 are close each other as well as 5 and 6). An approach to decrease the number of outlets should be considered.
- The proposed realigned sanitary trunk sewer between SANMH 1A and Ex. SANMH 10255 encroaches into the proposed realigned Mud Creek. Any encroachments should be eliminated or coordinated to the satisfaction of the City.
- Final digital drawings files for the Mud Creek alignment can be obtained from the City by contacting stormwater@london.ca.

Requirements for a Complete Application
- Updated FPR with comments above addressed
- Hydrogeological Report
- Geotechnical Report
- Erosion and Sediment Control Plans

TRANSPORTATION PLANNING & DESIGN:
Andrew Giesen *Senior Transportation Technologist*

The Transportation Planning & Design Division has reviewed the proposal summary and has the following comments:
- The applicant is to have regard for and implement through this plan of subdivision Complete Streets (which includes such things as barrier curb, sidewalk on both sides, asphalt width, and ROW width)
- The applicant is also to have regard for the Council approved Rapid Transit Environmental Assessment (EA): https://www.londonbrt.ca/

- As part of a complete application an updated plan showing all bends, tapers, & centre line radii complying with City Standards including 10m straight tangents between horizontal curves, and centre line radii complying with the Design Specifications and Requirement Manual (DSRM) will be required. (150m centre line radii required for Neighbourhood connectors)
- As part of a complete application a Transportation Impact Assessment (TIA) is required, the TIA is to be scoped with City staff prior to undertaking and be carried out in conformance with the City's TIA Guidelines
- As part of a complete application the applicants engineer is to provide an opinion letter regarding the need for an EA for the two purposed mud creek channel crossings (Street A & Street B)
- As part of a complete application a sight line analysis is required for the intersections of Beaverbrook and Oxford Street, and Beaverbrook and Proudfoot, conceptual plan profile drawings are to be included
- Barrier curb will be required through the subdivision in accordance with the (DSRM)
- Street A and Street B to have ROW widths of 20.0m and asphalt widths of 7.5m
- Beaverbrook Avenue and Westfield drive is to have a ROW width of 23.0m
- Beaverbrook Ave to be constructed with an asphalt width of 13.0m and include buffered bike lanes in accordance with the Cycling Master Plan and DSRM
- Beaverbrook Avenue and Westfield drive to include a yellow centre line in accordance with the DSRM
- Temporary turning circle required at the south limit of Street B in accordance with the DSRM
- A right of way dedication of 24.0m from centre line is required along Oxford Street West
- A right of way dedication of 10.75m from centre line required along Proudfoot Lane
- A right of way dedication of 10.75m from centre line required along Beaverbrook Drive
- A 8.0m permanent easement for grading is required along Oxford Street West as per the requirements of the Rapid Transit EA
- A raised intersection will be required at the Beaverbrook Avenue and Street A & Westfield Drive intersection
- A raised intersection will be required at the Beaverbrook Avenue and Street B intersection
- Right and left turn lanes will be required on Oxford Street West at Beaverbrook Ave
- The centre line of Street A is to align opposite the centre line of Westfield drive and perpendicular to Beaverbrook Avenue
- 10m straight tangent is required on Beaverbrook Avenue between back to back horizontal curves
- Beaverbrook Avenue to align opposite existing Beaverbrook Avenue and perpendicular to Oxford Street West
- Beaverbrook Avenue to align opposite existing Beaverbrook Avenue and perpendicular to Proudfoot Lane
- Access to 415 Oxford Street is to be provided through the internal road network
- 0.3m (1ft) reserve's required along Oxford Street West frontage
- 6.0m x 6.0m daylight triangles will be required on Beaverbrook Ave at Oxford Street West
- 6.0m x 6.0m daylight triangles will be required on Beaverbrook Ave at Proudfoot Lane
- Gateway widening required on Beaverbrook Ave at Oxford Street West with a ROW width of 24.0m for 45.0m tapered back over 30m to a ROW width of 23.0m

Rapid Transit:

- Oxford St West is a Bus Rapid Transit (BRT) Corridors as per the completed EA. No timetable for implementation at this time.
- The preliminary engineering design of the BRT system in the area of this property can be found at the link below (Drawings SW18 to SW19).
- https://www.londonbrt.ca/app/uploads/2019/04/Appendix_A_West.pdf
- If BRT is implemented as per the EA on Oxford Street West, a centre-running transit lanes beside a small, curb-height median on the left and general traffic lanes on the right. A signalized intersections is proposed at Beaverbrook and Oxford St W.
- The proposed design will restrict accesses on Oxford St to right in/right out turning movements only outside of signalised intersections.

Requirements for a Complete Application

- Updated FPR with comments above addressed
- Transportation Impact Assessment
- EA opinion letter
- Sight line analysis

DEVELOPMENT FINANCE:
Greg LaForge *Manager I*

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

Stormwater Management

- The natural corridor channel realignment through the subject lands would be claimable under the Regional Open Channel program as it was identified under the Mud Creek EA and is included under the 2019 DC Study as the Mud Creek East Branch Phase 3 project (DC19MS0002). Natural environment enhancements are not DC eligible as they would be a requirement of mitigation/compensation of the proposed development. The extent of DC eligibility will be subject to the review and approval of a Work Plan to be provided with the first submission of engineering drawings.
- A related City led DC Mud Creek East Branch Phase 2 project (DC19MS0001) from the CNR tracks to Oxford Street West is currently scheduled for 2022. Further discussion and coordination of these projects will be required.
- As noted in the IPR, if new municipal oversized storm sewers are identified through the subdivision design process that are 1200mm diameter or greater, these would be eligible for oversizing subsidy. All local and private sewers and connections are to be constructed at the Owner's cost.
- If LIDs are accepted through the subdivision design process that improve water quality or water balance and are constructed on City owned lands or within a dedicated Municipal easement, these would be eligible for subsidy. LIDs constructed within a Site Plan are not eligible for subsidy.

Wastewater

- As noted in the IPR, if new municipal oversized sanitary sewers are identified through the subdivision design process that are 300mm diameter or greater, these would be eligible for oversizing subsidy. All local and private sewers and connections are to be constructed at the Owner's cost.
- Costs related to the realignment of any existing trunk or local sanitary sewers would be an Owner's cost as the realignment is only required to support the local servicing and network pattern.

Water

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

Transportation

- A major City led DC project related to the West Connection of the RT (DC19RS0305) which fronts the proposed development on Oxford Street West is tentatively scheduled between 2025 and 2028. Construction of any proposed external roadworks (i.e. channelization, traffic signals, etc) will be dependent upon the coordination and timing of these works.
- If Owner led DC eligible Minor Road Works are identified through the subdivision design process, these works would be subject to Work Plan approval. The Work Plan submission would be required in conjunction with the first submission of engineering drawings and may include the following works:
    - External road works including traffic signals and channelization may be eligible for a claim under the Minor Road Works program.
    - Internal road widenings would be claimable for the difference in construction costs between the standard road width up to a Neighbourhood Connector and the oversized road width under the Road Oversizing program.
    - Construction costs related to on-road cycling lanes would be eligible for a claim under the Active Transportation program.
- All other internal works up to and including Neighbourhood Connectors, temporary external road works and connections are to be constructed at the Owner's cost.

Parks

- If Owner led DC eligible parkland infrastructure is identified through the subdivision design process, these works would be subject to Work Plan approval.

Requirements for a Complete Application

- Updated FPR with comments above addressed

DEVELOPMENT ENGINEERING:

Ted Koza *Manager, Development Engineering*
Blair Hammond *Senior Engineering Technologist*
Michael Aitken *Engineering Technologist*

STANDARD COMMENTS:

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

INITIAL PROPOSAL REPORT COMMENTS:

Section Number and Heading from Report:
9.0 Water Servicing

- It should be noted that the existing watermain on Oxford St runs through the middle of the street. A detailed traffic management plan will be required for making the connection at Oxford St., and Beaverbrook Avenue.

DRAFT PLAN OF SUBDIVISION DRAWING COMMENTS:

The draft plan of subdivision drawing is to comply with all City standards with regard to the above comments and the following:

- Draft plan of subdivision is to include various features listed below for consideration;
    - C/L is to align through the intersection of Street A/Westfield Drive;
    - Show all existing and proposed servicing easements;
    - Provide radii to C of L standards on the street line where local roads bend 90 degrees (Fig 2.2 in Design Specs);
    - Topographical information (e.g. contours, elevations, vegetation areas, water courses, wells, utility corridors, and flood plain limits)
    - Legal info of this plan and adjoined lands (e.g. easements, lot and plan numbers, addresses, and adjacent streets)
    - Identify proposed road curvature and radii and ensure that they comply with the City of London standards.

REQUIREMENTS FOR A COMPLETE DRAFT PLAN OF SUBDIVISION SUBMISSION:

For a complete Draft Plan of Subdivision Application, the Owner is to provide the following:

- The Final Proposal Report addressing all Development Services comments with respect to the IPR.
- Revised proposed Draft Plan of Subdivision drawing as per Development Services comments.
- Provide a Geotechnical Report;
- Provide an opinion letter certified by a Professional Engineer confirming if an EA is required.

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

EXTERNAL COMMENTING AGENCIES

Ministry of Natural Resources and Forestry (MNRF)

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

UNION GAS LTD.

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

LONDON TRANSIT COMMISSION (L.T.C.)

Transportation Planning Technician
(No comments Rec'd)

THAMES VALLEY DISTRICT SCHOOL BOARD

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

LONDON DISTRICT CATHOLIC SCHOOL BOARD
Rebecca McLean *Planning Specialist*
(No comments Rec'd)

LONDON-MIDDLESEX HEALTH UNIT
Bernadette McCall *Public Health Nurse*
(No comments Rec'd)

UPPER THAMES RIVER CONSERVATION AUTHORITY (U.T.R.C.A.)
Christine Creighton *Land Use Planner*
Comments received via email and attached below

REQUIREMENTS TO PROCEED WITH CURRENT APPLICATION

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

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

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

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

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

Official Plan and/or Zoning By-Law Amendment (applicable only where Renderings are required as part of a complete application)
Proposed Development best represented using a landscape image format Graphic renderings are required which represent the conceptual design of the proposal for the production of the on-site sign.

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

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

OR

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

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

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

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

The following documentation is required for a Complete Application Submission:

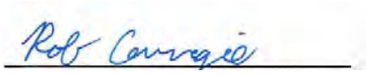
- **Draft Plan of Subdivision Application:**
  - 2 copies of the City of London Subdivision Application Form.
  - 24 rolled copies of the Draft Plan, completed as required under Section 51(17) of the Planning Act (the Draft Plan must include the Approval Authority signature block)
  - A digital file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

  Draft plan of Subdivision is to include various features listed on the Draft Plan of Subdivision Application Form

- **Zoning By-law Amendment Application:**
  - 2 copies of completed City of London Zoning By-law Amendment application form and supporting documentation
  - Hard copy and digital file of proposed zoning map
  - Associated application fees

- **Final Proposal Report (FPR):**
  - Updated to reflect the comments that have been identified in this Record of Consultation, in accordance with the requirements prescribed in the File Manager Reference Manual;
  - FPR is to include updated information on water, sanitary, stormwater, transportation and development finance components, parks and open space, natural heritage, urban design, heritage planning, and development planning and addressing all comments identified in the Record of Consultation (*Note: applicant/consultant should undertake off-line discussions with contacts prior to completing the FPR, to ensure all servicing requirements are suitably addressed*);
  - Final Proposal Report which fully addresses the polices of the Provincial, Policy Statement, the Planning Act, the 1989 Official Plan, the London Plan and the Southwest Area Secondary Plan - specifically, how a mix of housing types and lot/unit sizes is being addressed within this phase of development

- **Reports/Studies and Plans Required:**
  - Road layout and concept plan showing all bends, tapers, 10m straight tangents between horizontal curves, and centre line radii complying with the DSRM will be required. (150m centre line radii required for Neighbourhood connectors)
  - Concept plan showing the conceptual geometric design of the intersection of Regiment Road and Southdale Road West will be required ensuring the minimum design standards contained in the DSRM can be met
  - Noise and Vibration Study
  - Planning Justification report.
  - Urban Design Guideline
  - Archaeological Assessment
  - Subject Lands Status Report and EIS
  - Hydrogeological Report
  - Geotechnical Report
  - Erosion and Sediment Control Plans
  - Transportation Impact Assessment
  - EA opinion letter
  - Sight line analysis



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

UPPER THAMES RIVER
CONSERVATION AUTHORITY

"Inspiring a Healthy Environment"

Thames
Canadian Heritage River

June 4, 2020

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

Attention: Rob Carnegie (sent via e-mail)

Dear Mr. Carnegie:

Re: UTRCA Comments – March 2020 Initial Proposal Report – The Beaverbrook Lands
Owner/Applicant: Sam Katz Holdings Limited
Agent: Michael Hannay - MBTW Group
323 Oxford Street West and 92 & 825 Proudfoot Lane, London, Ontario

On September 18, 2017, the Upper Thames River Conservation Authority (UTRCA) provided comments on the July 2017 Initial Proposal Report for the subject lands. Based on our review of the March 2020 submission, it appears that most of the Conservation Authority's comments have yet to be addressed. We therefore have enclosed our previous comments and request that the applicant provide a response as to how the matters will be addressed.

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

CONSERVATION AUTHORITIES ACT

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

The UTRCA's role in the development process is comprehensive and coordinates our planning and permitting interests. Through the plan review process, we ensure that development applications meet the tests of the *Planning Act*, are consistent with the PPS, conform to municipal planning documents, and conforms with the policies in the UTRCA's Environmental Planning Policy Manual (2006). Permit applications must meet the requirements of Section 28 of the *Conservation Authorities Act* and the policies of the UTRCA's Environmental Planning Policy Manual (2006). This approach ensures that the

principle of development is established through the *Planning Act* approval process and that a permit application can issued under Section 28 of the *Conservation Authorities Act* once all of the planning matters have been addressed.

Section 28 Regulations - Ontario Regulation 157/06 *Conservation Authorities Act*

As shown on the enclosed mapping, the subject lands are regulated by the UTRCA in accordance with Ontario Regulation 157/06, made pursuant to Section 28 of the *Conservation Authorities Act*. The regulation limit is comprised of riverine flooding and erosion hazards as well as wetland features and the surrounding area of interference. The UTRCA has jurisdiction over lands within the regulated area and requires that landowners obtain written approval from the Authority prior to undertaking any site alteration or development within this area including filling, grading, construction, alteration to a watercourse and/or interference with a wetland.

Please be advised that in cases where a discrepancy in the regulation limit mapping occurs, the text of the regulation prevails and a feature identified on the landscape may be subject to the Conservation Authority's regulations.

UTRCA ENVIRONMENTAL PLANNING POLICY MANUAL (2006)

The UTRCA's Environmental Planning Policy Manual is available online at:

http://thamesriver.on.ca/planning-permits-maps/utrca-environmental-policy-manual/

NATURAL HAZARDS

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

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

3.2.2 General Natural Hazard Policies

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

3.2.3 Riverine Flooding Hazard Policies

These policies address matters such as the provision of detailed flood plain mapping, floodplain planning approach, and uses that may be allowed in the flood plain subject to satisfying UTRCA permit requirements.

3.2.4 Riverine Erosion Hazard Policies

The Authority generally does not permit development and site alteration in the meander belt or on the face of steep slopes, ravines and distinct valley walls. The establishment of the hazard limit must be based upon the natural state of the slope, and not through re-grading or the use of structures or devices to stabilize the slope.

3.2.6 Wetland Policies

New development and site alteration is not permitted in wetlands. Furthermore, new development and

site alteration may only be permitted in the area of interference surrounding a wetland if it can be demonstrated through the preparation of an Environmental Impact Study (EIS) that there will be no impact on the hydrological function of the wetland feature and no potential hazard impact on the development.

As indicated in our 2017 comments, an EIS is required to address the wetland features on the site and we recommend that the study be scoped to ensure that it addresses the Conservation Authority's interests and can be used to support the required Section 28 permit application.

NATURAL HERITAGE

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

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

3.3.2 Wetland Policies

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

3.3.3.1 Significant Woodlands Policies

The UTRCA does not permit new development and site alteration in woodlands considered to be significant. Furthermore, new development and site alteration is not permitted on adjacent lands to significant woodlands unless an EIS has been completed to the satisfaction of the UTRCA.

The UTRCA is providing the following comments to assist the City in assessing the natural heritage implications of the proposal as it relates to the broader landscape perspective. The woodland feature that is located on the subject lands and the adjacent lands has been identified as being significant in the Middlesex Natural Heritage Systems Study (MNHSS, 2014). The MNHS assessed woodland patches across the County of Middlesex at a landscape level, including the City of London to determine criteria that could be utilized as indicators of significance. The study's conclusions included that those patches which met one criterion are significant woodland patches on the Middlesex landscape and should be protected as key elements of the natural heritage framework.

DRINKING WATER SOURCE PROTECTION: *Clean Water Act*

The subject lands have been reviewed to determine whether they are located within a vulnerable area (Wellhead Protection Area, Highly Vulnerable Aquifer, and Significant Groundwater Recharge Areas). They are located within a vulnerable area and for policies, mapping and further information pertaining to drinking water source protection, please refer to the approved Source Protection Plan at:

https://www.sourcewaterprotection.on.ca/approved-source-protection-plan/

UTRCA COMMENTS ON THE 2020 IPR

The UTRCA was a key participant in the Mud Creek EA. While we are supportive of the concept being put forward for The Beaverbrook Lands which have been expanded to include 92 and 825 Proudfoot Lane, there are a number of outstanding issues/concerns that need to be resolved through the planning process for the subdivision including the preparation of the necessary technical reports - Environmental Impact Study, Geotechnical Study, Hydrogeological Study & Water Balance Assessment, Transportation Impact Study (should address the challenges associated with the proposed alignment of Beaverbrook Avenue) etc. to confirm the extent of the development lands. As previously noted, the UTRCA provided comments regarding the July 2017 Initial Proposal Report which have yet to be addressed. Please find those comments enclosed them and we request that a response be provided.

Given that the Beaverbrook Lands are subject regulated and are within the jurisdiction of the UTRCA, we request that the policy framework of the IPR be revised to include *The Conservation Authorities Act* as well as the UTRCA's Environmental Planning Policy Manual.

P.14 – please augment Section 2.2.3 of the IPR to include the following provisions from the 2020 PPS –

Development shall be directed away from areas of natural or human-made hazards where there is an unacceptable risk to public health or safety or of property damage, and not create new or aggravate existing hazards.

Mitigating potential risk to public health or safety or of property damage from natural hazards, including the risks that may be associated with the impacts of a changing climate, will require the Province, planning authorities, and conservation authorities to work together.

P.14 – It is stated that "…*the realignment of Mud Creek* ***eliminates*** *the risk of flooding to the community*….". We recommend replacing the word *eliminates* with reduces or minimizes.

P. 30 – Proposed Zoning – please include a reference to the Mud Creek Special Policy Area which stipulates that any Zoning By-Law approved prior to the works being completed shall contain a Holding Provision which requires the creek channel and stormwater works to be completed (to the satisfaction of the Conservation Authority) prior to any development occurring.

P. 34 – Existing Conditions – please include a reference that the site includes natural hazard lands which are regulated by the UTRCA.

PRELIMINARY SERVICING REPORT

The UTRCA has reviewed the submission titled ***Beaverbrook Lands Servicing Constraints and Preliminary Servicing Plans*** prepared by TMIG dated March 6, 2020. We offer the following comments.

1. Section 1 mentions various site constraints including flat grades, the existing servicing within the east and south portions of the site, the impacts on the extension of two large storm sewers from the east property boundary to the proposed realigned Mud Creek channel, and the realignment of an existing sanitary trunk sewer to the proposed road network. The UTRCA recommends that the impacts of the proposed stormwater runoff design concept and its conveyance be considered given the flat grades on the site in order to avoid the noted negative impacts.

2. In Section 2 it is mentioned that the design objective of the storm sewer extensions is to maintain the existing hydraulic condition with respect to the storm sewers located upstream of the development. However, there are existing capacity and flooding issues on the site. How will the proposed storm sewer improve the volume (quantity control), capacity and flooding issues on the site if the objective of the development is to maintain the existing hydraulic conditions?

3. Section 2 mentions the least margin for crossing storm sewers and other services due to the flat grades on the site. How will this issue be dealt with in the design of the storm sewer system as the grade plays an important role in the storm sewers conveying capacity? Flat grades means less conveying capacity for the sewers which may cause local flooding. Additionally, flat grades may have an impact on the velocity which may affect the sediment carrying capacity in the system thus causing flooding.

4. The UTRCA recommends the proposed SWM concepts for this development give consideration to the history of flooding in Mud Creek near Oxford Street and Proudfoot Lane, the sediment accumulation and the topography including flat grades on the site.

5. Section 2.1 mentions the sediment accumulation in the Mud Creek/ditch. What measures have been proposed to remove the sediment from the ditch to improve the conveyance capacity?

6. Section 2.1 mentions the proposed extension of the precast box (1.5 m H by 2.4 m W) sewer at a slope of only 0.04%. The UTRCA is concerned about the conveyance of the runoff and sediment during frequent small storms at such a flat slope which may cause a backup in the precast sewer and may cause local flooding. Please address.

7. The UTRCA will require hydrographs routed through the proposed SWM sewer system for all of the storm events showing the peak flows and timing of the runoff at the entry point into Mud Creek and hydrographs for the Mud Creek exit at Oxford Street from the proposed development. Also, please update Table 1 by showing the HGL for the 250-year 24 hour storm and provide justification for the lower HGL under the proposed conditions.
8. Section 2.2 mentions the assumed calculated capacity of 4.73 m^3/s for the existing 1350 mm storm sewer with a slope of 0.78%. Please provide justification for the assumed capacity.

9. Section 2.3 mentions that on-site stormwater management will be provided for each development block and the SWM within the public right-of-ways. The UTRCA recommends that quantity and enhanced level water quality controls be considered for the proposed SWM and that the locations of the quantity control measures on the site be shown.

   Also, the proposed use of the public right-of-ways for SWM control shall not cause any groundwater contamination due to the infiltration of polluted runoff from roads, street and parking lot including salt.

UTRCA REQUIREMENTS FOR A COMPLETE APPLICATION

An electronic and hard copy of all submissions is required as follows:

1. Environmental Impact Study(ies) – including the referenced Detailed Engineering Study
2. Functional Servicing Report
3. Hydrogeological & Water Balance Assessment prepared in accordance with the Conservation Ontario Hydrogeological Assessment Guidelines (2013)
4. Geotechnical Report
5. Transportation Impact Study

Approvals pursuant to Section 28 of the *Conservation Authorities Act* will be required for the realignment of Mud Creek as well as the proposed development.

UTRCA REVIEW FEES

Consistent with UTRCA Board of Directors approved policy, Authority Staff are authorized to collect fees for the review of *Planning Act* applications and supporting technical reports. The fees that may be invoiced to the applicant include:

- Plan of Subdivision - $150.00 per lot to a maximum of $10,00.00
- Zoning By-law Amendment Application $275.00
- Technical Peer Review (per study) - 1,075.00

The UTRCA's technical review includes one comprehensive review and one revised report review. Furthermore, in accordance with our Environmental Policy Manual, the Authority reserves the right to charge additional report review fees.

Fees will also be collected for the Section 28 permit application(s).

Thank you for the opportunity to comment. Our staff looks forward to participating in the virtual Proposal Review Meeting which is scheduled for June 10, 2020. If you have any questions, please contact the undersigned at extension 293.

Yours truly,
UPPER THAMES RIVER CONSERVATION AUTHORITY

Christine

Christine Creighton
Land Use Planner
IS/CC/cc

Enclosures –
1. Regulation Mapping (please print on legal size paper to ensure that the scales are accurate)
2. UTRCA's September 18, 2017 Correspondence re the IPR

c.c. Sent via email –
City of London, - Lou Pompilii & Mike Corby
UTRCA – Brent Verscheure, Land Use Regulations Officer

Regulation Limit

Regulation under s.28 of the *Conservation Authorities Act*

Development, interference with wetlands, and alterations to shorelines and watercourses. O.Reg 157/06, 97/04.

Legend

- Assessment Parcel (MPAC)
- Watercourse (UTRCA, 2015)
  - Open
  - Tiled
- Wetlands (MNRF)
  - Evaluated-Provincial
  - Evaluated-Other
  - Not Evaluated
- Wetland Hazard
- Flooding Hazard
- Erosion Hazard
- Regulation Limit 2018

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

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

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

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

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

This document is not a Plan of Survey.

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

UPPER THAMES RIVER CONSERVATION AUTHORITY

Created By: CC May 26, 2020

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

metres

1:5,000

N

APPENDIX A

Environmental Impact Study
ISSUES SUMMARY CHECKLIST REPORT

Application Title: ESAM Mud Creek

Date Submitted: November 12, 2020

Proponent: Sam Katz Holding Limited

Qualifications

Primary Consultant: MBTW

Key Contact Person: Michael Hena

Other Consultants/ field personnel:

Hydrogeology/ Hydrology: Palmer

Biological – Flora: MTE Consultants

Biological – Fauna: MTE Consultants

Other:

Context for Background Information

Subwatershed: Mud Creek

Tributary Fact Sheet Number:

Planning / Policy Area:

Technical Advisory Review Team

- ☑ **Ecologist Planner** — James MacKay
- ☑ **Planner for File** — Not identified
- ☑ **EEPAC** — Sandy Levin
- ☑ **Conservation Authority** — UTRCA
- ☑ **Ministry of Natural Resources** — & MECP - N/A
- ☑ **Ministry of Municipal Affairs and Housing**
- ☐ **Ministry of Agriculture and Food**

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

1.0 DESCRIPTON OF THE ENVIRONMENT (Features)

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

1.1 Mapping (Location and Context)

Current aerial photography

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

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

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

Mud Creek EA (2017)

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

1.2.1 Terrain Setting

☑	☑	Soils (surface and subsurface)
☑	☑	Glacial geomorphology – landform type
☑	☑	Subwatershed

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

1.2.2 **Hydrology**

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

1.2.3 **Natural Hazards**

☑	☑	100 year Erosion Line
☑	☑	Floodline mapping
☑	☑	Max line mapping

1.2.4 **Vegetation**

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

1.2.5 **Flora**

☑ ☑ Flora (inventory dates, source)

EA data + data collelcted by MTE

☑ ☑ Rare flora (National, Provincial, Regional)

NHIC, Oldham etc.

1.2.6 **Fauna**

☑ ☑ Fauna (Inventory dates; sources)

EA data + any additional collelcted by MTE

☑ ☑ Breeding Birds

☑ ☑ Migratory Birds

☑ ☑ Amphibians

☑ ☑ Reptiles

☑ ☑ Mammals Bat habitat assessment

☑ ☑ Butterflies

☑ ☑ Odonata

☐ ☐ Other

☑ ☑ Partners In Flight (PIF)

☑ ☑ Rare Fauna

1.2.7 **Wildlife Habitat** + MNRF Criteria (2015) & applicable Official Plan policies & In-force London Plan policies

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

1.2.8 **Aquatic Habitat**
(SWS Aquatic Resources Management Reports)

- ☑ ☑ Fish communities

  Data from the Mud Creek EA
- ☑ ☑ Fish spawning areas
- ☑ ☑ Fish migration routes
- ☑ ☑ Thermal refuge for fish

☐ ☐ Benthic inventory

☑ ☑ Substrate

☑ ☑ Riparian habitat (extent and type)

1.2.9 **Linkages and Corridors**

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

☑ ☑ Valleylands

☑ ☑ Significant Watercourses (Thames River, Stoney Creek, Medway Creek, Dingman Creek, Pottersburg Creek, Wabuno Creek, Mud Creek, Stanton Creek (Drain), Kelly Creek (Drain)

☑ ☑ Upland Corridors / species migration routes

☑ ☑ Big Picture Cores and Corridors

☑ ☑ Linkages between aquatic and terrestrial areas (riparian habitat, runoff)

☑ ☑ Groundwater connections

☑ ☑ Patch clusters (mosaic of patches in the landscape)

1.3 Social Values

1.3.1 **Human Use Values**

☑ ☐ Recreational linkages for hiking, walking

☑ ☐ Nature appreciation, aesthetics

☐ ☐ Education, research

☐ ☐ Cultural / traditional heritage

☐ ☐ Social (parks and open space)

☐ ☐ Resources Products (e.g. timber, fish, furbearers, peat)

☐ ☐ Aggregate Resources

1.3.2 **Land Use - Cultural**

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

Identify what stages were completed if required

1.3.3 **Land Use - Active**

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

1.3.4 **Other**

2.0 EVALUATION OF SIGNIFICANCE

Components of the Natural Heritage System

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

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

Northwest Portion of the site

2.1 Environmentally Significant Areas

- ☐ Identified Environmentally Significant Areas (ESA)

Name

- ☐ Potential ESAs – Expansion of an Existing ESA

  Name _____

- ☐ Potential ESA – Area not associated with an existing ESA

  Name _____

2.2 Wetlands

- ☐ Provincially Significant Wetlands

  Name _____

- ☐ Wetlands

  Name _____

- ☑ Unevaluated Wetlands (Based on UTRCA mapping) Northwest Portion of the Site

2.3 Areas of Natural and Scientific Interest

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

2.4 Habitat of Species-At-Risk (SAR)

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

2.5 Woodlands and Vegetation Patches

- ☑ Significant Woodlands
- ☑ Unevaluated Vegetation Patches and/ or other patches > 0.5ha

2.6 Corridors and Linkages

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

3.0 IDENTIFICAITON 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

- [x] Species life histories (reproduction and dispersal)
- [ ] Habitat guilds
- [x] Indicator species
- [ ] Keystone species
- [x] Introduced species
- [ ] Predation / parasitism
- [ ] Population dynamics
- [x] Vegetation structure, density and diversity
- [ ] Food chain support
- [ ] Productivity
- [x] Diversity
- [ ] Carbon cycle
- [ ] Energy cycling
- [x] Succession and disturbance processes
- [x] Relationships between species and communities

3.2 **Hydrological and Wetland Functions**

- [x] Groundwater recharge and discharge (hydrogeology) (northwest corner) outstanding
- [x] Water storage and release (fluvial geomorphology)
- [x] Maintaining water cycles (water balance) and for features on adjacent sites
- [x] Water quality improvement
- [ ] Flood damage reduction
- [ ] Shoreline stabilization / erosion control
- [ ] Sediment trapping
- [ ] Nutrient retention and removal / biochemical cycling
- [x] Aquatic habitat (fish, macroinvertebrates)

3.3 **Landscape Features and Functions**

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

3.4 **Functions, Benefits and Values of Importance to Humans**

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

4.0 ADDITIONAL COMPONENTS AND NOTES

- EIS to show and demonstrate conformity with the Provincial Policy Statement (2020), in-force London Plan (as of Nov. 2019) policies, and current Official Plan policies (1989), Environmental Management Guidelines (2006).
- EIS to address any Section 28 regulated areas requirements
- Natural heritage features and areas boundaries to be staked and GPS located in the field with City of London staff (northwest corner site).
- EIS to address buffers, additional mitigation and/or compensation based on the proposed development.
- EIS to focus on Significant Valleyland, Significant Forest, Wildlife Habitat, and Wetlands compensation/restoration within the approved Significant Valleyland corridor.

Dave Hayman

From: Dave Hayman
Sent: Thursday, January 21, 2021 9:34 AM
To: Zach Anderson
Subject: FW: ESAM Mud Creek Application - EIS Scoping Meeting
Attachments: Snowsells May 2017 comment letter - Mud Creek EA.pdf; PRM - September 13, 2017 - 323 Oxford Street West - Sam Katz Developments.pdf; 323 Oxford Street West and 92 & 825 Proudfoot Lane.pdf

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From: Christine Creighton
Sent: Thursday, December 3, 2020 1:15 PM
To: Dave Hayman
Cc: Corby, Mike ; Feldberg, Matt ; Hachey, Jeff ; James MacKay ; Page, Bruce ; Tchir, Tara ; Verscheure, Brent ; m.hannay@mbtw.com; s.levin, s.levin
Subject: RE: ESAM Mud Creek Application - EIS Scoping Meeting

Hello Dave.

With respect to the EIS report requirements, while we appreciate that significant effort has been made regarding the ecological work through the Mud Creek Subwatershed EA process (2008 Biolgic study, 2013 Delcan/Parsons Study, 2016 LGL Study), that information needs to be pulled into the EIS for this site especially with respect to the natural hazard features - Tribs A, B & C and also the wetlands.

As shown on the enclosed mapping, much of the site is regulated by the UTRCA and the applicant will need to secure the necessary Section 28 permits for the works contemplated within the regulated area. We are not expecting you to go out and do more field work simply to bring forward the relevant supporting information.

I have attached the UTRCA's comments regarding the Mud Creek EA from May 16, 2017. Of particular note are the following remarks -

Item 2.

2. Given the relatively recent submission of an alternative series of management strategies for much of lands north of Oxford Street (as articulated in the MBTW // WAI document), it is apparent that the CH2M report will have to be revised once again. We would caution the City and the consulting team that an interim step may involve consideration of the comments contained in this letter and a meeting if necessary to address and/or otherwise discuss the implications of these comments prior to moving to a final report.

Item 4.

Technical justification of the concepts has not been provided in the MBTW //WAI material and as a result, it is difficult to determine the degree to which the new alternative management strategy is compliant with or contrary to UTRCA policies. We have provided support in principle to the approach taken but further technical support is needed.

Item 6.

During our May 3/17 meeting, it was noted that there may be conflicting information regarding wetland boundaries on lands north of Oxford Street. Specifically, Conservation Authority wetland mapping shows a wetland community immediately north and west of the area recently cleared of vegetation. This wetland community does not appear on any of the information produced in support of the EA. The reason this is raised here is that UTRCA policy calls for the protection of all wetlands – regardless of whether they are deemed Provincially Significant or not. Nevertheless, a Class EA is a legitimate means of considering all viable alternatives in addressing the problem statement. We will work with all parties to ensure accurate information is available to properly characterize existing conditions and where necessary, outline a process whereby compensation for wetland loss can be considered for approval by our UTRCA Hearing Board.

These matters were conveyed again at the Proposal Review Meetings for this proposed development as well as in the UTRCA's comments. If they have been addressed we would appreciate receiving the information especially given that our colleague who was the lead on this project has left the Conservation Authority.

Please let me know if you have any comments or concerns regarding the UTRCA's requirements.

Thank you.
Christine

UPPER THAMES RIVER
CONSERVATION AUTHORITY
Christine Creighton
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All UTRCA offices and buildings are closed to the public to help protect them and our staff from COVID-19. I am working remotely and am monitoring voicemail and email messages. Thank you for your patience.

>>> Dave Hayman 12/1/2020 8:14 AM >>>
Thanks for this. I have forwarded to Michael Hannay and Jacob Katz for their review. Please note the spelling of Michael Hannay on the contact page (first page of checklist).

Also, in the notes section at the end of the checklist, I would like a bit more clarity on report requirements. My view is that the channel relocation part of the report will be about implementation to carry forward from the EA. The more traditional EIS component of the report (Policy reviews, boundaries, SWH etc. will be focused on the northwest corner. Can you confirm?

Dave Hayman, M.Sc. | **Manager, Biological Sciences**
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From: MacKay, James
Sent: Thursday, November 26, 2020 8:31 PM
To: Corby, Mike ; Feldberg, Matt ; Christine Creighton (creightonc@thamesriver.on.ca) ; TchirT@thamesriver.on.ca; VerscheureB@thamesriver.on.ca; Dave Hayman ; m.hannay@mbtw.com; s.levin s.levin
Cc: Page, Bruce ; Hachey, Jeff
Subject: RE: ESAM Mud Creek Application - EIS Scoping Meeting

Hi All, please see the attached Draft EIS scoping document for review and comment. Please let me know if anything is missing or requires further detail.

Regards,

James MacKay, M.Sc.
Ecologist Planner
ISA Certified Arborist
City of London
Development Services
T: (519) 661-CITY (2489) ext. 4865 | F: (519) 963-1483 | E: jmackay@london.ca

UPPER THAMES RIVER
CONSERVATION AUTHORITY

The Thames
A Canadian
Heritage River

"Inspiring a Healthy Environment"

May 16, 2017

The Corporation of the City of London
Stormwater Engineering
300 Dufferin Avenue
P. O. Box 5035
London, Ontario
N6A 4L9

Attention: Shawna Chambers, P. Eng. – Division Manager, Stormwater

Dear Ms. Chambers:

Re: Mud Creek Subwatershed Class Environmental Assessment
Review of Revised Draft Report by CH2M Hill Canada Limited

The Upper Thames River Conservation Authority has completed a preliminary review of the revised draft "Mud Creek Subwatershed Class Environmental Assessment" report prepared by CH2M, dated December 2016 in addition to the "Mud Creek Analysis of the Proposed Realignment at 323 Oxford Street West" prepared by MBTW // WAI without prejudice on behalf of ESAM. The UTRCA has participated in discussions over an extended period of time involving various stakeholders including those property owners with lands within the study area. Innovative concepts have been brought forward during these discussions and have culminated in a possible revised preferred "management strategy" which consequently may lead to a further update of the EA report. Based on our preliminary review of the information provided as recently as May 3/17, we offer the following comments at this time.

General Comments

1. The City is reminded that virtually all aspects of the proposed preferred management strategy will be subject to prior review and approval by the UTRCA pursuant to Section 28 of the Conservation Authorities Act. Also, as noted in our 2016 comments, channel works may be subject to prior approval by Fisheries and Oceans Canada (DFO) in accordance with the Fisheries Act. The UTRCA will work with all parties to facilitate the approval process, including efforts to provide permits as various elements of the strategy are brought forward over time as funding and other approvals allow. For future reference, submissions in support of Section 28 applications will include but not be limited to modelling of the overall management strategy, modelling for all culvert upgrades/replacements to confirm no increase in flood or erosion risk upstream or downstream within the study area, a comprehensive naturalization strategy for any modifications to the flood plain corridor, UTRCA participation in a "working group" intended to develop specific design elements which maximize natural heritage benefits and eliminate negative natural hazard impacts and detailed cut and fill calculations, if applicable.
2. Given the relatively recent submission of an alternative series of management strategies for much of lands north of Oxford Street (as articulated in the MBTW // WAI document), it is apparent that the CH2M report will have to be revised once again. We would caution the City and the consulting team that an interim step may involve consideration of the comments contained in this letter and a meeting if

necessary to address and/or otherwise discuss the implications of these comments prior to moving to a final report.

3. The EA Report appendices and model files were not included in the CH2M document provided to the UTRCA and consequently it was challenging to meaningfully review the flood hazard aspect of report.
4. Technical justification of the concepts has not been provided in the MBTW //WAI material and as a result, it is difficult to determine the degree to which the new alternative management strategy is compliant with or contrary to UTRCA policies. We have provided support in principle to the approach taken but further technical support is needed.
5. There does not appear to be any form of flood plain mapping in the latest draft report by CH2M. The UTRCA wonders whether this is a deliberate strategy, given the dynamic nature of the modelling/mapping process. An explanation is warranted.
6. During our May 3/17 meeting, it was noted that there may be conflicting information regarding wetland boundaries on lands north of Oxford Street. Specifically, Conservation Authority wetland mapping shows a wetland community immediately north and west of the area recently cleared of vegetation. This wetland community does not appear on any of the information produced in support of the EA. The reason this is raised here is that UTRCA policy calls for the protection of all wetlands – regardless of whether they are deemed Provincially Significant or not. Nevertheless, a Class EA is a legitimate means of considering all viable alternatives in addressing the problem statement. We will work with all parties to ensure accurate information is available to properly characterize existing conditions and where necessary, outline a process whereby compensation for wetland loss can be considered for approval by our UTRCA Hearing Board.

Specific Comments

1. Section 2.1.4 seems poorly worded to describe flood hazard regulations, related flood hazard mapping and the respective role of UTRCA. We offer to provide the City and CH2M with wording which hopefully can provide more clarity in this regard, for inclusion in the final report.
2. Section 3.1.1 does not seem to clearly make any point. It is primarily a series of statements regarding floodplain regulations and might be more appropriate in an earlier background section. We suspect this wording is included as a reminder that flood hazard limits cannot take into account proposed works until the project has been constructed (and that flood hazard regulations are administered by the Conservation Authority).
3. Section 4.1 suggests a specific objective of managing stormwater flows north of the CPR line by providing adequate conveyance of large flow events to the North Thames; The UTRCA has expressed concerns regarding this component of the study previously. We respectfully submit that this is not an acceptable alternative without much more analysis. Further, it is unclear that this flow path currently exists as described and we remain concerned this causes other flooding issues. Please note that in general, as an objective, runoff from within a certain drainage basin should be managed within that drainage basin. The existing 'diversion' of runoff out of the Mud Creek drainage area along the CPR corridor should be considered an existing issue to be addressed within the EA. We submit the means by which this issue is addressed has a potentially significant impact on the proposed preferred management strategy of this EA.
4. It would seem that existing private property flooding issues should be more clearly defined (ie. exact properties / existing private infrastructure), and alternatives should consider flood mitigation infrastructure to reduce flood risk for existing private infrastructure (ie. dykes)

5. Further explanation and/or better wording is required for sections 4.3.18 (two-zone concept) and 4.3.19 (cut/fill). We acknowledge these concepts have been discussed in the past but they do not appear to have been carried forward to the alternatives, and may be misleading as a result.
6. We find it odd that the report reads that the hydrologic/hydraulic models have not been used to identify flood issues, have not been used to identify/evaluate alternatives, and are vaguely stated to have been only used to evaluate whether the chosen alternative meets EA objectives. This will likely be confusing to someone looking for a logical/defensible identification of flood issues, identification/evaluation of alternative remedies and selection of a preferred solution.
7. We note that descriptions of the two future condition model scenarios implies that identification of the flood hazards is an unnecessary exercise within the EA (as it is described that one scenario is for flood hazard delineation, and the other scenario is to evaluate against EA objectives). On a related note, please consider reducing current information in sections 6.1/6.2 (perhaps simply refer to Appendix G), but the report requires a better explanation of the purpose of the modelling and its application in report (ie. explain which specific EA objectives the models have been used to demonstrate meeting, and present corresponding model results that demonstrate that the specific objectives are met)
8. From Section 2 - It seems odd that 2.2.1 Hydrology is within the 2.2 Natural Heritage section.
9. From Section 3 - 3.2 discusses the City of London EA for a bus rapid transit system in general terms. Should the anticipated reconstruction of the Wonderland/Riverside intersection be noted here as well?
10. Previous UTRCA comments suggested adding an analysis of estimated cut/fill for future public projects in this part of report. We do not see evidence of this in the latest draft of the CH2M report.
11. Similar to section 2, previous UTRCA comments suggested adding a detailed description of potential additional flood issues related to future development (public/private) in this part of report (ie. utilize model tools to identify potential future issues), and then compare the existing and future model scenarios to further the analysis. This does not appear to have been included. Instead, the report just very vaguely identifies flooding issues as a development limitation.
12. From Section 4/5 – It seems odd that, instead of being located in the previous two sections (2/3), the most detailed identification/description of issues appears to be located within 4.1 and 4.2 of this Alternative Development section, mixed in with more specific objectives/targets (which may be more appropriate in section 1, or at least organized in terms of meeting overall study objectives). This may be confusing for readers.
13. Section 6 - It is challenging to meaningfully review this section without being provided Appendix G or the latest model files. Also, as noted previously, it is not clear that there needs to be two separate future conditions hydraulic models.

Thank you for the opportunity to comment on the latest submissions for the Mud Creek EA. If you wish to meet to discuss any aspects of this letter, please contact the undersigned.

Yours truly,
UPPER THAMES RIVER CONSERVATION AUTHORITY

Mark Snowsell
Land Use Regulations Officer

c.c. Tom Mahood, CH2M
Mark Shifflett, UTRCA

Appendix B

Excerpts from Hydrogeology Report (Palmer, 2021)

Hydrogeological Assessment – 323 Oxford Street West, City of London, Ontario

Palmer Project #
180261

Prepared For
The ESAM Group

April 14, 2021

Table of Contents

List of Figures

List of Tables

List of Appendices

Document Path: C:\Enpvte\Shared\Projects\Active\18026 - The ESAM Group\180261-323 Oxford St London\Mapping\mxd\180261-1 BoreholePlan.mxd

CLIENT: The ESAM Group	PROJECT: 323 Oxford St, London		
PREPARED BY: PALMER ENVIRONMENTAL CONSULTING GROUP INC.	PROJECT NO.: 180261	REVISION: 3	
	DATE: May 17, 2019	SCALE: 1:6000	
	DRAWN: BE	DATUM: NAD 1983	
	CHECKED: AL	PROJECTION: UTM zone 17	

LEGEND:

- Subject Property
- Watercourse
- Infiltration Test Site
- Borehole
- Monitoring Well
- Mini-piezomter

Imagery (2017) and street information providedby City of London. Watercourses provided by Ontario Hydro Network.

Borehole and Monitoring Well Location Plan DRAFT

Figure 1

Coarse-Textured Glaciolacustrine Deposits

This unit was found in BH18-9 below the fill, reaching full extent of the borehole. It contains silt and silty sand with trace clay and layers of clayey silt.

Tavistock Till

The Tavistock Till unit was found in BH18-1, and BH18-4 through to BH18-8 below the modern fluvial, glaciofluvial, or fine-textured glaciolacustrine deposits. Sandy silt till was encountered in BH18-1, BH18-5 and BH18-7, and extended to depths ranging from about 4.1 to 6.7 m below the existing ground surface. Borehole BH18-5 was terminated in this deposit. Clayey silt till was encountered in Boreholes BH18-4 and BH18-6 to BH18-8 and extended to depths ranging from about 2.2 to 6.7 m below the existing ground surface. Boreholes BH18-6 and BH18-8 were terminated in these deposits. Remnants of glaciolacustrine deposits can be seen within the till unit as layers of silty clay, clayey silt, sand and gravel.

3.3 Groundwater Levels

Regular water levels were collected between October 2018 and October 2019. Beginning in November 21, 2018, BH18-2, BH18-3, BH18-5, and BH18-7, were instrumented with Solinst dataloggers to continuously measure groundwater levels. The manual water level data is presented on **Table 3**. Both manual and continuous water level monitoring data is presented on **Figure 4**, along with monthly precipitation data, obtained from the London CS Station. Based on the water level and precipitation trends between October 2018 and October 2019, groundwater level was observed to rise with increased precipitation and decreased evapotranspiration during the fall months and fell with decreased precipitation and increased evapotranspiration during the summer months. BH18-1 and BH18-2 are missing continuous data from January 2019 to April 2019 due to a logger malfunction.

Groundwater levels were highest in April 2019 and were found ranging from 234.62 to 256.24 metres above sea level (masl). BH18-7 had relatively high water levels from January 2019 to April 2019 compared to the other boreholes. The lowest water level was found in early October 2018 and 2019, where the groundwater is found ranging from 234.29 to 253.37 masl. The groundwater level fluctuation is consistent in all monitoring wells, indicating they respond similarly to precipitation events. The groundwater flow generally follows topography and flows from high elevation in the northwest to low elevation in the south (**Figure 5**). In the southeast portion of the site, water is expected to flow north or northwest towards groundwater discharge areas in Mud Creek.

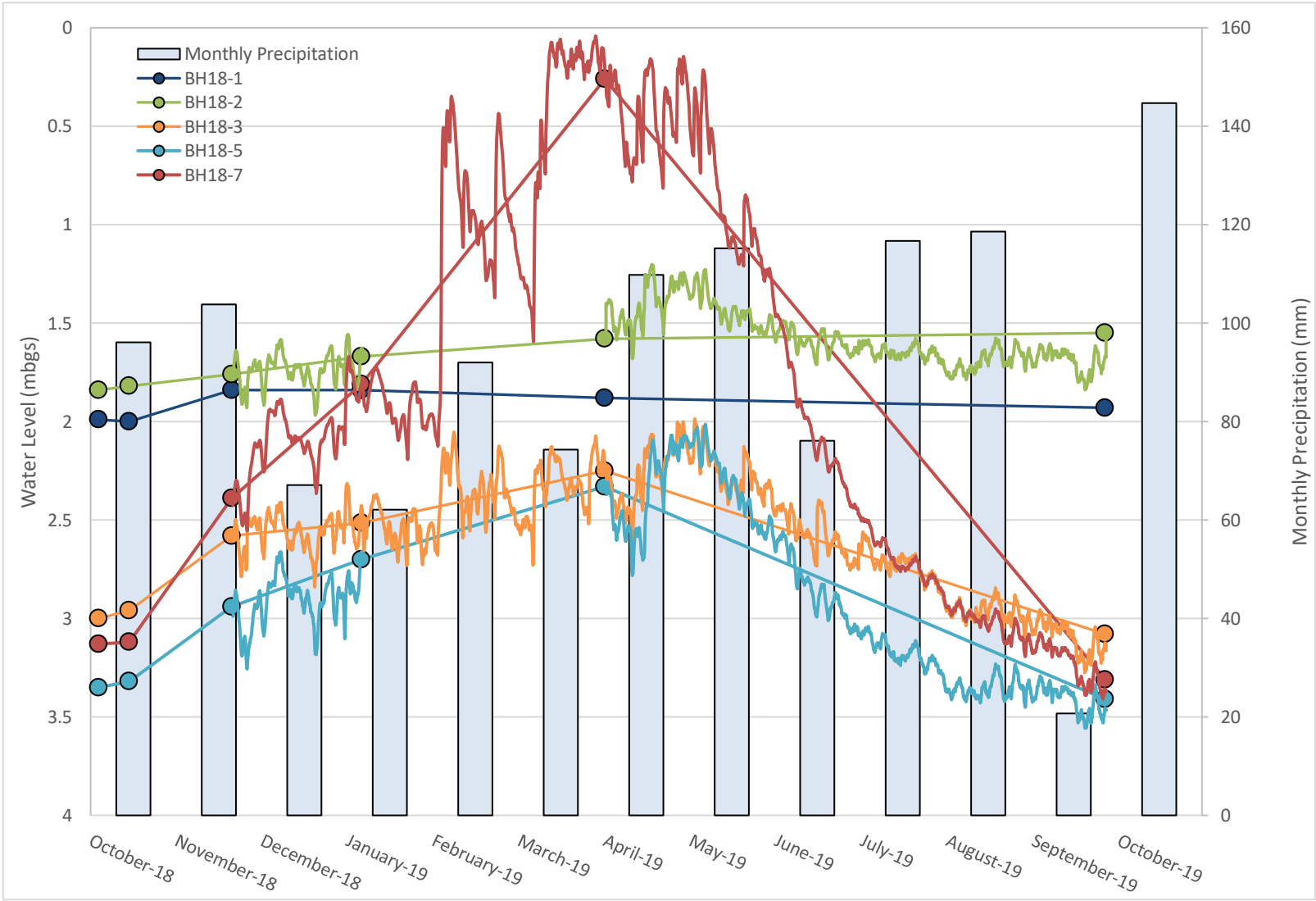
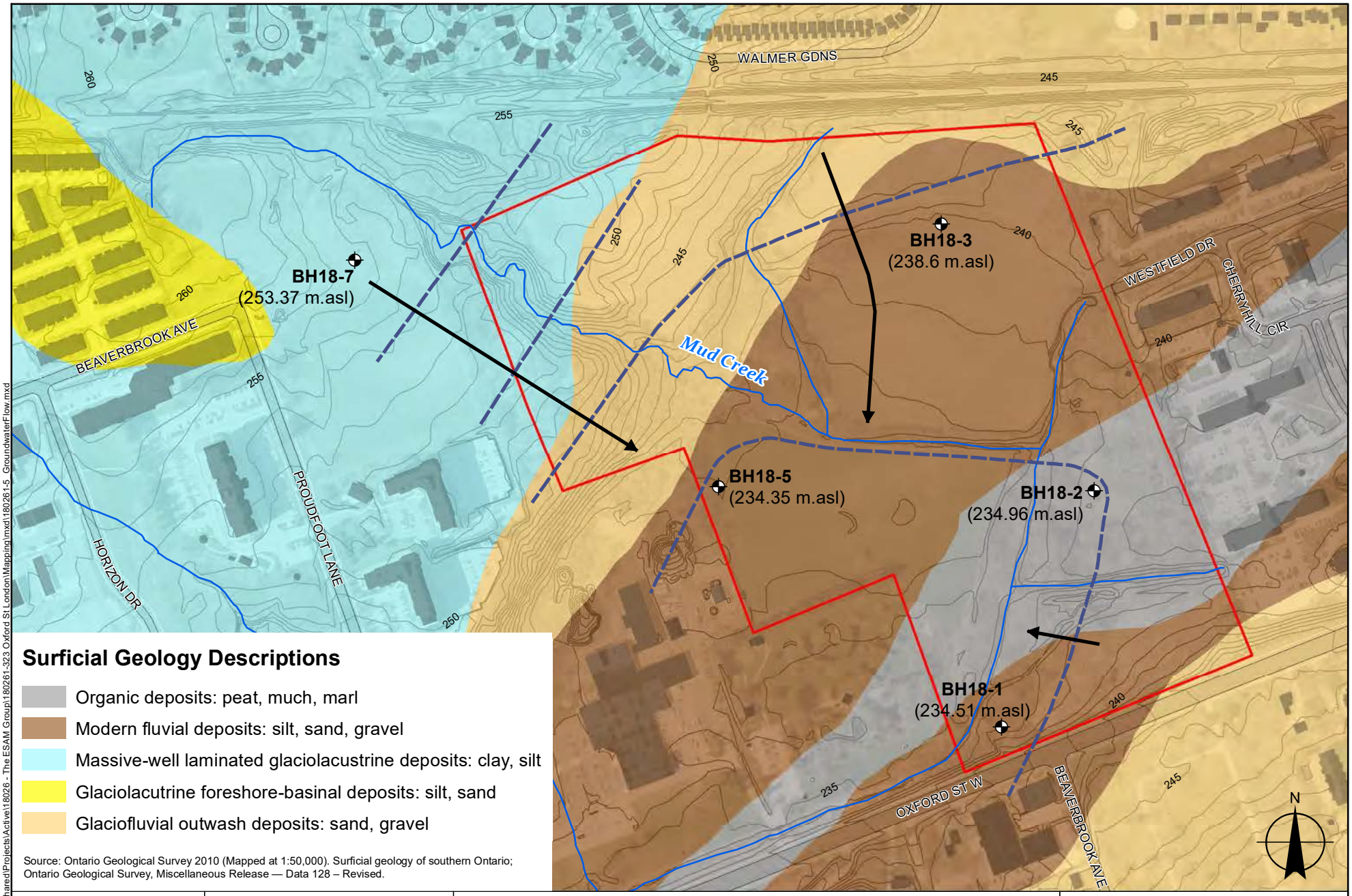


Figure 4. Manual Groundwater Levels



Surficial Geology Descriptions

- Organic deposits: peat, much, marl
- Modern fluvial deposits: silt, sand, gravel
- Massive-well laminated glaciolacustrine deposits: clay, silt
- Glaciolacutrine foreshore-basinal deposits: silt, sand
- Glaciofluvial outwash deposits: sand, gravel

Source: Ontario Geological Survey 2010 (Mapped at 1:50,000). Surficial geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release — Data 128 – Revised.

Document Path: C:\Egnyte\Shared\Projects\Active\180261 - The ESAM Group\180261-323 Oxford St London\Mapping\mxd\180261-5_GroundwaterFlow.mxd

CLIENT: The ESAM Group	PROJECT: 323 Oxford St, London		
PREPARED BY: PALMER ENVIRONMENTAL CONSULTING GROUP INC.	PROJECT NO. 180261	REVISION: 1	
	DATE: May 17, 2019	SCALE: 1:5000	
	DRAWN: BE	DATUM: NAD 1983	
	CHECKED: AL	PROJECTION: UTM zone 17	

LEGEND:
- Groundwater Flow Direction
- Potentiometric Surface (masl)
- Watercourse
- Contour (1 m)
- Subject Property
- Borehole

0 50 100 150 metres

Imagery (2017), contours, building footprints and street information provided by City of London. Watercourse provided by Ontario Hydro Network.

DRAFT

Groundwater Flow Direction

Figure 5

Table 3. Groundwater Monitoring Results

Monitoring Well	Monitoring Event (mbgs/masl)					
	4-Oct-18	15-Oct-18	21-Nov-18	7-Jan-19	05-Apr-19	03-Oct-19
BH18-1	1.99/234.51	2.00/234.50	1.84/234.66	1.84/234.66	1.88/234.62	1.93/234.57
BH18-2	1.84/234.96	1.82/234.98	1.76/235.04	1.67/235.13	1.58/235.22	1.55/235.25
BH18-3	3.00/238.60	2.96/238.64	2.58/239.02	2.52/239.09	2.25/239.35	3.08/238.52
BH18-5	3.35/234.35	3.32/234.38	2.94/234.76	2.70/235.00	2.33/235.37	3.41/234.29
BH18-7	3.13/253.37	3.12/253.38	2.39/254.11	1.81/254.69	0.26/256.24	3.31/253.19

3.4 Hydraulic Conductivity Testing

3.4.1 Hydraulic Conductivity

On October 15, 2018, Palmer conducted in-situ testing to determine the hydraulic conductivity (K) of the geological material at BH18-1, BH18-2, BH18-3, BH18-5, and BH18-7. The tests were completed using a PVC slug with a diameter of 1.5 inches and length of 1 m. A rising head test was conducted at each location by removing a slug with a known volume from the well, causing a near-instantaneous drop in water level. As the water returns to static, water levels in the well were recorded using a datalogger which was set to record water levels at two-second intervals. K-values were calculated from the displacement-time data using the Bouwer-Rice method for unconfined aquifers, as modelled by Aqtesolv™ software. The results are provided in **Appendix C**.

Each of the boreholes were screened across either the organic, modern fluvial, glaciofluvial outwash, or Tavistock till deposits. The K-values ranged from $1.7x10^{-5}$ to $2.3x10^{-6}$ m/s, with a geometric mean of $2.8x10^{-5}$ m/s for the fluvial outwash and 2.3×10^{-6} m/s for the Tavistock Till.

Table 4. Calculated Hydraulic Conductivity

Monitoring Well	Stratigraphic Unit	Soils	Hydraulic Conductivity (m/s)	Geometric Mean Hydraulic Conductivity (m/s)
BH18-1	Organic and Modern Fluvial Deposits	Sand and Gravel	$1.6x10^{-5}$	$2.8x10^{-5}$
BH18-2	Modern Fluvial and Glaciofluvial Outwash Deposits	Clayey Silt, Sand and Gravel	$1.7x10^{-5}$	
BH18-3	Modern Fluvial Deposits	Silty Sand and Sand	$6.1x10^{-6}$	
BH18-5	Modern Fluvial and Glaciofluvial Deposits	Silty Sand, Sand and Gravel	$3.7x10^{-6}$	
BH18-7	Tavistock Till	Sandy Silt Till and Sandy Gravel	$2.3x10^{-6}$	$2.3x10^{-6}$

3.4.2 Infiltration Testing

The infiltration rate of the identified surficial units was measured through infiltration testing conducted by Palmer personnel on November 21, 2018. Testing was completed using a Guelph Permeameter and employed the combined reservoir in high permeability soils and single reservoir in low permeability soils.

Six (6) Single Head infiltration tests were conducted within a 2 m distance of BH18-1, BH18-2, BH18-3, BH18-5, BH18-6, and BH18-7. Prior to testing, a hand auger was used to excavate the infiltration test pit past the existing fill and topsoil materials to the best extent practical. The Permeameter was filled with approximately 2.5 L of water and an initial head change of approximately 0.10 m was utilized to initiate the test with the subsequent rate of change within the water column observed. The test was terminated once the rate of change was observed to remain stable over three consecutive time intervals.

Infiltration rate values were calculated using the Guelph Permeameter K-sat Calculator (2012) method for the single head and combined reservoirs method. The analytical results are presented in **Appendix D**, and the field saturated hydraulic conductivity values and infiltration rates are summarized in **Table 5**. Data from the infiltration test near BH18-5 was unreliable and was not included in further analysis.

Using this method of analysis, the calculated field saturated hydraulic conductivity (Kfs) of the soils found on site ranged from 1.7×10^{-5} to 3.0×10^{-7} m/s. The higher field saturated hydraulic conductivity values were found in the modern fluvial deposits, while lower hydraulic conductivity was found in fine-textured glaciolacustrine due to higher clay content restricting the movement of water below the water table.

Measured infiltration rates ranged between 33.5 mm/hr (near BH18-2) to 98.7 mm/hr (near BH18-3), with an average rate of 54.5 mm/hr. The range of infiltration rates is likely due to soil variability. These values are considered representative of the native soils underneath the fill material at the site and are sufficiently permeable to permit a wide variety of stormwater infiltration measures should they be required.

Table 5. Calculated Infiltration Rates

Test Location	Test Type	Surface Geology	Stratigraphic Unit	Field Saturated Hydraulic Conductivity (m/s)	Infiltration Rate (mm/hr)
BH18-1	Outer Tube (Combined Reservoir)	Organic Silt/Sandy Silt	Organic Deposits	4.4×10^{-7}	37.1
BH18-2	Outer Tube (Combined Reservoir)	Organic Sandy Silt/Silty Sand	Organic Deposits	3.0×10^{-7}	33.5
BH18-3	Outer Tube (Combined Reservoir)	Sand/Silt	Modern Fluvial Deposits	1.7×10^{-5}	98.7
BH18-6	Outer Tube (Combined Reservoir)	Sand/Silt	Fine-Textured Glaciolacustrine Deposits	3.8×10^{-6}	66.1
BH18-7	Outer Tube (Combined Reservoir)	Silt/Sandy Silt	Fine-Textured Glaciolacustrine Deposits	4.3×10^{-7}	36.9

Parameter	Detection Limit	Units	Regulatory Standards	Sample Concentration				
			PWQO	BH18-1	BH18-2	BH18-3	BH18-5	BH18-7
o-Xylene	0.10	µg/L	40	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	0.10	µg/L	2.5	<0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	0.10	µg/L	4	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	0.10	µg/L	2.5	<0.10	<0.10	<0.10	<0.10	<0.10
1,2,4-Trichlorobenzene	0.30	µg/L	0.5	<0.30	<0.30	<0.30	<0.30	<0.30
1,3-Dichloropropene (Cis + Trans)	0.30	µg/L		<0.30	<0.30	<0.30	<0.30	<0.30
Xylene Mixture (Total)	0.20	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20
n-Hexane	0.20	µg/L		<0.20	<0.20	<0.20	<0.20	<0.20
Toluene-d8		% Recovery		89	91	90	99	107
4-Bromofluorobenzene		% Recovery		78	111	90	72	81

NDOGT – No Data; Overgrown with Target, refers to over-crowding microbial growth

3.6 Mud Creek Water Level Monitoring

3.6.1 Groundwater / Surface Water Interactions

Mini-piezometers (MPs) were used to measure the vertical hydraulic gradient between the surface water level and the groundwater table along Mud Creek, a tributary of Thames river. Solinst data loggers were placed in MP1, MP2, and MP3 on October 15, 2018. A datalogger malfunction during the winter months resulted in a loss of data at MP1, 2 and 3 during this time period.

Monitoring of groundwater and surface water levels in the MPs can determine if a creek is supported by groundwater discharge or by surface water runoff. When the water level in the MP is higher than that of the surface water, groundwater is discharging from the water table into the creek in the immediate vicinity of the MP. When the water level in the MP is lower than that of the surface water, surface water from the creek is seeping into the ground and recharging the groundwater table. The rate a which groundwater recharge or discharge occurs is highly dependent upon the hydraulic conductivity of the creek bed soils.

The results of monthly monitoring between October 2018 and October 2019, and the results of the continuous monitoring at each creek MP locations are discussed below. Due to blockage in MP1 in November 2018, the data is considered unreliable. Additionally, due to weather conditions in January 2019, the water in MP1 and MP3 were frozen in place and therefore, the manual data could not be collected. The monthly monitoring data from October 2018 to October 2019 is presented in **Table 7** and **Figure 6**.

MP1 was installed in October 2018 to measure both groundwater and surface water levels in the northern western portion of Mud Creek within the site boundary. This MP was placed within the Mud Creek valley which is highly incised through the overburden soil relative to the surrounding tableland topography. In April 2019, MP1 was reinstalled since the logger could not be retrieved. The monitoring results at MP1 show a large range of hydraulic gradient values, from -1.92 to +2.53 m/m, changing from gaining in the fall to losing in the spring. This suggests that seasonal groundwater discharge and recharge are occurring in this reach of Mud Creek. Based on OGS Mapping and the strong updates gradients, there is a potential

that this MP encountered glaciofluvial outwash deposits confined below the fine-grained glaciolacustrine soils.

MP2 was installed in October 2018 in the center of the site along Mud Creek in a marshy/grassy wetland area. The monitoring results suggest that this reach of Mud Creek and the associated wetland area has a strong negative hydraulic gradient and is therefore losing water to the water table. The hydraulic gradient was measured to range from -0.12 to -0.33 m/m. This portion of Mud Creek and wetland community may be perched on lower permeability soils limiting groundwater/ surface water interactions.

MP3 was installed in October 2018 to measure both groundwater and surface water levels in the southern end of Mud Creek near Oxford Street. A measurement was not taken in January due to the water level being frozen in the MP. In April 2019, MP3 was reinstalled since the old MP needed to be pulled to retrieve the logger frozen in place. The monitoring results suggest that this portion of the creek has a neutral to downwards hydraulic gradient ranging from -0.03 to -0.10 m/m. It is therefore interpreted that at the MP3 location Mud Creek is losing water to the water table, although there does appear to be a convergence of groundwater equipotential lines in this area (**Figure 5**).

Table 7. Mud Creek Water Level Monitoring

Creek Piezometer	MP Depth (mbgs)	Stick Up (mags)	Water Level Type	Monitoring Events (metres above ground surface - mags)					
				4-Oct-18	15-Oct-18	21-Nov-18	7-Jan-19	05-Apr-19	03-Oct-19
MP1	0.47 (old) 0.56 (new)	1.51 (old) 1.42 (new)	Groundwater Level	0.58	0.59	-	frozen	-0.38	-0.10
			Surface Water Level	0.16	0.16	0.17	frozen	0.12	-0.11
			Gradient (m/m)	+2.47	+2.53	-	frozen	-1.92	+0.04
MP2	1.06	0.92	Groundwater Level	-0.10	-0.10	-0.12	-0.12	0.04	-0.20
			Surface Water Level	0.10	0.09	0.08	0.13	0.13	0.10
			Gradient (m/m)	-0.26	-0.25	-0.26	-0.33	-0.12	-0.39
MP3	0.99 (old) 1.00 (new)	0.99 (old) 0.98 (new)	Groundwater Level	0.12	0.12	0.11	frozen	-0.60	-0.32
			Surface Water Level	0.14	0.18	0.18	frozen	-0.56	-0.28
			Gradient	-0.03	-0.09	-0.10	frozen	-0.06	-0.06

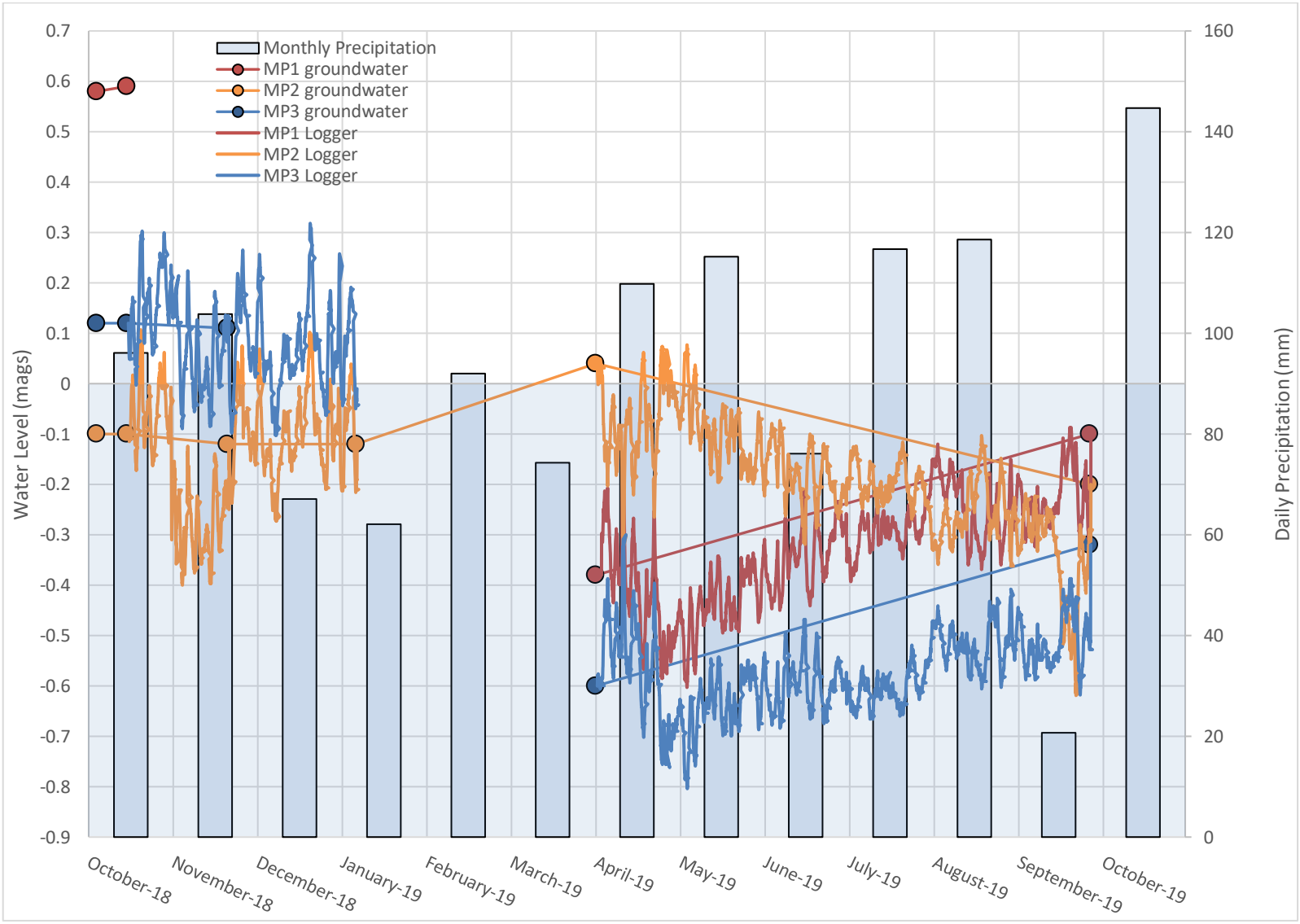


Figure 6. Mud Creek MP Continuous Water Level Monitoring

6 Summary and Next Steps

The following summarizes the results of the preliminary hydrogeological assessment completed to support the proposed subdivision at 323 Oxford Street in the city of London:

- Hydrogeological Investigations were completed between October 2018 and October 2019, consisted of the installation of four monitoring wells, regular groundwater level monitoring, the installation of dataloggers to continuously record groundwater levels, the installation of three creek MPs to measure groundwater recharge/ discharge, and infiltration testing at four locations.
- Based on regional geology and borehole drilling results, the site is underlain by a series of hydrostratigraphic units: Tavistock till, fine-textured glaciolacustrine deposits, coarse-textured glaciolacustrine deposits, glaciofluvial deposits, and modern fluvial deposits and organics.
- In general, groundwater levels follow the topography, and are found at a depth ranging from 0.26 to 3.35 mbgs. Groundwater elevations ranged from 234.29 to 256.24 masl.
- The hydraulic conductivity of the soils was found to range from $1.7x10^{-5}$ to $2.3x10^{-6}$ m/s, with a geometric mean of $6.8x10^{-6}$ m/s. The results indicate that the surficial unit acts as an unconfined aquifer.
- The infiltration rates were calculated to range from 33.5 to 98.7 mm/hr. The variation in infiltration rates are likely due to soil variability hydraulic conductivity of the site.
- Groundwater chemistry samples were taken from all monitoring wells. The results showed that the groundwater quality at the site is good and typical of groundwater chemistry for the area
- MP measurements from within Mud Creek showed that the watercourse is seasonally gaining groundwater in the northwestern portion of the site (groundwater discharge) and losing water in the central and southern portions (groundwater recharge).
- Based on the existing land use/cover conditions, the total pre-development infiltration volume is estimated to be 117,718 m^3/year. Over a site area of 36.96 ha, this equates to an average annual infiltration rate of 319 mm. This is consistent with the estimated infiltration rates provided in the Upper Thames River Source Protection Area Assessment Report (Thames-Sydenham and Region Source Protection Committee, 2015).
- Without mitigation, the post-development infiltration is expected to decrease to 56,127 mm/yr or -52%. The relatively high change in infiltration is due to the area of proposed medium and high density land-uses, relative to the existing conditions. Fortunately, the hydrogeological conditions at the site are conducive to the implementation of infiltration-based LID measures to help balance the pre-to-post development water budget.
- The site is located within a SGRA and HVA, as defined under Source Water Protection Policies. Based on vulnerability scorings between 4 and 6, no restrictions to land use are required under Source Water Protection policies, but pre-development infiltration should be maintained post-development to the extent practical and a Salt Management Plan should be developed.

- The proposed realignment of Mud Creek is expected to maintain the same groundwater recharge and discharge characteristics as the current alignment. The surficial geology of the proposed location is comprised of the same mixture of fine and coarse- textured glaciolacustrine, modern fluvial, glaciofluvial, and organic soils overlying the Tavistock till. In addition, as the channel realignment is situated along the same groundwater equipotential lines as the existing channel. It is recommended that the surface elevation of the new channel bed is regraded to approximately the same elevation as the existing channel.

Appendix C

Species Lists

Appendix B-1 :Potential Species at Risk and Species of Conservation Concern in the Study Area

Taxon	Common Name	Latin Name	s-rank	SARO List	SARA Sch 1
Plants	Butternut	*Juglans cinerea*	S2?	END	END
Plants	Kentucky Coffee-tree	*Gymnocladus dioicus*	S2	THR	THR
Plants	Drooping Trillium	*Trillium flexipes*	S1	END	END
Plants	False-rue anemone	*Enemion biternatum*	S2	THR	THR
Plants	Edible Valerian	*Valeriana edulis*	S1		
Plants	Green Dragon	*Arisaema dracontium*	S3	SC	SC
Plants	Eastern Stiff-leaved Goldenrod	*Solidago rigida ssp. rigida*	S3		
Plants	Hairy-fruited Sedge	*Carex trichocarpa*	S3		
Plants	Eastern Green-violet	*Hybanthus concolor*	S2		
Plants	Broad Beech Fern	*Phegopteris hexagonoptera*	S3	SC	SC
Plants	Chinese Hemlock-parsley	*Conioselinum chinense*	S2		
Invertebrates	Monarch	*Danaus plexippus*	S4B, S2N	SC	SC
Invertebrates	Rusty-patched Bumble Bee	*Bombus affinis*	S1	END	END
Fish	Silver Shiner	*Notropis photogenis*	S2S3	THR	THR
Fish	Lake Sturgeon (GL-Upper SLR pop'n)	*Acipenser fulvescens pop. 3*	S2	THR	THR
Reptiles	Snapping Turtle	*Chelydra serpentina*	S3	SC	SC
Reptiles	Spiny Softshell	*Apalone spinifera*	S2	END	END
Reptiles	Northern Map Turtle	*Graptemys geographica*	S3	SC	SC
Reptiles	Eastern Ribbonsnake	*Thamnophis sauritus*	S4	SC	SC
Reptiles	Milksnake	*Lampropeltis triangulum*	S4	NAR	SC
Birds	Barn Swallow	*Hirundo rustica*	S4B	THR	THR
Birds	Chimney Swift	*Chaetura pelagica*	S3B	THR	THR
Birds	Eastern Meadowlark	*Sturnella magna*	S4B, S3N	THR	THR
Birds	Eastern Wood-Pewee	*Contopus virens*	S4B	SC	SC
Birds	Wood Thrush	*Hylocichla mustelina*	S4B	SC	THR
Mammals	Eastern small-footed bat	*Myotis leibii*	S2S3	END	
Mammals	Little Brown Myotis	*Myotis lucifugus*	S3	END	END
Mammals	Northern Myotis	*Myotis septentrionalis*	S3	END	END
Mammals	Tricoloured Bat	*Perimyotis subflavus*	S3?	END	END
Mammals	American Badger (SWO pop'n)	*Taxidea taxus jacksoni*	S1	END	END

Floral Inventory (2014 09-25, 2020 08-21, 2020 08-21, 2021-05-18, 2021-06-02)																			
2	3	4	5	6	7	8	9	10	Scientific Name	Common Name	CW	GRank	COSEWIC	Nrank	SARO	SRank	MD	Type	
						X			*Abutilon theophrasti*	Velvetleaf		GNR		NNA		SE5	IC	FO	
						X		X	*Acalypha rhomboidea*	Common Three-seeded Mercury		G5		N5		S5	C	FO	
						X			*Acer campestre*	Hedge Maple	5.0	GNR		NNA		SE1		SH	
X	X	X	X	X	X	X	X	X	*Acer negundo*	Manitoba Maple	0.0	G5		N5		S5	C	TR	
X		X	X	X		X	X		*Acer nigrum*	Black Maple		G5		NNR		S4?	C	TR	
		X		X			X		*Acer platanoides*	Norway Maple	5.0	GNR		NNA		SE5	IU	TR	
				X		X	X		*Acer rubrum*	Red Maple		G5		N5		S5	C	TR	
X	X	X		X			X		*Acer saccharinum*	Silver Maple	-3.0	G5		N5		S5	C	TR	
X			X	X			X		*Acer saccharum*	Sugar Maple		G5		N5		S5	C	TR	
				X			X		*Acer tataricum ssp. ginnala*	Amur Maple	5.0	G--TNR		NNA		SE1		SH	
							X		*Acer x freemanii*	(Acer rubrum X Acer saccharinum)	0.0	GNA		NNA		SNA	hyb	TR	
X						X			*Achillea millefolium*	Common Yarrow	3.0	G5		N5		SE		FO	
						X			*Aegopodium podagraria*	Goutweed	0.0	GNR		NNA		SE5	IU	FO	
				X		X	X		*Agrimonia gryposepala*	Hooked Agrimony		G5		N5		S5	C	FO	
X		X	X			X		X	*Agrostis gigantea*	Redtop	-3.0	G4G5		NNA		SE5	IC	GR	
						X		X	*Agrostis stolonifera*	Creeping Bentgrass	-3.0	G5		N5		SE5	IC	GR	
				X					*Ailanthus altissima*	Tree-of-heaven	5.0	GNR		NNA		SE5	IR	TR	
X									*Alisma subcordatum*	Southern Water-plantain	-5.0	G5		N5		S4?	X	FO	
	X	X	X	X	X	X	X	X	*Alliaria petiolata*	Garlic Mustard	0.0	GNR		NNA		SE5	IC	FO	
X				X			X		*Allium vineale*	Wild Garlic	3.0	GNR		NNA		SE2	IR	FO	
						X			*Ambrosia trifida*	Great Ragweed	0.0	G5		N5		S5	C	FO	
		X				X	X		*Anemone virginiana*	Tall Anemone	3.0	G5		NNR		S5	C	FO	
		X		X		X	X		*Apocynum cannabinum*	Hemp Dogbane	0.0	G5		N5		S5		FO	
X		X		X	X	X	X	X	*Arctium minus*	Common Burdock		GNR		NNA		SE5	IC	FO	
X									*Artemisia vulgaris*	Common Wormwood	5.0	GU		NNA		SE5	IR	FO	
						X			*Asclepias incarnata*	Swamp Milkweed	-5.0	G5		N5		S5	C	FO	
X		X		X		X	X	X	*Asclepias syriaca*	Common Milkweed	5.0	G5		N5		S5	C	FO	
						X			*Asclepias tuberosa*	Butterfly Milkweed	5.0	G5		N4		S4	U	FO	
						X			*Asparagus officinalis*	Garden Asparagus	3.0	G5?		NNA		SE5	IC	FO	
		X				X			*Barbarea vulgaris*	Bitter Wintercress	0.0	GNR		NNA		SE5	IC	FO	
						X		X	*Berberis vulgaris*	European Barberry	3.0	GNR		NNA		SE5	IX	SH	
				X					*Betula alleghaniensis*	Yellow Birch	0.0	G5		N5		S5	X	TR	
				X			X		*Betula papyrifera*	Paper Birch		G5		N5		S5	X	TR	
X									*Bidens cernua*	Nodding Beggarticks	-5.0	G5		N5		S5	X	FO	
X	X				X	X		X	*Bidens frondosa*	Devil's Beggarticks	-3.0	G5		N5		S5	X	FO	
						X		X	*Bidens vulgata*	Tall Beggarticks		G5		N5		S5	X	FO	
X									*Bromus inermis*	Smooth Brome	5.0	G5		NNA		SE5	IC	GR	
						X			*Buddleja davidii*	Orange-eye Butterfly-bush		G4G5		NNA		SE1		SH	
								X	*Calla palustris*	Wild Calla	-5.0	G5		N5		S5		FO	
						X			*Cannabis sativa*	Marijuana		GNR		NNA		SE1	IR	FO	
		X							*Carduus crispus*	Curled Thistle	5.0	GNR		NNA		SE2?		FO	
								X	*Carex alopecoidea*	Foxtail Sedge	-3.0	G5		N5		S4	U	SE	
								X	*Carex aquatilis*	Water Sedge	-5.0	G5		N5		S5		SE	
		X							*Carex bebbii*	Bebb's Sedge	-5.0	G5		N5		S5	C	SE	
						X			*Carex lacustris*	Lake Sedge	-5.0	G5		N5		S5	C	SE	
								X	*Carex normalis*	Larger Straw Sedge	-3.0	G5		NNR		S4		SE	
				X			X		*Carex pensylvanica*	Pennsylvania Sedge	5.0	G5		N5		S5	C	SE	
		X							*Carex radiata*	Eastern Star Sedge	0.0	G5		N5		S5	C	SE	
						X			*Carex spicata*	Spiked Sedge		GNR		NNA		SE5	IC	SE	
X		X				X	X	X	*Carex vulpinoidea*	Fox Sedge	-5.0	G5		N5		S5	C	SE	
	X		X	X			X		*Carpinus caroliniana*	Blue-beech	0.0	G5		N5		S5	C	TR	
				X			X		*Carya cordiformis*	Bitternut Hickory	0.0	G5		N5		S5	X	TR	
				X					*Carya ovata*	Shagbark Hickory		G5		N5		S5	X	TR	
				X					*Catalpa bignonioides*	Southern Catalpa		G3G4		NNA		SE1		TR	
						X			*Celastrus orbiculatus*	Oriental Bittersweet	5.0	GNR		NNA		SE2	IR	VW	
		X	X	X	X	X	X	X	*Celtis occidentalis*	Common Hackberry		G5		N4		S4	X	TR	
				X			X		*Centaurea jacea*	Brown Knapweed	5.0	GNR		NNA		SE5	IX	FO	
						X			*Cercis canadensis*	Eastern Redbud	3.0	G5		NX		SX	IR	SH	
						X	X		*Chamaenerion angustifolium ssp. angustifolium*	Fireweed		G5T5		N5		S5?		FO	
				X			X		*Chelidonium majus*	Greater Celandine	5.0	GNR		NNA		SE5	IX	FO	
X									*Cichorium intybus*	Chicory		GNR		NNA		SE5	IC	FO	
		X	X	X			X	X	*Circaea canadensis*	Broad-leaved Enchanter's Nightshade		G5		N5		S5	X	FO	
						X			*Cirsium arvense*	Canada Thistle		G5		NNA		SE5	IC	FO	
	X	X		X	X			X	*Cirsium vulgare*	Bull Thistle	3.0	GNR		NNA		SE5	IX	FO	
						X	X		*Clinopodium vulgare*	Field Basil		G5		N5		S5	X	FO	
	X	X	X	X			X		*Convallaria majalis*	European Lily-of-the-valley		G5		NNA		SE5	IR	FO	

X		X						*Convolvulus arvensis*	Field Bindweed	5.0	GNR		NNA		SE5	IX	VI	
				X			X		*Cornus alternifolia*	Alternate-leaved Dogwood	3.0	G5		N5		S5	X	SH	
X	X	X	X	X	X	X	X	X	*Cornus obliqua*	Pale Dogwood	-3.0	G5		N5		S5	X	SH	
	X	X	X	X	X	X	X	X	*Cornus racemosa*	Gray Dogwood	0.0	G5		N5		S5	X	SH	
X		X		X		X	X	X	*Cornus sericea*	Red-osier Dogwood	-3.0	G5		N5		S5	C	SH	
						X			*Cotinus coggygria*	European Smoketree	5.0	GNR		NNA		SE1		SH	
		X	X	X		X	X		*Crataegus punctata*	Dotted Hawthorn	5.0	G5		N5		S5	C	SH	
X		X	X	X		X	X		*Dactylis glomerata*	Orchard Grass	3.0	GNR		NNA		SE5	IC	GR	
				X			X		*Danthonia spicata*	Poverty Oatgrass	5.0	G5		N5		S5	X	GR	
X		X		X			X	X	*Daucus carota*	Wild Carrot	5.0	GNR		NNA		SE5	IC	FO	
							X		*Deutzia scabra*	Fuzzy Deutzia	5.0	GNR		NNA		SE1		SH	
		X					X		*Dianthus armeria*	Deptford Pink	5.0	GNR		NNA		SE5	IX	FO	
X									*Digitaria sanguinalis*	Hairy Crabgrass	3.0	G5		NNA		SE5	IX	GR	
	X	X	X	X	X	X	X	X	*Dipsacus fullonum*	Common Teasel	3.0	GNR		NNA		SE5	IC	FO	
					X	X			*Echinochloa crus-galli*	Large Barnyard Grass	-3.0	GNR		NNA		SE5	IC	GR	
					X	X		X	*Echinocystis lobata*	Wild Mock-cucumber	-3.0	G5		N5		S5	X	VI	
	X	X				X			*Elaeagnus umbellata*	Autumn Olive	3.0	GNR		NNA		SE3	IR	SH	
		X				X			*Elymus repens*	Creeping Wildrye	3.0	GNR		NNA		SE5	IC	GR	
						X			*Elymus virginicus*	Virginia Wildrye	-3.0	G5		N5		S5		GR	
		X				X			*Epilobium ciliatum ssp. ciliatum*	Northern Willowherb	-3.0	G5T5		N5		S5	X	FO	
							X		*Epilobium hirsutum*	Hairy Willowherb	-3.0	GNR		NNA		SE5	IX	FO	
				X			X	X	*Epipactis helleborine*	Eastern Helleborine	3.0	GNR		NNA		SE5	IX	FO	
				X			X	X	*Equisetum arvense*	Field Horsetail	0.0	G5		N5		S5	C	FE	
X					X	X			*Eragrostis pectinacea*	Tufted Lovegrass	0.0	G5		N5		S5		GR	
				X		X	X	X	*Erigeron annuus*	Annual Fleabane	3.0	G5		N5		S5	C	FO	
X		X				X			*Erigeron canadensis*	Canada Horseweed	3.0	G5		N5		S5	C	FO	
		X	X	X			X	X	*Erigeron strigosus*	Rough Fleabane	3.0	G5		N5		S5	C	FO	
X	X			X			X	X	*Eupatorium perfoliatum*	Common Boneset	-3.0	G5		N5		S5	C	FO	
	X								*Euphorbia cyparissias*	Cypress Spurge	5.0	G5		NNA		SE5	IX	FO	
	X	X				X	X	X	*Euthamia graminifolia*	Grass-leaved Goldenrod	0.0	G5		N5		S5	C	FO	
X	X			X	X	X	X	X	*Eutrochium maculatum*	Spotted Joe Pye Weed	-5.0	G5		N5		S5		FO	
							X		*Fagus grandifolia*	American Beech	3.0	G5		N5		S4	C	TR	
		X		X			X	X	*Fragaria virginiana*	Wild Strawberry	3.0	G5		N5		S5		FO	
X	X	X	X	X	X	X	X	X	*Frangula alnus*	Glossy Buckthorn	0.0	GNR		NNA		SE5	IU	SH	
		X	X	X		X	X		*Fraxinus americana*	White Ash	3.0	G5		N5		S4	C	TR	
X	X	X	X	X		X	X	X	*Fraxinus pennsylvanica*	Green Ash	-3.0	G5		N5		S4	C	TR	
		X		X			X		*Galium aparine*	Cleavers	3.0	G5		N5		S5	X	FO	
						X			*Galium mollugo*	Smooth Bedstraw	5.0	GNR		NNA		SE5	IX	FO	
						X			*Galium palustre*	Marsh Bedstraw	-5.0	G5		NNR		S5	X	FO	
	X					X			*Galium trifidum*	Three-petalled Bedstraw	-3.0	G5		NNR		S5		FO	
X		X		X			X		*Geranium maculatum*	Spotted Geranium	3.0	G5		N5		S5	X	FO	
		X				X		X	*Geum aleppicum*	Yellow Avens	0.0	G5		N5		S5	X	FO	
		X		X		X	X	X	*Geum canadense*	White Avens	0.0	G5		N5		S5	X	FO	
						X			*Geum laciniatum*	Rough Avens	-3.0	G5		N5		S4	X	FO	
		X							*Geum urbanum*	Wood Avens	5.0	G5		NNA		SE3	IR	FO	
						X		X	*Glechoma hederacea*	Ground Ivy	3.0	GNR		NNA		SE5	IX	FO	
						X		X	*Glyceria grandis*	Tall Mannagrass	-5.0	G5		N5		S5	X	GR	
				X		X	X	X	*Glyceria striata*	Fowl Mannagrass	-5.0	G5		N5		S5	X	GR	
		X		X			X	X	*Hackelia virginiana*	Virginia Stickseed	3.0	G5		N5		S5	U	FO	
	X								*Hedera helix*	English Ivy	3.0	GNR		NNA		SE1		VW	
						X			*Hemerocallis fulva*	Orange Daylily	5.0	GNA		NNA		SE5	IX	FO	
						X			*Heracleum mantegazzianum*	Giant Hogweed	0.0	GNR		NNA		SE2		FO	
				X		X	X	X	*Heracleum maximum*	Cow-parsnip	-3.0	G5		N5		S5	X	FO	
		X	X			X		X	*Hesperis matronalis*	Dame's Rocket	3.0	G4G5		NNA		SE5	IX	FO	
		X	X	X		X	X		*Hydrophyllum virginianum*	Virginia Waterleaf	0.0	G5		N5		S5	C	FO	
		X					X		*Hypericum perforatum*	Common St. John's-wort	5.0	GNR		NNA		SE5	IC	FO	
X		X		X	X	X	X	X	*Impatiens capensis*	Spotted Jewelweed	-3.0	G5		N5		S5	C	FO	
	X	X		X	X	X	X	X	*Juglans nigra*	Black Walnut	3.0	G5		N4		S4?	X	TR	
		X		X			X	X	*Juncus dudleyi*	Dudley's Rush	-3.0	G5		N5		S5	C	RU	
X					X				*Juncus effusus*	Soft Rush	-5.0	G5		N5		S5		RU	
		X				X			*Juncus torreyi*	Torrey's Rush	-3.0	G5		N5		S5	U	RU	
	X			X		X	X		*Juniperus virginiana*	Eastern Red Cedar	3.0	G5		N5		S5	X	TR	
				X		X	X		*Lapsana communis*	Common Nipplewort	3.0	GNR		NNA		SE5	IR	FO	
						X			*Lathyrus latifolius*	Everlasting Pea	5.0	GNR		NNA		SE4	IX	VI	
X	X							X	*Leersia oryzoides*	Rice Cutgrass	-5.0	G5		N5		S5	X	GR	
		X		X			X		*Leersia virginica*	Virginia Cutgrass	-3.0	G5		N4N5		S4	X	GR	
		X	X	X		X	X	X	*Leonurus cardiaca*	Common Motherwort	5.0	GNR		NNA		SE5	IC	FO	

		X						*Leucanthemum vulgare*	Oxeye Daisy	5.0	GNR		NNA		SE5	IC	FO	
	X	X	X	X			X	X	*Ligustrum vulgare*	European Privet	3.0	GNR		NNA		SE5	IX	SH	
		X	X			X			*Linaria vulgaris*	Butter-and-eggs	5.0	GNR		NNA		SE5	IC	FO	
					X	X			*Lobelia siphilitica*	Great Blue Lobelia	-3.0	G5		NNR		S5	X	FO	
				X					*Lolium arundinaceum*	Tall Fescue	3.0	GNR		NNA		SE5	IC	GR	
						X			*Lolium perenne*	Perennial Ryegrass	3.0	GNR		NNA		SE4	IX	GR	
	X		X	X	X	X	X		*Lonicera maackii*	Amur Honeysuckle	5.0	GNR		NNA		SE2	IR	SH	
				X		X	X		*Lonicera morrowii*	Morrow's Honeysuckle	3.0	GNR		NNA		SE3	IR	SH	
	X	X	X	X		X	X		*Lonicera tatarica*	Tartarian Honeysuckle	3.0	GNR		NNA		SE5	IX	SH	
				X			X		*Lotus corniculatus*	Garden Bird's-foot Trefoil	3.0	GNR		NNA		SE5	IX	FO	
								X	*Lycopus uniflorus*	Northern Water-horehound	-5.0	G5		N5		S5	C	FO	
						X			*Lysimachia ciliata*	Fringed Loosestrife	-3.0	G5		N5		S5	X	FO	
						X			*Lysimachia nummularia*	Creeping Jennie	-3.0	GNR		NNA		SE5	IX	FO	
X	X				X		X	X	*Lythrum salicaria*	Purple Loosestrife	-5.0	G5		NNA		SE5	IC	FO	
		X	X						*Maianthemum racemosum*	Large False Solomon's Seal	3.0	G5		N5		S5	X	FO	
	X					X			*Malus baccata*	Siberian Crabapple	5.0	GNR		NNA		SE1		SH	
			X	X			X		*Malus pumila*	Common Apple	5.0	G5		NNA		SE4	IX	SH	
		X						X	*Malva neglecta*	Dwarf Cheeseweed	5.0	GNR		NNA		SE5	IX	FO	
						X			*Medicago lupulina*	Black Medic	3.0	GNR		NNA		SE5	IC	FO	
		X							*Melilotus albus*	White Sweet-clover	3.0	G5		NNA		SE5	IC	FO	
						X			*Miscanthus sinensis*	Chinese Silver Grass	5.0	GNR		NNA		SE1		GR	
	X	X	X			X	X		*Monarda fistulosa*	Wild Bergamot	3.0	G5		N5		S5		FO	
		X		X	X	X	X	X	*Morus alba*	White Mulberry	0.0	GNR		NNA		SE5	IX	TR	
				X			X		*Muhlenbergia frondosa*	Wirestem Muhly	-3.0	G5		NNR		S4	X	GR	
X	X			X	X	X	X	X	*Nasturtium officinale*	Watercress	-5.0	GNR		NNA		SE	IX	FO	
		X		X	X	X			*Nepeta cataria*	Catnip	3.0	GNR		NNA		SE5	IC	FO	
						X		X	*Oenothera biennis*	Common Evening Primrose	3.0	G5		N5		S5	X	FO	
	X					X		X	*Onoclea sensibilis*	Sensitive Fern	-3.0	G5		N5		S5	X	FE	
	X			X		X	X	X	*Ostrya virginiana*	Eastern Hop-hornbeam	3.0	G5		N5		S5	C	TR	
		X						X	*Oxalis stricta*	Upright Yellow Wood-sorrel	3.0	G5		N5		S5	X	FO	
						X			*Panicum capillare*	Common Panicgrass	0.0	G5		N5		S5	X	GR	
						X			*Panicum dichotomiflorum*	Fall Panicgrass	-3.0	G5		N5		SE5	IC	GR	
		X							*Parthenocissus quinquefolia*	Virginia Creeper	3.0	G5		N4N5		S4?	X	VW	
		X	X	X		X	X		*Parthenocissus vitacea*	Thicket Creeper	3.0	G5		N5		S5	X	VW	
						X			*Persicaria hydropiper*	Marshpepper Smartweed	-5.0	GNR		NNR		SE5	IX	FO	
X					X	X		X	*Persicaria hydropiperoides*	False Waterpepper	-5.0	G5		N5		S5	X	FO	
		X				X			*Persicaria lapathifolia*	Pale Smartweed	-3.0	G5		N5		S5	X	FO	
		X							*Persicaria virginiana*	Virginia Smartweed	0.0	G5		N4		S4	X	FO	
X	X	X	X	X	X	X	X	X	*Phalaris arundinacea*	Reed Canary Grass	-3.0	G5		N5		S5	X	GR	
	X	X				X			*Phleum pratense*	Common Timothy	3.0	GNR		NNA		SE5	IC	GR	
X	X			X		X	X	X	*Phragmites australis*	Common Reed	-3.0	G5		N5		S4?		GR	
				X			X		*Physalis heterophylla*	Clammy Ground-cherry	5.0	G5		N4		S4	X	FO	
				X					*Physocarpus opulifolius*	Eastern Ninebark	-3.0	G5		N5		S5	X	SH	
			X	X			X	X	*Phytolacca americana*	Common Pokeweed	3.0	G5		N4		S4	X	FO	
				X			X		*Picea abies*	Norway Spruce	5.0	G5		NNA		SE3	IX	TR	
				X		X	X		*Picea glauca*	White Spruce	3.0	G5		N5		S5	IR	TR	
X	X					X		X	*Pilea pumila*	Dwarf Clearweed	-3.0	G5		N5		S5	X	FO	
						X			*Pinus sylvestris*	Scots Pine	3.0	GNR		NNA		SE5	IR	TR	
		X		X		X	X		*Plantago lanceolata*	English Plantain	3.0	G5		NNA		SE5	IC	FO	
		X				X			*Plantago major*	Common Plantain	3.0	G5		NNA		SE5	IC	FO	
		X							*Poa pratensis*	Kentucky Bluegrass	3.0	G5		N5		S5		GR	
				X			X		*Podophyllum peltatum*	May-apple	3.0	G5		N5		S5	X	FO	
		X		X			X		*Populus balsamifera*	Balsam Poplar	-3.0	G5		N5		S5	X	TR	
X	X	X	X	X	X	X	X	X	*Populus deltoides*	Eastern Cottonwood	0.0	G5		N5		S5		TR	
				X			X		*Populus grandidentata*	Large-toothed Aspen	3.0	G5		NNR		S5	X	TR	
	X	X	X	X		X	X	X	*Populus tremuloides*	Trembling Aspen	0.0	G5		N5		S5	X	TR	
		X							*Potentilla norvegica*	Norwegian Cinquefoil	0.0	G5		N5		S5	X	FO	
		X							*Potentilla recta*	Sulphur Cinquefoil	5.0	GNR		NNA		SE5	IX	FO	
				X					*Potentilla simplex*	Old-field Cinquefoil	3.0	G5		N5		S5	X	FO	
							X		*Prunella vulgaris*	Self-heal	0.0	G5		N5		S5		FO	
			X						*Prunella vulgaris ssp. lanceolata*	Lance-leaved Self-heal	0.0	G5T5		N5		S5	C	FO	
				X			X		*Prunus avium*	Sweet Cherry	5.0	GNR		NNA		SE4	IR	TR	
	X	X		X		X	X	X	*Prunus serotina*	Black Cherry	3.0	G5		N5		S5	C	TR	
	X		X	X	X	X	X		*Prunus virginiana*	Choke Cherry	3.0	G5		NNR		S5	C	TR	
					X		X		*Pyrus communis*	Common Pear	5.0	G5		NNA		SE4	IX	SH	
		X		X			X		*Quercus alba*	White Oak	3.0	G5		N5		S5	C	TR	
		X	X	X			X		*Quercus bicolor*	Swamp White Oak	-3.0	G5		N4		S4	X	TR	

		X				X	X	X	*Quercus macrocarpa*	Bur Oak		G5		N5		S5	C	TR	
	X	X		X		X	X		*Quercus rubra*	Northern Red Oak		G5		N5		S5	C	TR	
						X			*Ranunculus caricetorum*	Northern Swamp Buttercup	-5.0	G5		NNR		S5	C	FO	
		X					X		*Reynoutria japonica*	Japanese Knotweed	3.0	GNR		NNA		SE5	IU	FO	
	X	X	X	X	X	X	X	X	*Rhamnus cathartica*	Common Buckthorn	0.0	GNR		NNA		SE5	IC	SH	
X		X		X		X	X	X	*Rhus typhina*	Staghorn Sumac	3.0	G5		N5		S5	C	SH	
						X	X	X	*Rhus x borealis*	(Rhus glabra X Rhus typhina)	5.0	GNA		NNA		SNA	hyb	SH	
				X		X	X	X	*Ribes rubrum*	Northern Red Currant	5.0	G4G5		NNA		SE5	IR	SH	
		X		X		X	X		*Robinia pseudoacacia*	Black Locust	3.0	G5		NNA		SE5	IC	TR	
						X			*Rosa carolina*	Carolina Rose	3.0	G5		N4N5		S4		SH	
	X								*Rosa gallica*	French Rose	5.0	GNR		NNA		SE1		SH	
		X		X	X	X	X		*Rosa multiflora*	Multiflora Rose	3.0	GNR		NNA		SE5	IX	SH	
						X			*Rosa rubiginosa*	Briar Rose	3.0	GNR		NNA		SE4		SH	
				X					*Rubus allegheniensis*	Allegheny Blackberry	3.0	G5		N5		S5	C	SH	
				X	X	X	X	X	*Rubus idaeus*	Common Red Raspberry	3.0	G5		N5		S5		SH	
				X					*Rubus laciniatus*	Cut-leaved Blackberry	5.0	GUQ		NNA		SE1		SH	
X	X	X	X	X		X	X	X	*Rubus occidentalis*	Black Raspberry	5.0	G5		N5		S5	C	SH	
	X		X			X			*Rudbeckia hirta*	Black-eyed Susan	3.0	G5		N5		S5	C	FO	
X	X			X		X	X		*Rumex britannica*	Water Dock	-5.0	G5		N5		S5	X	FO	
X		X		X		X			*Rumex crispus*	Curly Dock	0.0	GNR		NNA		SE5	IC	FO	
		X				X		X	*Rumex obtusifolius*	Bitter Dock	-3.0	GNR		NNA		SE5	IX	FO	
					X	X	X		*Sagittaria latifolia*	Broad-leaved Arrowhead	-5.0	G5		N5		S5	C	FO	
X				X			X	X	*Salix alba*	White Willow	-3.0	G5		NNA		SE4	IX	TR	
	X	X	X	X	X	X	X	X	*Salix amygdaloides*	Peach-leaved Willow	-3.0	G5		N5		S5	X	TR	
X								X	*Salix bebbiana*	Bebb's Willow	-3.0	G5		N5		S5	X	SH	
X	X		X	X		X	X		*Salix discolor*	Pussy Willow	-3.0	G5		N5		S5	X	SH	
X			X	X	X	X	X		*Salix eriocephala*	Heart-leaved Willow	-3.0	G5		N5		S5	X	SH	
			X			X			*Salix interior*	Sandbar Willow	-3.0	GNR		NNR		S5	C	SH	
						X			*Salix matsudana*	Corkscrew Willow	0.0	GNR		NNA		SE1		TR	
				X		X	X		*Salix petiolaris*	Meadow Willow	-3.0	G5		N5		S5	X	SH	
X	X			X			X		*Salix x fragilis*	(Salix alba X Salix euxina)	0.0	GNA		NNA		SNA	hyb	TR	
				X		X	X	X	*Salix x sepulcralis*	(Salix alba X Salix babylonica)	-3.0	GNA		NNA		SNA	hyb	TR	
X		X		X	X	X	X	X	*Sambucus canadensis*	Common Elderberry	-3.0	G5		NNR		S5	X	SH	
		X							*Sambucus racemosa*	Red Elderberry	3.0	G5		N5		S5	X	SH	
		X							*Sanguinaria canadensis*	Bloodroot	3.0	G5		N5		S5	X	FO	
X									*Saponaria officinalis*	Bouncing-bet	3.0	GNR		NNA		SE5	IX	FO	
					X	X			*Schoenoplectus tabernaemontani*	Soft-stemmed Bulrush	-5.0	G5		N5		S5	C	SE	
						X			*Scirpus atrocinctus*	Black-girdled Bulrush	-5.0	G5		N5		S5		SE	
		X			X	X		X	*Scirpus atrovirens*	Dark-green Bulrush	-5.0	G5		N5		S5	C	SE	
X									*Securigera varia*	Common Crown-vetch	5.0	GNR		NNA		SE5	IX	FO	
						X			*Setaria faberi*	Giant Foxtail	3.0	GNR		NNA		SE4	IC	GR	
X			X	X	X	X	X		*Setaria pumila*	Yellow Foxtail	0.0	GNR		NNA		SE5	IX	GR	
			X			X			*Setaria viridis*	Green Foxtail	5.0	GNR		NNA		SE5	IX	GR	
X				X			X		*Silene vulgaris*	Bladder Campion	5.0	GNR		NNA		SE5	IX	FO	
X	X	X		X		X	X	X	*Solanum dulcamara*	Bittersweet Nightshade	0.0	GNR		NNA		SE5	IC	VW	
						X			*Solanum lycopersicum*	Garden Tomato	5.0	GNR		NNA		SE2		FO	
X	X	X	X	X	X	X	X	X	*Solidago altissima*	Tall Goldenrod	3.0	G5		N5		S5		FO	
							X		*Solidago caesia*	Blue-stemmed Goldenrod	3.0	G5		N5		S5	X	FO	
	X	X	X	X	X	X	X	X	*Solidago canadensis*	Canada Goldenrod	3.0	G5		N5		S5		FO	
		X		X		X	X		*Solidago gigantea*	Giant Goldenrod	-3.0	G5		N5		S5	X	FO	
						X	X		*Solidago rigida*	Stiff-leaved Goldenrod	3.0	G5		N5		S3		FO	
						X			*Sonchus asper*	Prickly Sow-thistle	3.0	GNR		NNA		SE5	IX	FO	
		X							*Sonchus oleraceus*	Common Sow-thistle	3.0	GNR		NNA		SE5	IX	FO	
							X		*Sorbus americana*	American Mountain-ash	0.0	G5		N5		S5		SH	
				X			X		*Sorbus aucuparia*	European Mountain-ash	5.0	G5		NNA		SE4	IX	SH	
X					X	X			*Spiraea alba*	White Meadowsweet	-3.0	G5		N5		S5	X	SH	
								X	*Stellaria media*	Common Chickweed	3.0	GNR		NNA		SE5	IC	FO	
							X		*Symphyotrichum cordifolium*	Heart-leaved Aster	5.0	G5		N5		S5	C	FO	
						X	X		*Symphyotrichum ericoides*	White Heath Aster	3.0	G5		N5		S5		FO	
X	X								*Symphyotrichum ericoides var. ericoides*	White Heath Aster	3.0	G5T5		N5		S5	C	FO	
					X	X	X	X	*Symphyotrichum lanceolatum*	Panicled Aster	-3.0	G5		N5		S5	C	FO	
X	X	X		X			X		*Symphyotrichum lanceolatum ssp. lanceolatum*	Panicled Aster	-3.0	G5T5		N5		S5		FO	
				X					*Symphyotrichum lanceolatum var. lanceolatum*	White Panicled Aster	-3.0	G5T5		N5		S5		FO	
				X		X	X		*Symphyotrichum lateriflorum*	Calico Aster	0.0	G5		N5		S5	C	FO	
	X			X		X	X	X	*Symphyotrichum novae-angliae*	New England Aster	-3.0	G5		N5		S5	C	FO	
						X			*Symphyotrichum pilosum var. pilosum*	Old Field Aster		G5T5		N5		S5	U	FO	

						X		X	*Symphyotrichum puniceum*	Swamp Aster	-5.0	G5		N5		S5	X	FO	
	X	X	X	X		X	X	X	*Symphyotrichum urophyllum*	Arrow-leaved Aster	5.0	G4G5		N4		S4	X	FO	
		X		X		X	X	X	*Symplocarpus foetidus*	Skunk Cabbage	-5.0	G5		N5		S5	C	FO	
						X			*Syringa reticulata*	Japanese Tree Lilac	0.0	GNR		NNA		SE1		SH	
						X			*Syringa vulgaris*	Common Lilac	5.0	GNR		NNA		SE5	IX	SH	Y
X	X	X		X	X	X	X		*Tanacetum vulgare*	Common Tansy	5.0	GNR		NNA		SE5	IX	FO	
		X	X						*Thuja occidentalis*	Eastern White Cedar	-3.0	G5		N5		S5	X	TR	
	X	X	X	X			X	X	*Tilia americana*	American Basswood	3.0	G5		N5		S5	C	TR	
						X	X		*Toxicodendron radicans*	Poison Ivy	0.0	G5		N5		S5		VW	
				X			X		*Toxicodendron radicans var. radicans*	Eastern Poison Ivy	0.0	G5T5		N4		S5	C	VW	
X						X			*Trifolium pratense*	Red Clover	3.0	GNR		NNA		SE5	IX	FO	
						X			*Triosteum aurantiacum*	Orange-fruited Horse-gentian	5.0	G5		N5		S4S5	X	FO	
X	X				X	X			*Typha angustifolia*	Narrow-leaved Cattail	-5.0	G5		N5		SE5	IX	FO	Y
				X	X		X		*Typha latifolia*	Broad-leaved Cattail	-5.0	G5		N5		S5	X	FO	
			X	X	X	X	X		*Ulmus americana*	American Elm	-3.0	G5		N5		S5	C	TR	
				X		X	X		*Ulmus pumila*	Siberian Elm	3.0	GNR		NNA		SE3	IR	TR	Y
								X	*Urtica dioica*	Stinging Nettle	0.0	G5		N5		S5		FO	
			X	X	X	X	X	X	*Urtica dioica ssp. dioica*	European Stinging Nettle	0.0	G5T5?		NNA		SE2	IR	FO	
X			X	X	X	X	X	X	*Verbascum thapsus*	Common Mullein	5.0	GNR		NNA		SE5	IC	FO	
X				X		X	X	X	*Verbena hastata*	Blue Vervain	-3.0	G5		NNR		S5	C	FO	
X		X	X	X	X	X	X	X	*Verbena urticifolia*	White Vervain	0.0	G5		N5		S5	X	FO	
				X		X	X	X	*Veronica americana*	American Speedwell	-5.0	G5		N5		S5	X	FO	
	X					X		X	*Viburnum lentago*	Nannyberry	0.0	G5		N5		S5	C	SH	
	X	X		X		X	X	X	*Viburnum opulus ssp. trilobum*	Highbush Cranberry	-3.0	GNR		NNR		S5	X	SH	
				X		X	X		*Vinca minor*	Periwinkle	5.0	GNR		NNA		SE5	IR	VW	Y
				X		X	X		*Viola sororia*	Woolly Blue Violet	0.0	G5		N5		S5	X	FO	
X	X	X	X	X		X	X	X	*Vitis riparia*	Riverbank Grape	0.0	G5		N5		S5	C	VW	
X	X								*Bidens sp.*	Beggarticks sp.									
X	X		X	X		X	X	X	*Carex sp.*	Sedge sp.									
		X		X			X		*Cirsium sp.*	Thistle sp.									
X				X		X	X		*Crataegus sp.*	Hawthorn sp.									
X	X			X		X	X	X	*Epilobium sp.*	Willowherb sp.									
	X	X	X	X		X	X		*Geum sp.*	Avens sp.									
X	X					X		X	*Grass sp.*	Grass sp.									
							X		*Hypericum sp.*	St. John's Wort sp.									
X	X								*Iris sp.*	Iris sp.									
X	X								*Juncus sp.*	Rush sp.									
				X					*Maianthemum sp.*	Lily-of-the-Valley sp.									
									Mentha sp.	Mint sp.									
X	X					X			*Ranunculus sp.*	Buttercup sp.									
X	X		X	X		X	X		*Ribes sp.*	Currant sp.									
									Rosa sp.	Rose sp.									
						X	X	X	*Salix sp.*	Willow sp.									
						X			*Setaria sp.*	Foxtail sp.									

AVIFAUNAL SURVEY INFORMATION SUMMARY SHEET

Project: ESAM - Mud Creek
Collector(s): W. Huys and Erin Boynton

	Date	Start	Finish	Weather
Visit 1	15-Jun-18	6:30 a.m.	9:13 a.m.	11˚C sunny, clear
Visit 2	29-Jun-18	6:30 a.m.	8:55 a.m.	20˚C clear, still, humid

Species Code	Species Name	Visit 1		Visit 2		S Rank	ESA Statu	PIF Status	Community	Notes	
		Evidence Code	No.	Evidence Code	No.						
MALL	Mallard	VO	1			S5			8		16
WITU	Wild Turkey	OB	2			S5	-		7		43
KILL	Killdeer	T, OB	2			S5			3, 8		76
AMWO	American Woodcock			T	1	S4	-		10		85
DOWO	Downy Woodpecker			FY, T, NE	5	S5			6, 7, 8		108
NOFL	Northern Flicker			VO, FY	3	S4		RC	8, 10		110
EAWP	Eastern Wood-Pewee	VO, OB	2			S4	-	RC	10		112
EAKI	Eastern Kingbird	OB	1			S4		RC	7		119
WAVI	Warbling Vireo			SM	3	S5			4, 5, 6, 7, 8		123
BLJA	Blue Jay			VO	2	S5			8, 9		125
AMCR	American Crow	OB	1			S5			8		126
BARS	Barn Swallow	P, VO	3			S4	THR		4, 8		133
BCCH	Black-capped Chickadee	VO	2	FY	3	S5	-		4, 5		134
RBNU	Red-breasted Nuthatch			VO	1	S5	-		6, 7		136
WBNU	White-breasted Nuthatch			VO	1	S5	-		8		137
CARW	Carolina Wren			SM	1	S4	-		8		139
HOWR	House Wren			SM	2	S5			6, 7, 9		140
AMRO	American Robin	VO, FE, OB	7	FY, OB	11	S5			2, 4, 6, 7, 8		152
GRCA	Gray Catbird	VO, OB	15	SM, OB	7	S4			2, 4, 6, 7, 8, 9, 10		153
EUST	European Starling	OB, P	8			SNA			2, 8		156
CEDW	Cedar Waxwing			P	4	S5			10		157
YWAR	Yellow Warbler	VO, OB	16	SM, VO	7	S5			2, 3, 4, 5, 6, 7, 8, 10		163
AMRE	American Redstart	P	2	SM	5	S5			4, 5, 8, 10		179
MOWA	Mourning Warbler	OB	1			S4	-		4		184
COYE	Common Yellowthroat	OB, VO	4	P, T	2	S5	-		4, 7, 10		185
CHSP	Chipping Sparrow	VO	2			S5			4, 8		192
SOSP	Song Sparrow	VO, OB	9	SM, OB, P	8	S5			2, 3, 4, 5, 6, 7, 8, 9, 10		198
NOCA	Northern Cardinal	VO, OB, P	11	P, OB	12	S5			2, 3, 4, 5, 6, 7, 8, 9, 10		203
INBU	Indigo Bunting			SM, T	3	S4			4, 5, 10		205
RWBL	Red-winged Blackbird	VO, OB	5	FY, OB	10	S4			2, 6, 8, 10		207
COGR	Common Grackle	OB, VO	2	FY	3	S5			8, 10		210
BHCO	Brown-headed Cowbird	OB, VO	5	OB, SM, P	10	S4			6, 7, 8, 9, 10		211

GENERAL SITE INFORMATION FIELD SHEET

Project: ESAM Mud Creek 45591-100
Date: June 4, 2021 Project Manager: MC
Collector(s): MC, AL Visit #:
Time started: 7:35AM Time finished: 7:50AM Combined collectors' hours:
☐ NHIC List ☐ MNR EO's ☐ none ☐ not provided to collector

WEATHER CONDITIONS				
Temp.	Wind: 0-1 (6KM/h)		Cloud Cover (%)	Precipitation
16°C	Direction: S		90%	Today: Overnight Yesterday: Yes - Rain

WIND SCALE	
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper
5	Small trees sway
6	Large branches sway
7	Lots of resistance when walking into
8	Limbs breaking off trees

DATA FOCUS

☒	Birds 1__ 2__ Mig__	☐	ELC's	☐	Dripline/Tree Survey
☐	Mammals	☐	Floral V__ S__ A_	☐	Aquatic - Physical
☐	Amphibians 1_ 2_ 3_	☐	Wetland	☐	Aquatic - Biological
☐	Reptiles	☐	Butternut (BHA)	☐	Faunal Habitat
☐	Inverterbrates	☐	other SAR	☐	Other - see notes

FEATURES (with GPS co-ordinates where applicable)	Mapped	Follow-up Req'd		
	UTM	Yes	No	Who
Man-made Structures: ☐ None observed				
Yes No				
☐ ☐ Barns/Footings/Wells/other(list)				
☐ ☐ Rock Piles				
☐ ☐ Garbage				
Natural Vegetation: ☐ None observed				
☐ ☐ Fallen Logs outside woods (#'s)				
☐ ☐ Brush Piles				
☐ ☐ Snags (raptor perch)				
☐ ☐ Tree Cavities (nesting)				
☐ ☐ Sentinel Trees				
☐ ☐ Butternut Identified				
☐ ☐ Mast Trees (6E) ☐ Berry Shrubs (6E)				
Wildlife Features: ☐ None observed				
☐ ☐ Waterfowl nesting (large #'s, # of species)				
☐ ☐ Exposed Banks (nesting swallows)				
☐ ☐ Stick Nests				
☐ ☐ Animal Burrows (>10cm)				
☐ ☐ Heronry				
☐ ☐ Crayfish mounds				
☐ ☐ Sand/gravel on site				
☐ ☐ Marsh/open country/shrub				
☐ ☐ Winter Deer yards				
☐ ☐ Corridor from pond to woods (ampibian movement)				
☐ ☐ Bat corridor (shorelines, escarpments)				
☐ ☐ Bat hibernacula (caves, mines, crevices, etc.)				
Aquatic Features:				
☐ ☐ Perm. pond in woodland ☐ emergents/submergents/logs ☐ temp.				
☐ ☐ Perm. pond in open ☐ emergents/submergents/logs ☐ temp.				
☐ ☐ Water in woodland ☐ pools ☐ flowing ☐ dry				
☐ ☐ Waterways flowing dry pools				
☐ natural stream ☐ ☐ ☐				
☐ swale ☐ ☐ ☐ ☐ None observed				
☐ open drain ☐ ☐ ☐				
☐ Seeps/Springs ☐ ☐ ☐				
Incidental Observations/Notes:				
POBO + EAME Survey #1				
↳ None observed				

Graphic ☐ Attached or Name E:\ENV\Biological Services\Templates\MTE NEnv_General Field Sheet Checked by Project Manager ☐ Date:

4559-100

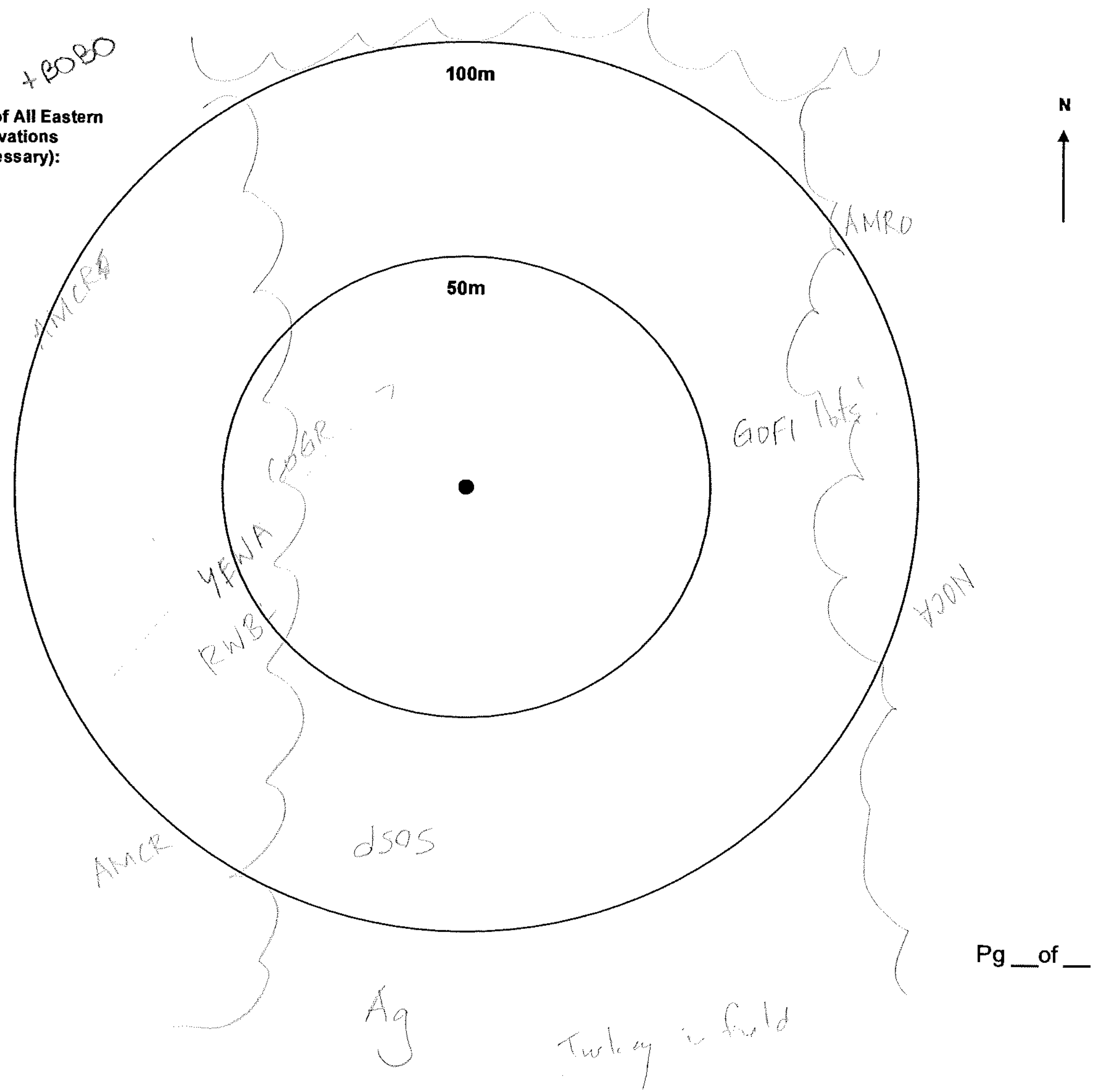
Eastern Meadowlark Point Count & Transect Data Sheet		Site Name: Mud Creek ESAM	Survey #: 1
Start Time: 7:35 AM	End Time: 7:50 AM	Date: June 4, 2021	
UTM Coordinates: 476330 4759883		Observers: MC AL	
Weather Cloudy			
Temperature (°C): 16°C	Wind Speed (Beaufort wind scale): 0-1	Comments:	
Cloud Cover (%): 90%			
Precipitation: No (rain overnight)			

Trans. #	Pt. Count #	Habitat Description (field, hedgerow, etc.)	Species	Time of obs.	# of Ind.	Sex (M/F/U)	Behaviour (breeding evidence codes)	Direction from obs.	Distance from obs.	Comments
	1	Open field								

Pg __of __

Point Count #: +BOBO

Sketch Locations of All Eastern Meadowlark Observations (Attach map if necessary):



Pg __of __

GENERAL SITE INFORMATION FIELD SHEET

Project: ESAM Mud Creek
Date: June 16 2021 Project Manager: MC
Collector(s): MC AL Visit #:
Time started: 7:00AM Time finished: 7:20PM Combined collectors' hours:
☐ NHIC List ☐ MNR EO's ☐ none ☐ not provided to collector

WEATHER CONDITIONS				
Temp.	Wind: 2		Cloud Cover (%)	Precipitation
7°C	Direction: N		5%	Today: No Yesterday: No?

WIND SCALE	
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper
5	Small trees sway
6	Large branches sway
7	Lots of resistance when walking into
8	Limbs breaking off trees

DATA FOCUS

☒	Birds 1__ 2__ Mig__	☐	ELC's	☐	Dripline/Tree Survey
☐	Mammals	☐	Floral V__ S__ A_	☐	Aquatic - Physical
☐	Amphibians 1_ 2_ 3_	☐	Wetland	☐	Aquatic - Biological
☐	Reptiles	☐	Butternut (BHA)	☐	Faunal Habitat
☐	Inverterbrates	☐	other SAR	☐	Other - see notes

FEATURES (with GPS co-ordinates where applicable)	Mapped	Follow-up Req'd		
	UTM	Yes	No	Who
Man-made Structures: ☐ None observed				
☐ ☒ Barns/Footings/Wells/other(list)				
☐ ☒ Rock Piles				
☐ ☒ Garbage				
Natural Vegetation: ☐ None observed				
☐ ☒ Fallen Logs outside woods (#'s)				
☐ ☒ Brush Piles				
☐ ☐ Snags (raptor perch)				
☐ ☐ Tree Cavities (nesting)				
☐ ☒ Sentinel Trees				
☐ ☒ Butternut Identified				
☐ ☒ Mast Trees (6E) ☐ Berry Shrubs (6E)				
Wildlife Features: ☐ None observed				
☐ ☒ Waterfowl nesting (large #'s, # of species)				
☐ ☐ Exposed Banks (nesting swallows)				
☐ ☐ Stick Nests				
☐ ☐ Animal Burrows (>10cm)				
☐ ☐ Heronry				
☐ ☐ Crayfish mounds				
☐ ☐ Sand/gravel on site				
☐ ☐ Marsh/open country/shrub				
☐ ☐ Winter Deer yards				
☐ ☐ Corridor from pond to woods (ampibian movement)				
☐ ☐ Bat corridor (shorelines, escarpments)				
☐ ☐ Bat hibernacula (caves, mines, crevices, etc.)				
Aquatic Features:				
☐ ☐ Perm. pond in woodland ☐ emergents/submergents/logs ☐ temp.				
☐ ☐ Perm. pond in open ☐ emergents/submergents/logs ☐ temp.				
☐ ☐ Water in woodland ☐ pools ☐ flowing ☐ dry				
☐ ☐ Waterways flowing dry pools				
☐ natural stream ☐ ☐ ☐				
☐ swale ☐ ☐ ☐ ☐ None observed				
☐ open drain ☐ ☐ ☐				
☐ Seeps/Springs ☐ ☐ ☐				

Incidental Observations/Notes:

Grassland Birds

No BOBO or EAME

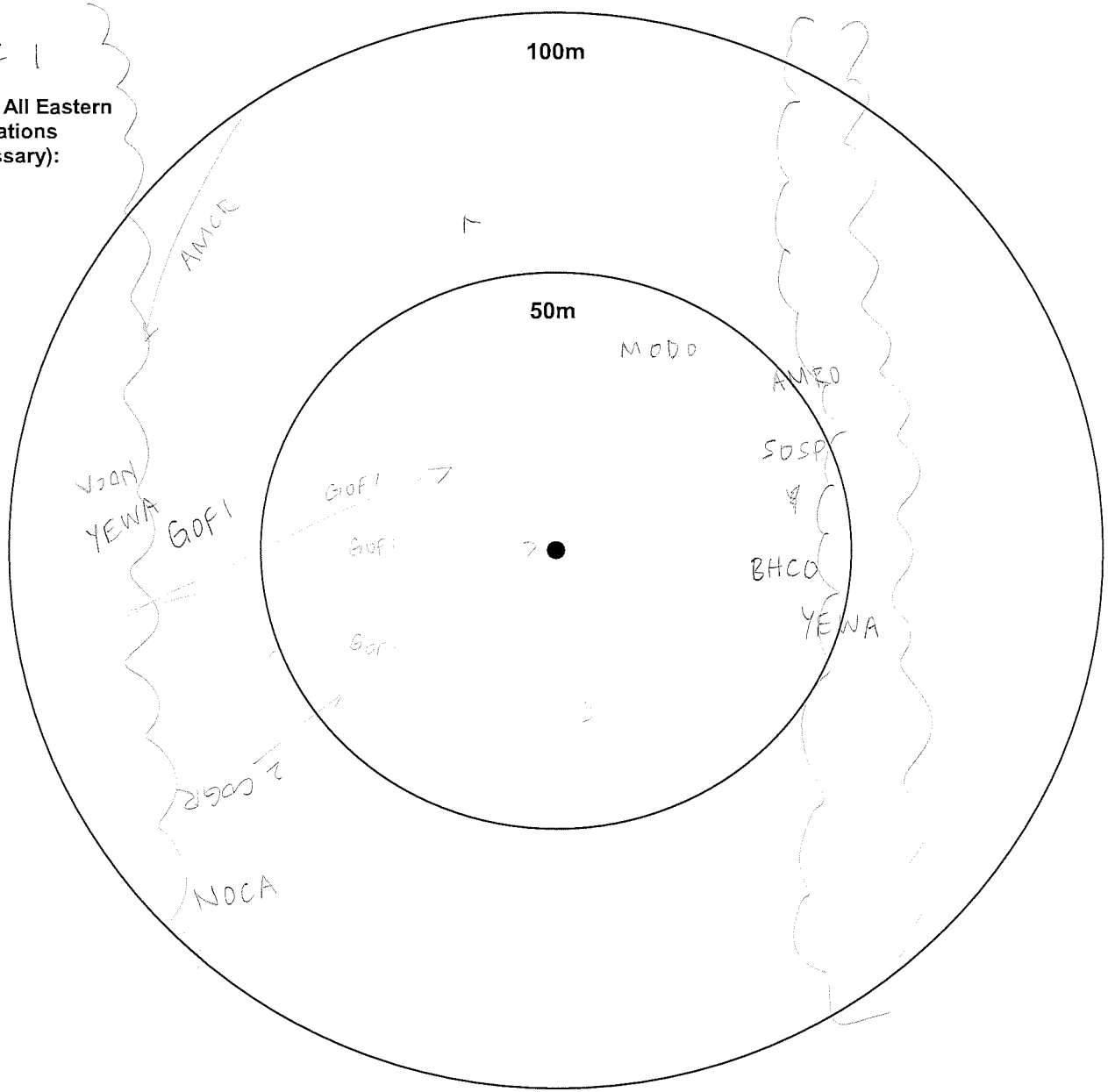
Graphic ☐ Attached or Name L:\ENV\Biological Services\Templates\MTE NEnv_General Field Sheet Checked by Project Manager ☐ Date:

Eastern Meadowlark Point Count & Transect Data Sheet		Site Name: ESAM - Mud Creek	Survey #: BB # 2
Start Time: 7:09	End Time: 7:19	Date: 16 JUNE 2021	
UTM Coordinates:		Observers: AL + MC	
Weather			
Temperature (°C):	Wind Speed (Beaufort wind scale):	Comments: EAME + BOBO survey 2 of 2 none observed - see over	
Cloud Cover (%):			
Precipitation:			

Trans. #	Pt. Count #	Habitat Description (field, hedgerow, etc.)	Species	Time of obs.	# of Ind.	Sex (M/F/U)	Behaviour (breeding evidence codes)	Direction from obs.	Distance from obs.	Comments

Point Count #: 1 of 1

Sketch Locations of All Eastern Meadowlark Observations (Attach map if necessary):



GENERAL SITE INFORMATION FIELD SHEET

Project: 45911-100 ESAM Mud Creek
Date: June 25, 2021 Project Manager: MC
Collector(s): AL Visit #:
Time started: 7:30am Time finished: 2:50pm Combined collectors' hours:
☐ NHIC List ☐ MNR EO's ☐ none ☐ not provided to collector

WEATHER CONDITIONS

Temp.	Wind:		Cloud Cover (%)	Precipitation
23°C	Direction: SW		70%	Today: No Yesterday: No

WIND SCALE

0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper
5	Small trees sway
6	Large branches sway
7	Lots of resistance when walking into
8	Limbs breaking off trees

DATA FOCUS

Grassland Birds

☒	Birds 1__ 2__ Mig__	☐	ELC's	☐	Dripline/Tree Survey
☐	Mammals	☐	Floral V__ S__ A_	☐	Aquatic - Physical
☐	Amphibians 1_ 2_ 3_	☐	Wetland	☐	Aquatic - Biological
☐	Reptiles	☐	Butternut (BHA)	☐	Faunal Habitat
☐	Inverterbrates	☐	other SAR	☐	Other - see notes

FEATURES (with GPS co-ordinates where applicable)

Yes	No		Mapped UTM	Follow-up Req'd Yes	No	Who
		Man-made Structures: ☐ None observed				
☐	☒	Barns/Footings/Wells/other(list)				
☐	☒	Rock Piles				
☐	☒	Garbage				
		Natural Vegetation: ☐ None observed				
☐	☐	Fallen Logs outside woods (#'s)				
☒	☐	Brush Piles				
☐	☐	Snags (raptor perch)				
☐	☐	Tree Cavities (nesting)				
☐	☐	Sentinel Trees				
☐	☐	Butternut Identified				
☐	☐	Mast Trees (6E) ☐ Berry Shrubs (6E)				
		Wildlife Features: ☐ None observed				
☐	☐	Waterfowl nesting (large #'s, # of species)				
☐	☐	Exposed Banks (nesting swallows)				
☐	☐	Stick Nests				
☐	☐	Animal Burrows (>10cm)				
☐	☐	Heronry				
☐	☐	Crayfish mounds				
☐	☒	Sand/gravel on site				
☐	☐	Marsh/open country/shrub				
☐	☐	Winter Deer yards				
☐	☐	Corridor from pond to woods (ampibian movement)				
☐	☒	Bat corridor (shorelines, escarpments)				
☐	☐	Bat hibernacula (caves, mines, crevices, etc.)				
		Aquatic Features:				
☐	☐	Perm. pond in woodland ☐ emergents/submergents/logs ☐ temp.				
☐	☐	Perm. pond in open ☐ emergents/submergents/logs ☐ temp.				
☐	☐	Water in woodland ☐ pools ☐ flowing ☐ dry				
☐	☐	Waterways flowing dry pools				
		☐ natural stream ☐ ☐ ☐				
		☐ swale ☐ ☐ ☐ ☐ None observed				
		☐ open drain ☐ ☐ ☐				
		☐ Seeps/Springs ☐ ☐ ☐				

Incidental Observations/Notes:

Grassland Birds

Graphic ☐ Attached or Name L:\ENV\Biological Services\Templates\MTE NEW_General Field Sheet Checked by Project Manager ☐ Date:

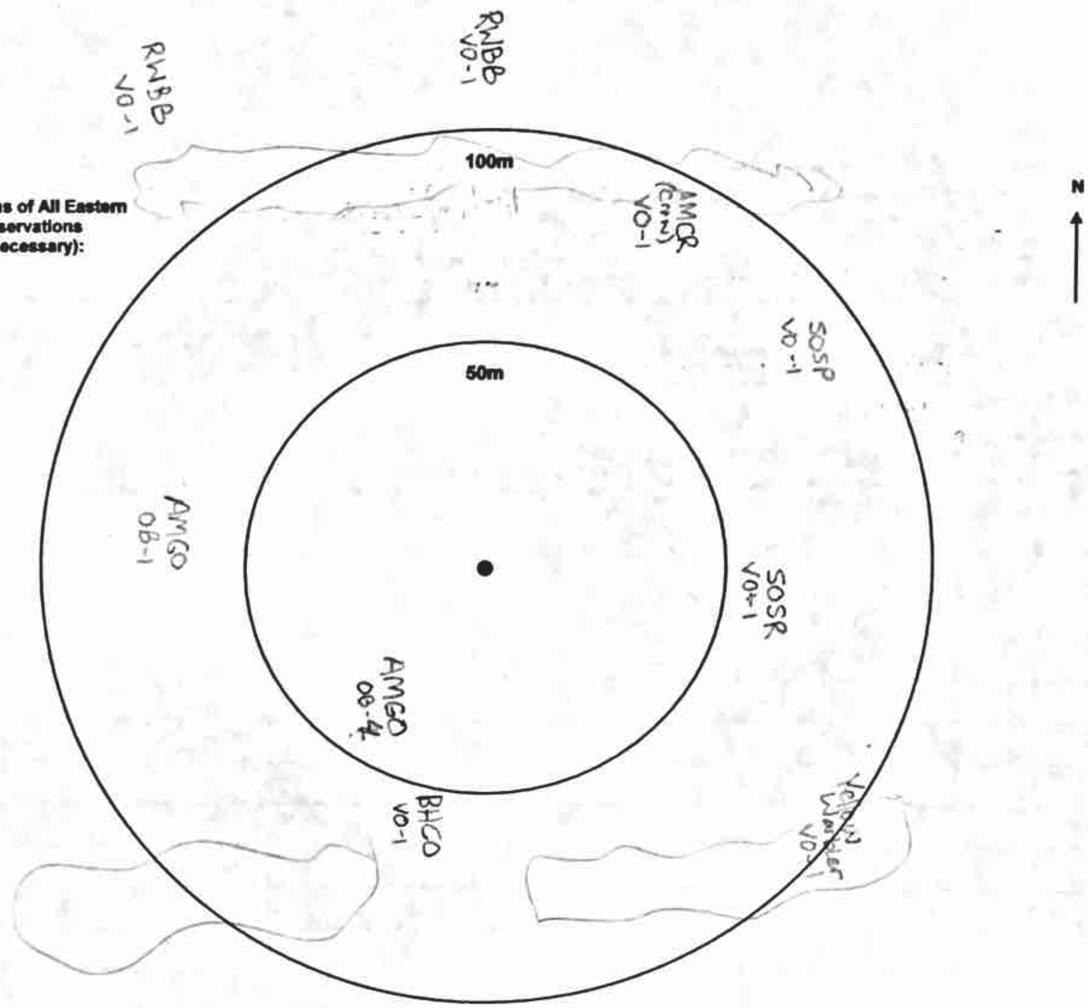
Eastern Meadowlark Point Count & Transect Data Sheet		Site Name: 45591-100 Farm Mud Creek	Survey #: 3
Start Time: 7:30 AM	End Time: 7:50 AM	Date: June 28, 2021	
UTM Coordinates: 476332 4759559		Observers: AL	
Weather			
Temperature (°C): 23°C	Wind Speed (Beaufort wind scale): 1 (7 km/h) SW	Comments:	
Cloud Cover (%): 70%			
Precipitation: None			

Trans. #	Pt. Count #	Habitat Description (field, hedgerow, etc.)	Species	Time of obs.	# of Ind.	Sex (M/F/U)	Behaviour (breeding evidence codes)	Direction from obs.	Distance from obs.	Comments

Pg __ of __

Point Count #:

Sketch Locations of All Eastern Meadowlark Observations (Attach map if necessary):



Pg __of __

Appendix D

Significant Wildlife Habitat Assessment

ELCs: CUM1, CUM1-1, CUT1, CUW1, FOD7, MAM3-5

Seasonal Concentration of Animals

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH
Waterfowl Stopover and Staging Areas (Terrestrial)	CUM1, CUT1	- spring flooding was not observed in fields or thicket communities on the Subject Lands	No
Waterfowl Stopover and Staging Areas (Aquatic)	None present	- none present	No
Shorebird Migratory Stopover Area	MAM3-5	- beach areas, bars, seasonally flooded, muddy and un-vegetated shoreline habitat were not present on the Subject Lands	No
Raptor Wintering Area	CUT, CUW	- combination of forest and fields on the Subject Lands is not large enough to support wintering raptors (need to be >20ha)	No
Bat Hibernacula	None present	- none present	No
Bat Maternity Colonies	FOD	- acoustic monitoring documented concentrations of Big Brown Bat at dusk on the Subject Lands, although use of roosts could not be confirmed.	**Candidate**
Turtle Wintering Areas	MAM3-5	-over-wintering sites are permanent water bodies, large wetlands, and bogs and fens with adequate dissolved oxygen. Permanent water was not observed on the Subject Lands.	No
Reptile Hibernaculum	all upland communties	- no features providing below-grade access (building foundations, rock crevices) were observed on the Subject Lands	No
Colonially-Nesting Bird Breeding Habitat (Bank / Cliff)	None present	- Eroding banks or stockpiles were not observed on the Subject Lands	No
Colonially-Nesting Bird Breeding Habitat	None present	- breeding bird surveys did not identify any heronries or species of heron within the Subject Lands	No
Colonially-Nesting Bird Breeding Habitat (Ground)	CUM, CUT	- Brewer's Blackbird was not detected on the Subject Lands during breeding bird surveys	No
Migratory Butterfly Stopover Areas	CUM, CUT, FOD	- The Subject Lands are not within 5km of Lake Ontario or Lake Erie.	No
Land Bird Migratory Stopover Areas	FOD	- The Subject Lands are not within 5km of Lake Ontario or Lake Erie.	No
Deer Winter Congregation Areas	FOD	- The Subject Lands do not contain woodlots >50ha in size. Deer management is an MNRF responsibility, and deer winter congregation areas considered significant will be mapped by MNRF.	No

Rare Vegetation Communities

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH
Cliffs and Talus Slopes	None Present		No
Sand Barren	None Present		No
Alvar	None Present		No
Old Growth Forest	FOD	Trees with old growth characteristics were not observed on the Subject Lands	No
Savannah	None Present		No
Tallgrass Prairie	None Present		No
Other Rare Vegetation	None Present		No

Specialized Habitats of Wildlife considered SWH

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH
Waterfowl Nesting Area	MAM3-5	- breeding bird studies did not identify the presence of 3 or more nesting pairs for listed species	No
Bald Eagle and Osprey Nesting, Foraging, Perching	FOD	- Deciduous forest on the Subject Lands is not directly adjacent to a river, pond, lake or large wetland. No stick nests were observed.	No
Woodland Raptor Nesting Habitat	FOD	- natural or conifer plantation woodlands/forest stands >30ha with >4ha of interior habitat were not present on the Subject Lands	No
Turtle Nesting Areas	None Present	- no exposed mineral soil adjacent to wetlands	No
Springs and Seeps	None present	-none present	No
Amphibian Breeding Habitat (Woodland or Wetland)	FOD, MAM3-5	- One wetland was present on the Subject Lands within or adjacent (within 120m) woodland. Amphibian breeding evidence did not meet the criteria for significance.	No
Woodland Area-Sensitive Bird Breeding Habitat	FOD	-habitats where interior forest breeding birds are breeding; large mature (>60yrs old) forest stands or woodlots >30ha were not present on the Subject Lands. No significant woodland species were detected during breeding bird surveys.	No

Habitats of Species of Conservation Concern considered SWH

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH
Marsh Breeding Bird Habitat	MAM3-5	- No target marsh breeding birds were detected at the the small cattail marsh on the Subject Lands during breeding bird surveys.	No
Open Country Bird Breeding Habitat	CUM1	- natural and cultural fields >30ha were not present on the Subject Lands -no target species were observed during breeding birds surveys	No
Shrub/Early Successional Bird Breeding Habitat	CUW1	- no large fields succeeding to shrub and thicket habitats > 10ha in size were present on the Subject Lands -no target species were observed during breeding birds surveys	No
Terrestrial Crayfish	MAM3-5	- wet meadow and edges of shallow marshes - no evidence of crayfish chimneys was observed during field investigations	No
Special Concern and Rare Wildlife Species (EA, NHIC and MNRF pre-consultation)		- Eastern Wood-pewee [SC] was detected during one round of the breeding bird survey. - no higher level confirmed breeding evidence noted (carrying food, nest with young) - Candidate habitat for this species is present in woodlands on the Subject Lands and adjacent lands, particularly the wooded valley running northeast/southwest to Proudfoot Lane	**Confirmed**
		Stiff goldenrod [S3] was observed in the cultural woodland near Oxford Street (polygon 8)	**Confirmed**

Animal Movement Corridors

Wildlife Habitat	ELC Codes Triggers*	Additional Habitat Criteria	Candidate SWH
Amphibian Movement Corridors	None present	-Movement corridors are determined when there is confirmed amphibian breeding habitat	No

SWH exceptions for Ecoregion 7E

Wildlife Habitat	Ecosites	Habitat Criteria and Information	Candidate SWH
Bat Migratory Stopover Area	None present	- the Subject Lands are not located near Long Point	No

Under-Represented Habitat Types in the City of London (London Plan Section 7)

Wildlife Habitat	Ecosites	Habitat Criteria and Information	Candidate SWH
Wetland types: Marsh, Bog, Fen	MAM3-5	- A marsh/thicket community is present on the Subject Lands. The Mud Creek EA described this community as Glossy Buckthorn Mineral Swamp (SWT2), a wet thicket community dominated by invasive species. No significant marsh indicator species were observed within this community.	No
Tall grass prairie and savannah	None present		No
Bluff	None present		No
Aquatic types: Shallow and open aquatic	None present		No

Appendix E

Revised EIS Text Change Matrix

MTE Consultants
123 St. George St., London, Ontario N6A 3A1

February 23, 2023
MTE File No.: 45591-100

Sam Katz Holding
720 Proudfoot Lane
London, ON N8G 5G5
howardk@esam.on.ca

To whom it may concern,

RE: Mud Creek – Beaverbrook Avenue Environmental Impact Study (EIS) Resubmission Text Change Matrix

An Environmental Impact Study (EIS) was previously submitted to the City (MTE, 2021) for the proposed residential development and Mud Creek corridor realignment at 323 Oxford Street West, 92 Proudfoot Lane, and 825 Proudfoot Lane in London, ON. After receiving comments and meeting with City staff, the EIS has been revised and submitted with reference to the updated Draft Plan (MBTW, 2022). A matrix outlining the changes between the first and second EIS submissions was requested by the City of London. The tables below will summarize the changes made in the text (Table 1), figures (Table 2), and Appendices (Table 3) of the revised EIS (MTE, 2023) with explanations and report locations of changes provided.

Table 1: Text Change Matrix for the Mud Creek - Beaverbrook EIS

EIS Report Location (MTE, 2023)	Change in the Revised EIS Text (MTE, 2023)
Entire EIS report	Updated the report format to adhere to current MTE Consultants report formatting.
Page 1, Section 1.0, Paragraph 1	Changed “site plan process” to “updated Draft Plan of Subdivision approval and zoning by-law amendment process” to be more descriptive.
Page 1, Section 1.0, Paragraph 1	“Beaverbrook Lane” changed to “Beaverbrook Avenue”.
Page 1-2, Section 1.0, Paragraph 6	Added a paragraph to clarify what woodland compensation was required according to the EA (CH2M, 2017) and how that relates to the mitigation recommendations being provided in this EIS for the proposed development.
Page 2, Section 1.0, Paragraph 7	Changed wording to clarify that the 2019 settlement identified natural heritage features to be designated as significant, rather than identified those features as needing to be fully retained in-situ. Added LPAT settlement details.
Page 2, Section 1.0, Paragraph 7	Added “An updated Draft Plan has been proposed and any changes to retained features or potential compensation lands will be discussed in this EIS.”
Page 2, Section 1.1, Paragraph 1	Changed “as agreed upon during previous studies and settlements” to “as discussed in previous studies and settlements for clarity because there has been an update to the Draft Plan.
Page 2, Section 1.1, Paragraph 2	Clarified that the SLSR/EIS will reference the negotiated Settlement for assessment of features since this was not as clear in the original submission.
Page 2, Section 1.1, Paragraph 3	Removed sentence fragment: “The report contains recommendations”.

EIS Report Location (MTE, 2023)	Change in the Revised EIS Text (MTE, 2023)
Page 2, Section 1.2, Paragraph 2	Heading for Section 2.0 changed to “Land Use Setting and Policy Overview” from “Land Use Setting”. Added “Section 9.0 References” to this list of report sections.
Page 3, Section 1.4, Paragraph 3	Added details about the City of London comments received for the first EIS submission, as well as the July 6 and October 25, 2022 site walks.
Page 7, Section 2.1	Added London Policy background to provide context to the policy information and adhere to the current MTE Consultants EIS formatting.
Page 7, Section 2.1.1 and 2.1.2	Altered the section titles slightly to be more descriptive of what is on Maps 5 and 1 in the London Plan. Combined 2.1 and 2.2 into one London Policy section. Added some details in 2.1.1 regarding the EA and 2019 LPAT decision.
Page 8, Section 2.3	UTRCA requested a clarification be included about their May 16, 2017 correspondence. The following sentence has been added to clarify their position on the development: “It should be noted that UTRCA also expressed in correspondence dated May 16, 2017, that further technical support was needed to determine if the proposed concept would be compliant with UTRCA policies”. This addresses UTRCA’s comment #1 from June 23, 2022. The full correspondence from UTRCA on May 16, 2017 is included in Appendix A4 of the revised EIS.
Page 9, Section 4.2	Added 2021 to the listed years of field data collection.
Page 10, Section 4.2.1, Paragraph 3	Referenced the negotiated settlement.
Page 11-13, Table 1, Column 5	Updated the vegetation community areas using the more accurate measurements on the updated CAD figures.
Page 12, Table 1, Row 16	Added CUT1 inclusion to the polygon 6 description.
Page 12, Table 1, Row 17	Altered polygon 7 (CUW1) description to clarify that Tributary B is the direct tributary to Mud Creek, not Trott Award Drain. Also added that Mud Creek flows through polygon 7 as well as Tributary B. Added a short description of the CUT1 inclusion.
Page 12, Table 1, Row 18	Altered polygon 8 (CUW1) description to clarify that the ‘dug channel’ is really more of an outlet and some overland flow rather than a "dug channel". It is clearly manmade, not natural. This channel is identified as "Tributary C" on figures in the EIS. Added a SWT2 inclusion (8a) to the polygon description. This is based off of an updated site visit in 2022.
Page 13, Table 1, Row 22	May 1, 2022 City Ecology comments (#3) stated that Community 10 should include SWD6 since there is a Maple/Poplar Swamp located in the western portion of this community. This was reviewed and it was determined our ELC was correct and is consistent with EA mapping (LGL, 2016; CH2M, 2017).
Page 13, Section 4.3.2, Paragraph 1	Removed the sentence “A spring botanical inventory will be completed in May 2021 to update this EIS”. The full floral inventory is now complete.
Page 13, Section 4.3.2, Paragraph 2	The numbers of floral species within the Subject Lands have been updated. The final MTE plant list is now provided in Appendix C.
Page 13, Section 4.4.1, Paragraph 2	Added details about the grassland bird surveys conducted in 2021.
Page 14, Section 4.4.1, Paragraph 4	Clarified that suitable habitat for Eastern Wood-pewee is assumed in polygons 9 (FOD7) and 7 (CUW1) on the Subject Lands, as well as the adjacent woodlands towards Proudfoot Lane.

EIS Report Location (MTE, 2023)	Change in the Revised EIS Text (MTE, 2023)
Page 14, Section 4.4.3, Paragraph 2	Additional details have been added about why the four bat trees observed by LGL are considered low quality potential bat habitat. This addresses Comment #12 from UTRCA technical review comments provided on June 23, 2022.
Page 17, Section 4.5.1, Paragraph 1	A sentence has been added to clarify the fish habitat discussed is located outside the Subject Lands: “It should be noted that fish (not identified to species) have only been observed in a deep pool at the mouth of Tributary C and in the deeper pools along Oxford Street, outside the Subject Lands.” This addresses Comment #11 from UTRCA technical review comments provided on June 23, 2022.
Page 17-18, Section 4.6.1	“Community” was changed to “polygon” to maintain consistent wording throughout the EIS.
Page 18, Section 5.0, Paragraph 2	Minor edit to clarify that the significant features are being summarized, not the policies. Original text is, “These policies have been reviewed again and summarized in this section (Table 5) to ensure the features and functions identified are protected and/or replicated in the design of the new Mud Creek corridor and valley system.”
Page 18, Section 5.0, Paragraph 3	Added a reference to the new Figure 8 that shows the natural heritage features to be considered for the proposed development more clearly on an air photo.
Page 18-19, Section 5.0, Table 5	Comment #1 from the City Ecology Review provided on May 1, 2022 stated that the description of natural heritage features present was not clear. Table 5 has been edited to focus solely on summarizing the features present as evaluated through the negotiated settlement, EA, and updated MTE field investigations. Changes from the original first three columns of Table 5 include updated polygon sizes, additional details for locations of features, citations for assessments of significance, and polygon numbers.
Page 19, Section 6.0, Paragraph 3	Added a paragraph to describe the main changes from the Draft Plan provided in the initial EIS submission (MTE, 2021).
Page 19, Section 6.0, Paragraph 4	Removed the description of the potential 11 m wide servicing easement as this is no longer proposed. Servicing will come off of Proudfoot Lane instead. This addresses Comment #16 from the June 23, 2022 UTRCA comments.
Page 20, Section 6.1	Added a section to compare the 2021 to 2023 Draft Plans.
Page 20, Section 6.2, Paragraph 1	Added a reference to the new Figure 11 showing the conceptual design of the Mud Creek corridor (TMIG, 2017).
Page 20, Section 6.2, Paragraph 3	The multi-use path along the west side of the proposed Mud Creek corridor is no longer limited to a five metre buffer, so this has been changed in the text. The path will meander slightly but will remain within the west valley buffer outside the designated valleyland. The widths of the valleyland buffer were added to the EIS text.
Page 21, Section 6.3, Paragraph 1	The Significant Woodland is not proposed to be fully retained on the updated Draft Plan, so the text was edited to clarify this.
Page 21, Section 6.3, Paragraph 2	A sentence was added to indicate that the dedication of adjacent woodland to the City will be further discussed in Section 7.0 of the EIS in the context of compensation for woodland removal.
Page 21	The Section 6.3 from the original EIS submission (MTE, 2021) has been deleted. Restoration planting will instead be addressed in Section 7.0 in terms of woodland compensation.
Page 24-28, Section 7.0	Recommendation numbers have changed due to text being added and rearranged. Actual changes to recommendations are listed in this table.
Page 20, Section 7.0, Paragraph 1	Edited the first sentence for clarity and to fix the Figure #’s.

EIS Report Location (MTE, 2023)	Change in the Revised EIS Text (MTE, 2023)
Page 20, Section 7.0, Paragraph 2	More clearly states which features are going to be discussed and which types of impacts are addressed in Sections 7.1 (direct) and 7.2 (indirect).
Page 21, Section 7.0, Paragraph 3	Clarified what is included in the net effects table at the end of Section 7.0. Table 6.0 in the original EIS (MTE, 2021) has been deleted and instead incorporated into the text of Section 7.0 and the updated net effects table. This eliminates unnecessary repetition that may have been confusing.
Page 21, Section 7.1	This section has been reorganized to follow the order of features presented in Table 5 so it is easier to follow the discussion of potential impacts and mitigations.
Page 21, Section 7.1.1	The original *Section 7.1.1 Vegetation and Wetlands* has been divided into two sections: *Section 7.1.1 Wetlands*, and *Section 7.1.2 Significant Woodlands and Woodlands*. These sections more clearly outline how different features are being impacted and what compensation is provided. The updated Section 7.1.1 addresses the removal of polygon 10 (SWT3/MAM3-5) and the newly identified inclusion 8a (SWT2) required for the updated Draft Plan.
Page 21-25, Section 7.1.2	More clearly described how much Significant Woodland and Woodland is impacted and where the areas being removed are located. Expanded on how the functions of the woodlands will be retained or enhanced post-development. Added details and updated areas for woodland compensation (by area) being provided based on the updated Draft Plan. Clarified which woodlands will be considered for 1:1 compensation based on the EA (CH2M, 2017). Removed discussion of Stiff Goldenrod (S3) from this section to focus only on the woodland removal/compensation. Added a description of the conceptual pathways proposed in Block 10 and discussion of potential impacts. This addresses comments #2 and #3 from the City Ecology comments received May 1, 2022, and comment #16 from UTRCA comments received June 23, 2022.
Page 25, Section 7.1.3	Added a section to clearly address impacts to Significant Valleylands as it is one of the natural heritage features identified in Table 5.
Page 25, Section 7.1.4	Added a section to separately address impacts to candidate and confirmed Significant Wildlife Habitat.
Page 25-26, Section 7.1.5	This was *Section 7.1.4 Aquatic Habitat* in the original EIS submission (MTE, 2021). The section number and title have been changed to *Section 7.1.5 Fish Habitat* to coordinate with the order and wording of Table 5. The location of fish habitat has been clarified in this section.
Page 26, Section 7.1.6	This was *Section 7.1.3 Species at Risk* in the original EIS submission (MTE, 2021). The section number and title have been changed to *Section 7.1.6 Habitat of Endangered and Threatened Species* to coordinate with the order and wording of Table 5. The number of bat trees to be removed has been updated based on the updated Draft Plan.
Page 26-27, Section 7.1.7	This was *Section 7.1.2 Wildlife and Wildlife Habitat* in the original EIS submission (MTE, 2021). The section number and title have been changed to *Section 7.1.7 Migratory Birds and Wildlife*. Discussion of SWH was moved to its own section and recommendations 17-20 were renumbered but not changed.

EIS Report Location (MTE, 2023)	Change in the Revised EIS Text (MTE, 2023)
	Recommendation 21 was added as a standard recommendation for all construction activities to prevent potential impacts to Bank Swallow [THR] due to incorrect slope management.
Page 27-28, Section 7.1.8	This was *Section 7.1.5 Groundwater and Stormwater Management* in the original EIS submission (MTE, 2021). The section number and title have been changed to *Section 7.1.8 Water Resources - Groundwater and Stormwater Management* to coordinate with the order and wording of Table 5. Deleted repeated word ("conditions") in Paragraph 3.
Page 30, Section 7.3.1, Paragraph 6	Removed the recommendation for turtle nesting beds in the corridor based on the City of London's comment #12 (May 1, 2022) that there were concerns with encouraging turtles to nest in an urbanized zone.
Page 30, Section 7.3.3, Paragraph 2	Added "A comprehensive aquatic habitat restoration plan will be developed at the detailed design stage."
Page 31-32, Section 7.5	Fixed a formatting error in the original EIS (MTE, 2021) so the Monitoring Plan has its own clearly labelled section.
Page 32, Section 7.5	Added encroachment monitoring recommendations (first two bullet points).
Page 32-33, Section 7.6	Added a section for UTRCA Regulations to clarify that a Section 28 permit is required for this proposed development.
Page 34-36, Table 7	Reordered the table to follow the order of policy-protected features inn Table 5 and Section 7.0. Updated areas of removal and compensation based on the updated Draft Plan. Updated the proposed protections, mitigations, replications, and enhancements to correspond with the revised Section 7.0.
Page 37, Section 8.0	Rewrote the Summary and Conclusions section to reflect the changes throughout the revised report.

Table 2: Figure Change Matrix for the Mud Creek - Beaverbrook EIS

Figure (MTE, 2023)	Change in the EIS Figures
All figures	• Updated all EIS figures in a CAD format to adhere to the new MTE standard formatting that is easier to read and reference
Figure 1	• Watercourses added for clarity and consistency through the following figures • The 2019 Settlement Area and EA (CH2M, 2017) Preferred Alternative Area were added to provide context
Figure 3	• Used the updated Map 1 (London Plan, 2021)
Figure 5	• Added the names of the watercourses/drains from UTRCA for additional information
Figure 6	• Based on updated site visits, several polygons were divided with vegetation inclusions. This included Polygon 7 (CUW1) with a CUT1 inclusion, Polygon 6 with a CUT1 inclusion, and Polygon 8 with a SWT2 inclusion. These changes were carried through to the rest of the figures. • Proposed culverts are not shown on this figure any more since this is irrelevant to vegetation communities • Polygon 10 (SWT3/MAM3-5) has been highlighted to clearly show where the wetland community is located on the Subject Lands
Figure 7	• Proposed culverts are not shown on this figure any more since this is irrelevant to survey stations • Polygon 10 was highlighted to make it clear this is a wetland community

Figure (MTE, 2023)	Change in the EIS Figures
Figure 8	• This "Natural Heritage Features" figure was added to address the UTRCA and City of London comments that it was not clear in the original EIS (MTE, 2021) exactly what natural heritage features are present and where. • This figure includes the features summarized in Table 5 of the revised EIS • Significant Woodlands (as evaluated in the EA [CH2M, 2017]) outside the Subject Lands have also been added to show the natural heritage linkages in the region more clearly • Notes added to clarify where SAR bat and Eastern Wood-pewee habitat is located • The original "Proposed Ecological Enhancements" figure was removed and instead the ecological mitigations/enhancements are shown on the revised Figure 13
Figure 9a	• The updated Landscape Plan (RKLA, 2023) on the updated Draft Plan (MBTW, 2023) is provided without overlaying so all Plan details are provided
Figure 9b	• A figure (provided by MBTW) was added to clearly show the changes between the 2021 and 2023 Draft Plans
Figure 10	• The updated Landscape Plan (RKLA, 2023) on the updated Draft Plan (MBTW, 2023) is used • The pathway in the corridor buffer has been corrected to say "path" instead of "trail" • The proposed 11 m servicing easement has been removed • Community 6 (CUW1) has been added as Significant Woodland • Fewer additional features are shown on this figure to improve readability. The focus is on significant features to be considered for mitigation/compensation
Figure 11	• This figure is provided to show more details for the conceptual proposed design of Mud Creek from TMIG (2017) without overlaying unnecessary layers from other figures
Figure 12	• This figure has been added to the EIS to more clearly outline which woodland and wetland features are being proposed for removal • The level of significance of woodlands is provided through a colour-coded system
Figure 13	• This figure has been added to the EIS to more clearly outline where woodland and wetland is proposed to be created as compensation for removals • Other compensation measures (e.g., invasive species management and restoration, woodland retention) are also shown on this figure

Table 3: Appendices Change Matrix for the Mud Creek - Beaverbrook EIS

Appendix (MTE, 2023)	Change in the EIS Appendices
Appendix A	• Added UTRCA comments from May 16, 2017
Appendix C	• Added the updated Plant List (all surveys included) • Add the 2021 grassland bird field sheets
Appendix E	• Added a new Appendix A for this matrix to make all changes made in the revised EIS (MTE, 2023) compared to the original submission (MTE, 2021) easier to follow

If you have any other questions or comments regarding the revised Environmental Impact Study (MTE, 2023), please contact us.

Yours Truly,

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