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NATURAL SCIENCES REPORT

KIRWIN AVENUE AND LITTLE JOHN LANE SANITARY SEWER MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

Prepared for:
Arcadis

Prepared by:
LGL Limited
environmental research associates

FEBRUARY 2024
LGL FILE TA9334-02

KIRWIN AVENUE AND LITTLE JOHN LANE SANITARY SEWER MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

Natural Sciences Report

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1. INTRODUCTION

LGL Limited (LGL) has been retained by Arcadis to provide natural sciences services for the Kirwin Avenue and Little John Lane Sanitary Sewer Replacement Environmental Assessment in the City of Mississauga, Region of Peel. The project is proceeding as a Schedule B Municipal Class Environmental Assessment study on behalf of the Region of Peel. This Natural Sciences Report (NSR) documents the results of the of data collection and analysis in the summer and winter of 2023, and the potential effects of this project on natural heritage features, including environmental protection measures.

1.1 Study Area

The study area is located along Kirwin Avenue, North of Dundas Street East and east of Hurontario Street, along Jaguar Valley Drive, and along Little John Lane between Kirwin Avenue and John Street. The limits of the study area are presented in **Figure 1**.

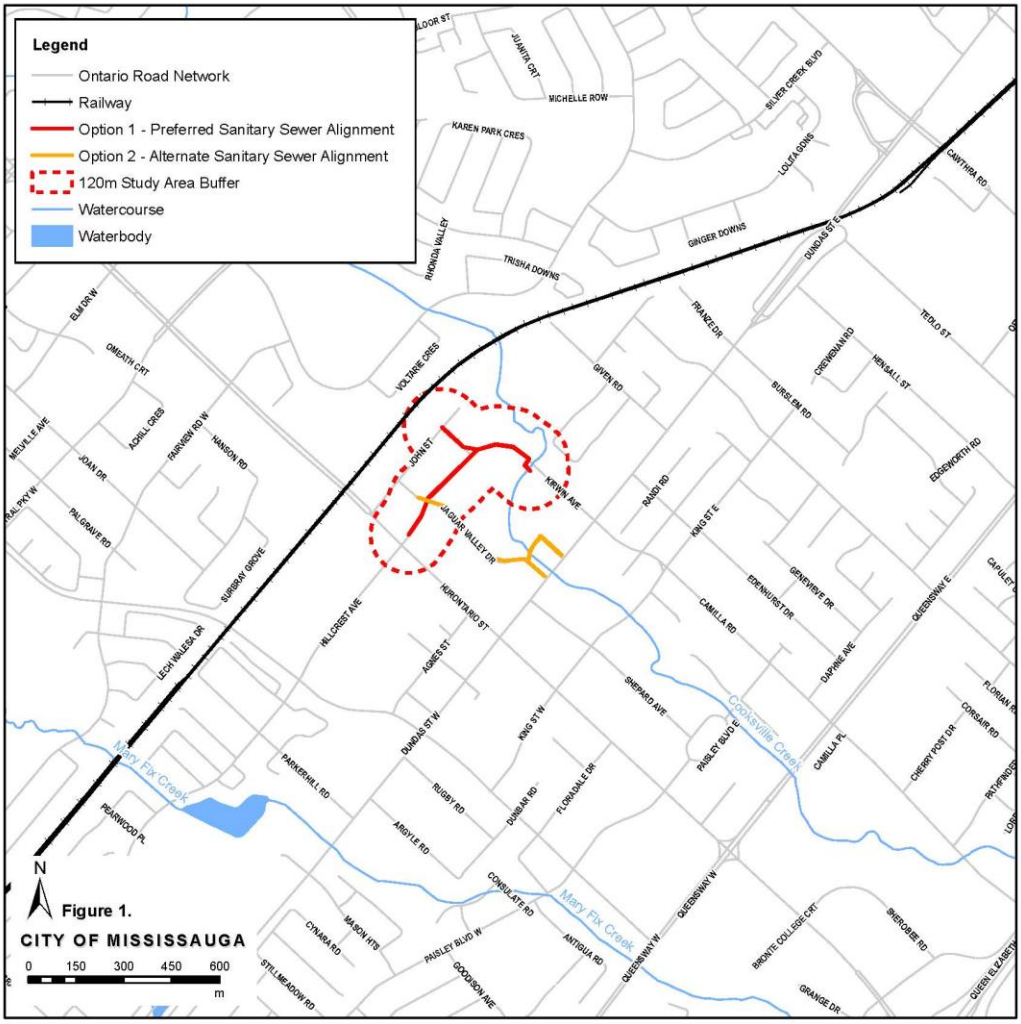

Figure 1: Study Area

2. ENVIRONMENTAL POLICY CONTEXT

A review of the applicable federal, provincial, and municipal policy is presented in the following sub-sections.

2.1 Fisheries Act

The Fisheries Act was established to manage and protect Canada's fisheries resources. It applies to all waters of Canada and is binding to federal, provincial, and territorial governments.

On February 6, 2018, DFO introduced proposed amendments to restore lost protections and incorporate modern safeguards into the Fisheries Act. On August 28, 2019, these changes came into effect and strengthened fish and fish habitat protection provisions under the modernized Fisheries Act, as well as regulations that support these provisions.

These changes include:

- the protection for all fish and fish habitats;
- restoring the previous prohibition against the “harmful alteration, disruption or destruction of fish habitat”; and,
- restoring a prohibition against causing “the death of fish by means other than fishing”.

The amendments address key considerations including prohibitions against causing the death of fish (other than by fishing) and the re-introduction of the concept of harmful alteration, disruption, or destruction (HADD) of fish habitat regulated under the Fisheries Act. If a HADD is unavoidable, authorization from DFO under Subsection 35(2) of the Fisheries Act may be issued.

2.2 Migratory Birds Convention Act

The Migratory Birds Convention Act is administered by the Canadian Wildlife Service of Environment Canada. The Migratory Birds Convention Act enables regulations that require authorization for designs which cause permanent destruction/disturbance of migratory bird habitat and authorization for killing/removing migratory bird fledglings, eggs, nests, or for other harmful activity to migratory birds to enable bridge construction/demolition, construction work areas. The study area falls within Environment Canada’s Nesting Zone C2 (Nesting Period: end of March – end of August). Bird species protected under the MBCA were documented across a variety of habitat types within the study area.

2.3 Provincial Policy Statement

The Provincial Policy Statement (PPS) (Ministry of Municipal Affairs and Housing, 2020) is issued under Section 3 of the Planning Act. The PPS provides policy direction for development that protects resources of provincial interest, public health and safety, and the quality of the natural environment. The natural heritage policies contained in Section 2.1 relevant to this NSR are provided for reference below.

- Policy 2.1.2 The diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.
- Policy 2.1.3 Natural heritage systems shall be identified in Ecoregions 6E & 7E1, recognizing that natural heritage systems will vary in size and form in settlement areas, rural areas, and prime agricultural areas.
- Policy 2.1.5 Development and Site alteration shall not be permitted in:
    a. Significant wetlands in the Canadian Shield north of Ecoregions 5E,6E, and 7E;
    b. Significant woodlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Mary's River);
    c. significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and the St. Marys River);
    d. Significant wildlife habitat;
    e. significant areas of natural and scientific interest; and
    f. coastal wetlands in Ecoregions 5E, 6E and 7E1 that are not subject to policy 2.1.4(b)

  unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.
- Policy 2.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.
- Policy 2.1.7 Development and Site alteration shall not be permitted in habitat of endangered species and threatened species except in accordance with provincial and federal requirements.
- Policy 2.1.8 Development and Site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.15, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

Consistent with the PPS, this project uses the following terms and definitions:

- Ecological function: the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include biological, physical and socio-economic interactions.

- Negative impacts (fish habitat): the harmful alteration, disruption or destruction of fish habitat, except where, in conjunction with the appropriate authorities, it has been authorized under the Fisheries Act, using the guiding principle of no net loss of productive capacity; and
- Negative impacts (natural heritage features and areas): degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified due to single, multiple or successive development or site alteration activities.

2.4 Species at Risk Act

The Species at Risk Act (SARA 2002) aims to protect wildlife species and their critical habitat in Canada, and to promote the recovery of species that are at risk where these are identified on federal lands. Under the SARA, the definition of federal land includes, but is not limited to Canada's oceans and waterways; national parks; military training areas; national wildlife areas; some migratory bird sanctuaries; and First Nations reserve lands. Wildlife protection under the SARA is associated with species listed under the registry as extirpated (no longer exist in the wild in Canada), endangered, or threatened. Species identified as special concern are also considered to prevent them from becoming endangered or threatened; however, general prohibitions under the SARA do not apply to species of special concern.

2.5 Endangered Species Act

The Ontario Endangered Species Act (ESA 2007) provides for the conservation, protection, restoration, and propagation of species of fauna and flora of the Province of Ontario that are threatened with extinction. The ESA (2007) outlines the responsibilities of the Committee on the Status of Species at Risk in Ontario (COSSARO) in the listing of species at risk, the preparation of recovery strategies for endangered or threatened species, and the preparation of management plans for special concern species.

Section 9 of the ESA prohibits similar activities as the SARA, such as prohibitions on the kill, harm, harass, capture or take of a living species at risk, or to possess, transport, collect, buy, sell, lease, trade a species at risk (living or dead). Section 10 of the ESA prohibits the damage or destruction of habitat of endangered, threatened, or extirpated species. Permits may be issued under Section 17 (2) of the ESA should a project result in a contravention of Section 9 and/or 10 of the ESA. As part of the permit process, an “overall benefit” to the impacted species must be included in the compensation package. It should be noted that the ESA was previously administered by the MNRF but is now under the jurisdiction of the Ministry of Environment, Conservation and Parks (MECP).

2.6 Region of Peel Official Plan

The Region of Peel Official Plan (Peel 2022) identifies Cooksville Creek and its associated valleylands as part of the 'Greenlands System Overlay' on Schedule C-2, while the portion upstream (east) of Kirwin Ave 'Core Areas of the Greenlands System', Schedule C-2. Figure 7 also identifies the area east of Kirwin as Core Area of Greenlands System, while it indicates the area west of Kirwin is 'Natural Areas and Corridors', while Figure 8 indicates the area west of Kirwin is a potential area of enhancement. Additionally, the study area is identified under Schedule E-3 of the Region of Peel Official Plan within the 'Urban Grown Area", as the surrounding areas near the study area include residential and commercial land uses.

2.7 City of Mississauga Official Plan

According to the City of Mississauga Official Plan (2023) the City of Mississauga's Green System is composed of the natural heritage system, the urban forest, natural hazard lands, and parks and open spaces. The study area is identified within the City of Mississauga Geen System in both Schedule 1 and 3. Schedule 3 indicates the Green system in the study area is a mix of 'Significant Natural Areas and Natural Green Spaces' as well as a 'Special Management Area'. Schedule 10 also indicates Cooksville Creek and associated riparian areas are part of the 'Natural Hazards'.

'Significant Natural Areas' include areas associated with provincially or regional significant life science areas of natural and scientific interest (ANSI), environmentally sensitive or significant areas, habitat of endangered species, fish habitat, significant wildlife habitat, significant woodlands, and significant wetlands.

'Natural Green Spaces' include areas associated with woodlands that do not fulfill the requirements of significant woodland (greater than 0.5 hectares), unevaluated and/or evaluated wetlands that are not provincially significant, watercourses that do not fulfill the requirements of a significant valleylands, and natural areas containing rare vegetation (greater than 0.5 hectares).

2.7.1 City of Mississauga's Natural Heritage and Urban Forest Strategy

The City of Mississauga's Natural Heritage and Urban Forestry Strategy (NH&UFS) provides guidance in balancing competing interests of accommodating growth and economic development, while ensuring that the natural heritage system and urban forest are protected, enhanced, restored, and expanded. The NH&UFS identifies 26 strategies supported by actions, to implement the objectives and targets. Opportunities to maximize green infrastructure will be explored within the study area. Appropriate environmental protection and mitigation measures to maintain and/or enhance the natural heritage and urban forest will be applied to the study area.

2.8 Credit Valley Conservation

Credit Valley Conservation (CVC)'s Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses objectives are intended to ensure public safety and protect areas with respect to natural hazards and to safeguard watershed health by preventing pollution and destruction of sensitive environmental areas including wetlands, shorelines, and watercourses.

Ontario Regulation 160/06 establishes Regulated Areas where development could be subject to flooding, erosion or dynamic beaches, or where interference with wetlands and alterations to shorelines and watercourses might have an adverse effect on those environmental features. Under Ontario Regulation 160/06, any proposed development, interference, or alteration within a regulated area requires a permit from CVC. The study area is located entirely within the regulated area as shown in **Figure 2**.

3. METHODOLOGY

3.1 Background Information and Records Review

LGL undertook a desktop review of natural heritage constraints within the study area. The review was intended to determine the presence of any natural areas (i.e. Areas of Natural and Scientific Interest, Provincially Significant Wetlands, Environmentally Sensitive Areas, Significant Woodlands or Significant Wildlife Habitat) or records of rare or sensitive. Information where available was requested and collected from the following sources:

- Land Information Ontario (LIO) database;
- Atlas of the Mammals of Ontario;
- Bat Conservation International Species Profiles;
- Atlas of the Breeding Birds of Ontario;
- eBird;
- iNaturalist;
- Aquatic species at Risk Maps (Department of Fisheries and Oceans Canada);
- Butterfly Atlas of Ontario;
- Alvars of Ontario;
- The Vascular Plants of Ontario (2009);
- Vascular Plants at Risk in Ontario (2018);
- City of Mississauga Natural Areas Survey (2020); and,
- City of Mississauga Official Plan (2023).

The background review was used to identify the known constraints present within the study area as summarized in the sections below. From there, field surveys were completed to verify the limits and extent of features identified through the background review in relation to the study area.

LEGEND

- Aquatic Resources Survey Point (AU-0001-COO)
- Watercourse - Warm Thermal Regime
- Railway
- Option 1 - Preferred Sanitary Sewer Alignment
- Option 2 - Alternate Sanitary Sewer Alignment
- Study Area 120 m Buffer
- Disturbance Area
- Generic Regulation Limit (CVC)
- Subwatershed Boundary (CVC)
- Provincially Tracked Species 1 km x 1km Grid
- Significant Natural Area - City of Mississauga
- Wooded Area

Data Sources: Credit Valley Conservation (CVC) & Ministry of Natural Resources and Forestry (LIO). Produced by LGL Limited under Licence with the Ontario Ministry of Natural Resources © King's Printer for Ontario, 2023. Contains information licenced under the Open Government Licence - Ontario.

0 40 80 120 160
m

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KIRWIN AVENUE SEWER
NATURAL HERITAGE SCREENING

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Project:	TA9334	**Figure:**	2
Date:	February, 2024	**Prepared By:**	VLG
Scale:	1:4,000	**Checked By:**	DCO

3.2 Aquatic Habitat Assessment

Surveys of the aquatic habitat within the study area were completed on July 20 and December 12, 2023. Habitat characteristics such as substrate, depth, nearshore vegetation was noted. Much of the aquatic assessment for this project was done with background documents available for the area, given that a significant amount of background data on fish habitat and communities is available for Cooksville Creek.

3.3 Ecological Land Classification and Botanical Surveys

The geographical extent, composition, structure, and function of vegetation communities were identified through air photo interpretation and field investigations. Air photos were interpreted to determine the limits and characteristics of vegetation communities. A field investigation of the vegetation communities within the study area and beyond to the extent possible, was undertaken on July 20, 2023.

Vegetation communities were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee *et al*. 1998). The communities were sampled using a plotless method for the purpose of determining general composition and structure of the vegetation. Plant species status was reviewed for Ontario (Oldham 2009) and the Region of Peel (Riley 1987). Vascular plant nomenclature follows Newmaster *et al*. (1998) with a few exceptions that have been updated to Newmaster *et al.* (2007).

3.4 Wildlife and Wildlife Habitat

An incidental wildlife survey was conducted during the terrestrial and aquatic surveys. The incidental wildlife observations were completed through visual and auditory observations as well as indirect incidental observations (i.e. tracks, scat, and scents).

4. EXISTING CONDITIONS

The results provided here focus on the study area that has been selected for this project. They characterize the existing conditions for the areas where impacts on the environment could be experienced and where mitigation will be required. The natural heritage and hydrological features located on and adjacent to the study area are delineated in **Figure 3**.

4.1 Designated Natural Areas

4.1.1 Provincially Significant Wetlands (PSW)

There are no Provincially Significant Wetlands within 120 m of the study area.

4.1.2 Areas of Natural and Scientific Interest (ANSI)

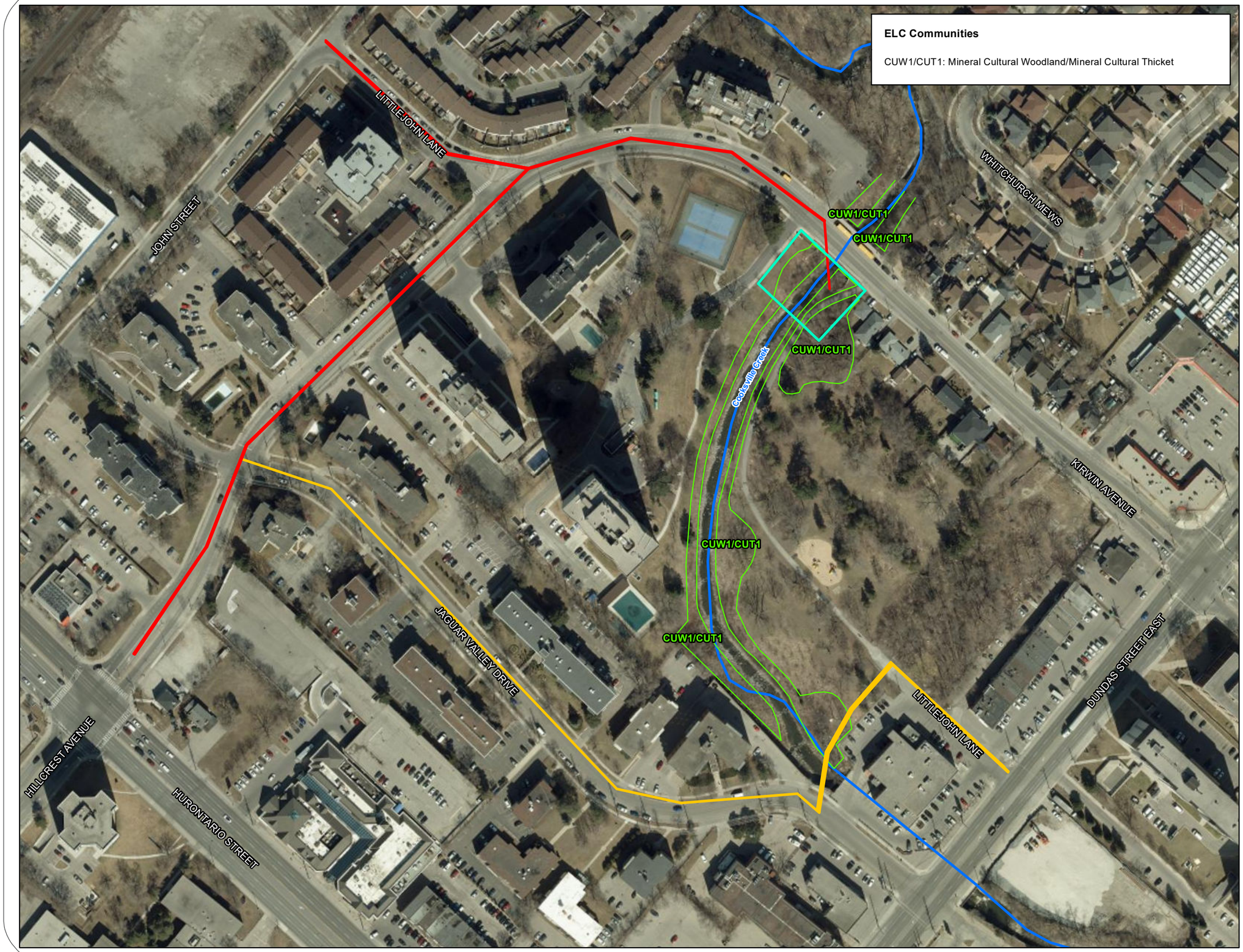
There are no Areas of Natural and Scientific Interest (ANSI) within 120 m of the study area.

4.1.3 Environmentally Significant Areas (ESA)

No Environmentally Significant Areas are located within 120 m of the study area.

4.1.4 Significant Valleylands

No Significant Valleylands are found within the study area, though the area is mapped as a Natural Hazard (Mississauga 2023).



LEGEND

- Disturbance Area
- Option 1 - Preferred Sanitary Sewer Alignment
- Option 2 - Alternate Sanitary Sewer Alignment
- Vegetation Community Boundary (ELC)
- Watercourse (LIO)

0 20 40 60 80 m

N

KIRWIN AVENUE SEWER
NATURAL HERITAGE EXISTING CONDITIONS

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Project:	TA9334	**Figure:**	3
Date:	February, 2024	**Prepared By:**	VLG
Scale:	1:2,000	**Checked By:**	DCO

4.2 Aquatic Habitat Communities

4.2.1 Background Information

Cooksville Creek is an urban creek that flows through the study area in a southwesterly direction. It is managed as a warmwater system. *Cooksville Creek Flood Evaluation Master Plan* reports that the creek drains an area of approximately 33.9km^2 which outlets to Lake Ontario (AquaforBeach 2012). According to the report the watercourse upstream of the QEW does not support fish due to the presence of fish barriers. Land Information Ontario (LIO) does list some fish species from this area, these include Western Blacknose Dace (*Rhinichthys obtusus*), Longnose Dace (*R. cataractae*), and Creek Chub (*Semotilus atromaculatus*). The Flood Master Plan also lists the water quality in the creek as poor due to unmanaged stormwater, salt, water temperatures, and nutrients as well as high E.coli and chloride. The report indicates that 92% of the channel of Cooksville Creek has been channelized with gabion, concrete, riprap, armourstone or other methods.

4.2.2 Species at Risk

According to the background review, Cooksville Creek is not reported to support any aquatic species at risk.

4.2.3 Field Investigations

Field investigations to evaluate aquatic habitat conditions within the study area were undertaken on July 20, and December 12, 2023. Weather conditions at the time were approximately 25C, with no precipitation in July, with water at low flow condition. Weather for the December survey was 5C, light wind, overcast, with water at low flow condition. A reconnaissance survey was completed at the Kirwin Avenue crossing of Cooksville Creek and upstream (north) of Jaguar Valley Drive. Photos from these site visits are available in **Appendix A**.

The creek was surveyed in three segments:

1. upstream of Kirwin Avenue,
2. downstream of Kirwin Avenue at the proposed crossing location, and
3. upstream of Jaguar Valley Drive.

4.2.3.1 Section 1 Upstream of Kirwin Ave

Within this section of the creek, it has been the subject of historical straightening and evidence of restoration is seen in the strategic bank stabilization efforts. New plantings were observed in the riparian areas of the creek. The stream is approximately 5m wide and 0.1-0.25m deep, and flows through a series of riffles and runs, with a few pools. Riparian vegetation consists of mainly trees and shrubs in a cultural woodland/thicket.

4.2.3.2 Section 2 Downstream of Kirwin Avenue at the Proposed Crossing Location

Within this section of the creek it was observed to be relatively straight and has a wetted width of approximately 5m. Water depth was approximately 0.1-0.25m through a series of small riffles and runs. Bankfull was approximately 8m wide and 2m deep. The boulder and cobble substrate on the creek bed and on the banks indicate this stretch of the creek has been subject to some restoration efforts in the past. The banks in this area appear to be stable, with no evidence of erosion. Several rock weirs have been strategically placed within the channel between Kirwin Avenue and Jaguar Valley Drive, one is just downstream of the Kirwin Avenue bridge. The riparian area is at its widest at this point in this segment, within a cultural woodland.

4.2.3.3 Section 3. Upstream of Jaguar Valley Drive

At Jaguar Valley Drive, the riparian area narrows to approximately 5m on either side of the channel. A pedestrian path is located to the south of the channel. The channel remains approximately 5m wide with a depth in the 0.1-0.25m range. At Jaguar Valley Drive the creek passes under the road, and Dundas Street through two concrete box culverts. These culverts likely present a fish barrier to upstream movement as they are very long and dark. The west bank at Jaguar Valley Drive is a concrete wall.

4.3 Vegetation and Vegetation Communities

4.3.1 Background Information

The study area is located within a portion of the City of Mississauga's Natural Areas Survey (2020) site CV12. According to the Natural Areas Survey, the main ELC community in the study area is a Fresh-Moist Willow Lowland Deciduous Forest (FOD7-3), with some Fresh-Moist Lowland Deciduous Forest (FOD7) and Sugar Maple Deciduous Forest (FOD5) upstream. The site is in fair to poor condition and has a high (47.97%) percentage of introduced species.

4.3.2 Field Investigations

A field investigation of the vegetation and vegetation within the study area was undertaken on July 20, 2023. Weather conditions at the time were approximately 25C, with no precipitation. Vegetation consists of manicured lands and Mineral Cultural Woodland (CUW1) and Mineral Cultural Thicket (CUT1) habitat. All of the vegetation communities identified within the study area are considered widespread and common in Ontario and secure globally. The limits of the vegetation within the study area are delineated in **Figure 3** and are described in **Table 1**.

Naturalized vegetation within the study area was restricted to the valleylands associated with Cooksville Creek. The Mississauga Natural Areas Survey identified the vegetation within the study area as a Fresh-Moist Willow Lowland Deciduous Forest (FOD7-3), however, the portions of this community within the study area display the characteristics of cultural woodland/cultural thicket habitat based on the precent of canopy cover and as such, have been classified as such by LGL. Vegetation within the portion of the community on the west side of Kirwin Avenue was largely dominated non-native and disturbance tolerant plant species including Manitoba maple (*Acer negundo*) and Siberian elm (*Ulmus pumila*) in the canopy with old field species within the ground layer. Vegetation on the east side of Kirwin Avenue supported similar plant species, however, new plantings of trees/shrubs associated with restoration were observed within the riparian habitat of Cooksville Creek. The cultural woodland extends along Cooksville Creek to Jaguar Valley Drive. The cultural woodland at Jaguar Valley Drive is comprised of similar species as to those that were identified at Kirwin Avenue.

Vegetation outside of the valleylands associated with Cooksville Creek was limited to manicured lands with amenity feature trees and shrubs.

Table 1: Summary of Ecological Land Classification Vegetation Communities within the Study Area

ELC Code	Vegetation Type	Species Association	Comments
Terrestrial-Cultural			
CUW/CUT	Cultural Woodland/Cultural Thicket		
CUW/CUT	Mineral Cultural Woodland/Mineral Cultural Thicket	**Canopy:** includes Manitoba maple (*Acer negundo*), Siberian elm (*Ulmus pumila*), and willow (*Salix* sp.). **Understorey**: includes common buckthorn (*Rhamnus cathartica*), multiflora rose (*Rosa multiflora*), and Manitoba maple. **Ground Cover:** includes garlic mustard (*Alliaria petiolata*), dame's rocket (*Hesperis matronalis*), awnless brome (*Bromus inermis* ssp. *inermis*), and wild carrot (*Daucus carota*).	CUW1 • Cultural communities (CU). • 25 % < tree cover < 35 % (W). • Mineral Soil (1). CUT1 • Cultural community (CU). • Tree cover <25 %; shrub cover >25% (T). • Mineral soil (1).
OTHER*			
M	Manicured	**Planted/established trees/shrubs**	• Areas where grass/shrubs/trees are maintained/retained and/or planted.

4.3.3 Flora

A total of 34 plant species have been recorded within the study area. One plant species could only be identified to genus and is not included in the following calculations. Of the 33 plant species identified, 8 (24%) plant species identified are native to Ontario and 25 (76%) plant species are considered introduced and non-native to Ontario. A list of vascular plants is presented in **Appendix B**. Definitions of the acronyms and species ranks used in **Appendix B** are described in **Appendix C**.

4.3.4 Species at Risk and Locally Rare Species

One plant species listed under the ESA was identified within the study area. Kentucky coffee tree (*Gymnocladus dioicus*) is regulated as 'Threatened' by the Ontario *Endangered Species Act* and was encountered during LGL's investigations of the study area. Three (3) Kentucky coffee trees were noted as a planted amenity trees. In January 2023 Ontario Regulation 230/08, refined the areas in which Kentucky coffee tree is regulated and consequently, Kentucky coffee trees in the City of Mississauga are no longer regulated.

No plant species that are considered regionally or locally rare were identified within the study area during LGL's botanical field investigation.

4.4 Tree Resources

A tree inventory within the study area was conducted on July 20 and December 12, 2023. All trees within the proposed disturbance limits, as well as any that could be impacted by the proposed construction were inventoried. The results of the tree inventory are presented under separate cover in the Arborist Report and Tree Protection Plan prepared by LGL.

4.5 Wildlife and Wildlife Habitat

4.5.1 Background Information

The study area lies in a predominantly residential and commercial setting, the natural areas associated with Cooksville Creek provides the main habitat for wildlife in the area. The creek valley and its associated natural areas provide a wildlife corridor through the area. The Cooksville Creek valley provides a variety of habitat types including deciduous woodlands and open riparian habitats. No wetlands are present in the study area.

Available background information from CVC, the Natural Areas Survey (2020), Ontario Nature Reptile and Amphibian Atlas (Ontario Nature 2023), and the Ontario Breeding Bird Atlas (OBBA) (Bird Studies Canada 2006) were reviewed for the broader project area (study area plus 120 m). The results of the background review are summarized in **Table 2**, while these species have some potential to be found in a broader project area, habitat potential within the study area is limited.

4.5.2 Species at Risk and Locally Rare Species

A review of available databases (Ontario Nature, Ontario Butterfly Atlas, Ontario Reptile Atlas, iNaturalist, OBBA, and eBird data) identifies the potential presence of several wildlife species at risk within 10 km of the study area (**Table 2**). In addition, the City of Mississauga's Natural Areas Survey (2020) indicates that a provincially threatened fauna species, Chimney Swift was observed at CV12. However, habitat potential for the species at risk listed in **Table 2** within the study area is limited. These species are further discussed in the species at risk screening in **Section 4.6** including habitat requirement, potential occurrence within the study and mitigation measures to be implemented during detailed design.

Table 2: Background Records of Wildlife Species at Risk in the Greater Study Area.

Common Name	Scientific Name	ESA	Source
Barn Swallow	*Hirundo rustica*	Threatened	Ebird
Bobolink	*Dolichonyx orzivorus*	Threatened	Ebird
Canada Warbler	*Cardellina canadensis*	Special Concern	Ebird
Chimney Swift	*Chaetura pelagica*	Threatened	OBBA, Ebird
Eastern Wood-pewee	*Contupus virens*	Special Concern	NHIC, eBird
Monarch	*Danaus plexippus*	Special Concern	Ontario Butterfly Atlas
Blanding's Turtle	*Emydoidea blandingii*	Threatened	Ontario Reptile Atlas
Snapping Turtle	*Chelydra serpentina*	Special Concern	Ontario Reptile Atlas, NHIC
Wood Thrush	*Hylocichla mustelina*	Special Concern	NHIC, OBBA, Ebird

4.5.3 Field Investigations

Wildlife observations were recorded during the visit on July 20, 2023, as summarized in **Table 3**. A total of 8 species were documented during the field investigation by LGL through direct observation or incidental observation (scat, tracks, hair, call, den, etc.), including three mammal species and five bird species.

Bird species observed are considered migratory and all are species regulated under the *Migratory Birds Convention Act* (MBCA), while the Eastern Gray Squirrel (*Sciurus carolinensis*), Eastern Cottontail (*Sylvilagus floridanus*) and White-tailed Deer (*Odocoileus virginianus*) are protected under the Fish and Wildlife Conventions Act (FWCA).

Table 3: Summary of LGL Limited Incidental Wildlife Observations within the Study Area*

Type	Scientific Name	Common Name	G Rank	S Rank	COSEWIC	SARA	SARO	FWCA	MBCA
Bird	*Corvus brachyrhynchos*	American Crow	G5	S5					X
Bird	*Turdus migratorius*	American Robin	G5	S5B					X
Bird	*Poecile atricapillus*	Black-capped Chickadee	G5	S5					X
Bird	*Anas platyrhynchos*	Mallard	G5	S5					X
Bird	*Melospiza melodia*	Song Sparrow	G5	S5B					X
Mammals	*Sciurus carolinensis*	Eastern Gray Squirrel	G5	S5				G	
Mammals	*Procyon lotor*	Northern Racoon	G5	S5				F	
Mammals	*Mephitis mephitis*	Striped Skunk	G5	S5				F	

*- Acronyms and definitions are presented in Appendix C

4.5.4 Wildlife Communities and Habitat

In general, the study area encompasses a highly urban influenced section of Cooksville Creek. As such, wildlife communities within the study area are tolerant of urban influence due to the extent of park use and surrounding landuses. Notwithstanding, this area provides an important north-south corridor through the watershed. As the Cooksville Creek crossing will require vegetation removals in the riparian area, it is warranted to minimize impacts to the extent feasible and to restore to existing or as-better conditions.

A snag survey was conducted at the proposed open cut crossing of Cooksville Creek on December 12, 2023, during leaf off conditions. It was determined that within the construction area, there are two potential bat snag trees (see **photo appendix**).

- Tree 23 is a Manitoba maple with a DBH of 23cm and a Decay Class of 2. It is leaning and has sloughing bark at a height of 6m, suitable for maternal roosts.
- Tree 30 is also a Manitoba maple. It has a DBH of 21 and a decay class of 3. It is leaning and has a broken canopy which has created a cavity that could be suitable for maternal roots.

4.6 Species at Risk Summary

A screening for species at risk within the study area was completed based on available background information and LGL's field investigations and is presented in **Table 4**. The screening includes an assessment of the potential to occur with the study area ranked as Low, Moderate, High potential or Confirmed to occur within the study area, habitat requirements and mitigation recommendations during Detailed Design.

Table 4: Summary of Species at Risk Screening

Type	Species		LGL Surveys (	MNRF NHIC	DFO SAR Mapping	Ontario Butterfly Atlas	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	eBird	MNRF Screening (	Endangered Species Act Designation[1]	Habitat	Potential for Habitat/Screening Conducted by LGL	Mitigation Recommendations for Detailed Design
Vegetation	American Chestnut (*Castanea dentata*)									X	Endangered	Generally found in deciduous or mixed forests with well drained soils. Most often found in the Carolinian zone in Ontario.	No habitat found in study area. ELC and arborist survey conducted within the vicinity of the worksite. No known background records for this species.	No further recommendations.
Vegetation	Butternut (*Juglans cinerea*)			X						X	Endangered	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldom, on dry, rocky and sterile soils. In Ontario, the Butternut Generally grows alone or in small groups in deciduous forests as well as in hedgerows	No Butternut were found during ELC and arborist surveys of the study area.	No further recommendations.
Bird	Barn Swallow (*Hirundo rustica*)								X	X	Threatened	Prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	No potential nesting sites were observed in study area.	No removal of built structures with the potential to function as nesting habitat are anticipated at this time. No further recommendations.
Bird	Bobolink (*Dolichonyx oryzivorus*)								X	X	Threatened	This species occurs in tallgrass prairies, open meadows, and fallow agricultural fields. It's also often found in hay fields.	No suitable habitat for this species found in study area.	No further recommendations.
Bird	Chimney Swift (*Chaetura pelagica*)							X	X	X	Threatened	Historically found in deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer; now most are found in urban areas in large, uncapped chimneys.	No buildings with chimneys suitable for nesting found in study area. Chimney Swifts observed flying over the study area.	No removal of built structures with the potential to function as habitat are anticipated. No further recommendations.
Bird	Canada Warbler (*Cardellina canadensis)*								X		Special Concern	Nests in deciduous and mixed conifer forests with shrubs and mosses frequently near water.	No suitable habitat for this species found in the study area.	No further recommendations.

Table 4: Summary of Species at Risk Screening

Type	Species		LGL Surveys (	MNRF NHIC	DFO SAR Mapping	Ontario Butterfly Atlas	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	eBird	MNRF Screening (	Endangered Species Act Designation[1]	Habitat	Potential for Habitat/Screening Conducted by LGL	Mitigation Recommendations for Detailed Design
Bird	Eastern Wood-Pewee (*Contopus virens*)								X	X	Special Concern	Mixed and deciduous forests in the mid-canopy layer near forest clearings and edges. The forests usually have little understory vegetation.	Suitable habitat for this species found in forests in study area.	Tree and vegetation clearing shall ensure compliance of the Migratory Bird Convention Act which identifies timing restrictions for clearing during breeding bird season (avoid clearing from April 1-August 31) for nesting Zone C2.
Bird	Peregrine Falcon (*Falco peregrinus*)								X	X	Special Concern	Nesting sites include cliff faces and ledges as well as the ledges on tall buildings, bridges, and other anthropogenic structures. They have also been found nesting in quarries and open pit mines	No suitable habitat for this species found in study area. No background records in EBird for the study area.	No further recommendations.
Bird	Wood Thrush (*Hylocichla mustelina*)								X	X	Special Concern	Mature deciduous and mixed woods. Nests regularly in Sugar Maple and American Beech.	Suitable habitat for this species found in woodland in study area.	Tree and vegetation clearing shall ensure compliance of the Migratory Bird Convention Act which identifies timing restrictions for clearing during breeding bird season (avoid clearing from April 1-August 31) for nesting Zone C2.
Reptile	Blandings Turtle (*Emydoidea blandingii*)						X			X	Threatened	Found in shallow aquatic habitat such as wetlands, rivers, and lakes	Cooksville Creek provides suitable habitat, but this species is considered low likelihood to occur here.	Consideration for turtles and turtle protection should ensure that the study area is delineated securely to ensure wildlife cannot enter the construction area (eg. such as through perimeter silt fencing). Should wildlife be encountered, actions and potential wildlife handling should be undertaken by a qualified environmental inspector.
Reptile	Eastern Ribbonsnake (*Thamnophis sauritus*)									X	Special Concern	They are a semi aquatic species. Their habitat is forests near water, particularly marsh habitat within a forest.	Marginal habitat for this species found in the study area, in Cooksville Creek and associated woodlands.	Recommend using ESCs as wildlife fencing to keep wildlife out of construction area.

Table 4: Summary of Species at Risk Screening

Type	Species		LGL Surveys (	MNRF NHIC	DFO SAR Mapping	Ontario Butterfly Atlas	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	eBird	MNRF Screening (	Endangered Species Act Designation[1]	Habitat	Potential for Habitat/Screening Conducted by LGL	Mitigation Recommendations for Detailed Design
Reptile	Northern Map Turtle (*Graptemys geographica*)						X			X	Special Concern	They inhabit rivers and lakes that support molluscs (for prey).	Cooksville Creek provides suitable habitat, but this species is considered low likelihood to occur here.	Consideration for turtles and turtle protection should ensure that the study area is delineated securely to ensure wildlife cannot enter the study area (eg. such as through perimeter silt fencing). Should wildlife be encountered, a qualified environmental inspector who can address and handle wildlife should be consulted.
Reptile	Snapping Turtle (*Chelydra serpentina*)			X			X			X	Special Concern	Aquatic setting such as lakes, ponds, bays and inlets. This is a highly aquatic species but may leave the water to seek out new aquatic habitats or to lay eggs.	Habitat for this species found in the study area, in Cooksville Creek.	Consideration for turtles and turtle protection should ensure that the study area is delineated securely to ensure wildlife cannot enter the study area (eg. such as through perimeter silt fencing). Should wildlife be encountered, a qualified environmental inspector who can address and handle wildlife should be consulted.
Mammal	Eastern Small-footed Bat (*Myotis leibii*)									X	Endangered	Overwintering habitat: Caves and mines Maternal Roosts: Caves, tree cavities, rock outcrops, bridges and buildings	No potential for hibernacula identified. Potential for maternal roosts in woodland. Candidate snag trees were identified during the site investigations during leaf-off conditions on December 12, 2023.	Apply timing window for tree clearing to protect maternity roosting period (avoid clearing May 1 to November 15). Further consultation may be required with the MECP to ensure compliance with the ESA at all project phases.
Mammal	Little Brown Bat (*Myotis lucifugus*)									X	Endangered	Overwintering habitat: Caves and mines that remain above 0. Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh).	No potential for hibernacula identified. Potential for maternal roosts in woodland. Candidate snag trees were identified during the site investigations during leaf-off conditions on December 12, 2023.	Apply timing window for tree clearing to protect maternity roosting period (avoid clearing May 1 to November 15). Further consultation may be required with the MECP to ensure compliance with the ESA at all project phases.
Mammal	Northern Long Eared Bat (*Myotis septentrionalis*)									X	Endangered	Overwintering habitat: Caves and mines that remain above 0. Maternal Roosts: Often associated with cavities of large diameter trees (25-44 cm dbh) with cavities and crevices. Occasionally found in structures (attics, barns etc.)	No potential for hibernacula identified. Potential for maternal roosts in woodland. Candidate snag trees were identified during the site investigations during leaf-off conditions on December 12, 2023.	Apply timing window for tree clearing to protect maternity roosting (avoid clearing May 1 to November 15). Further consultation may be required with the MECP to ensure compliance with the ESA at all project phases.

Table 4: Summary of Species at Risk Screening

Type	Species		LGL Surveys (	MNRF NHIC	DFO SAR Mapping	Ontario Butterfly Atlas	Ontario Reptile and Amphibian Atlas	OBBA (2001-2005)	eBird	MNRF Screening (	Endangered Species Act Designation[1]	Habitat	Potential for Habitat/Screening Conducted by LGL	Mitigation Recommendations for Detailed Design
Mammal	Tri-Coloured Bat (*Perimyotis subflavus*)									X	Endangered	Overwintering habitat: Caves and mines that remain above 0. Maternal Roosts: Often associated with clusters of dead leaves in large diameter Oak or Maple trees	No potential for hibernacula identified. Potential for maternal roots in woodland. Candidate snag trees were identified during the site investigations during leaf-off conditions on December 12, 2023.	Apply timing window for tree clearing to protect maternity roosting (avoid clearing May 1 to November 15). Further consultation may be required with the MECP to ensure compliance with the ESA at all project phases.
Invertebrate	Monarch (*Danaus plexippus*)					X					Special Concern	Summer habitat in Ontario includes meadows and open areas where milkweed grows. Caterpillars feed on milkweed, while adults feed on a variety of wildflowers	No suitable habitat found in study area for nectaring, breeding, orstaging. No overwintering habitat in Canada.	No additional mitigation recommended at this time.

1 Endangered Species Act (ESA), 2007 (O.Reg 242/08 July 2022). Species at Risk in Ontario List, 2007 (O.Reg 230/08 last amended January 2023.); Schedule 1 (Extirpated - EXP), Schedule 2 (Endangered - END), Schedule 3 (Threatened - THR), Schedule 4 (Special Concern – S).

5. DESIGN ALTERNATIVES

Consideration of two alternatives was undertaken during the Environmental Assessment process. A summary of the alternatives is provided below and the rational for the selection of the preferred option.

5.1 Option 1 (Preferred Option)

Option 1 proposes approximately 580m of a 525mm sanitary diversion sewer starting from Hurontario Street and travelling northeast along Kirwin Avenue. The proposed sewer will follow the bend in Kirwin Avenue and connect to the 825mm Cooksville Creek Trunk Sewer at an existing maintenance hole on the south side of the creek bank.

This option includes crossing the existing watercourse, Cooksville Creek, just south of Lynwood Lane before connecting to the trunk sewer. Trenchless technologies were reviewed for the watercourse crossing, however due to limited cover (~1m), existing connection elevations, and lack of available space for shafts, it was determined that trenchless technology cannot be used. Therefore the proposed sewer will be constructed via open cut for the entire length. Utilizing a flume/cofferdam with a scour pad will allow for the crossing to be constructed by open cut methodology.

5.2 Option 2

The second option is a proposed 525mm sanitary diversion sewer also starting from Hurontario Street and travelling northeast along Kirwin Avenue, however, at the Kirwin Avenue and Jaguar Valley Drive intersection, the proposed sewer will continue southeast along Jaguar Valley Drive replacing the existing 250mm sewer. Following the bend in the road, the proposed sewer will then cross through the south end of John C. Price Park to Little John Lane. The sewer will then travel southeast on Little John Lane and finally connect to an existing maintenance hole on the 825mm Cooksville Creek Trunk Sewer at the intersection of Little John Lane and Dundas Street East.

Option 2 crosses the existing watercourse in John C. Price Park before meeting Little John Lane. Due to major grade separation, this crossing cannot be accommodated by open cut methodology. Trenchless technologies have been reviewed, however due to limited cover (~1m) and proximity to the footing structures, frac out is expected. The remainder of the proposed sewer will be constructed via open cut.

6. IMPACT ASSESSMENT

A detailed assessment of the potential impacts on natural heritage and hydrological features within the study area was undertaken based on the preferred design alternative. The sections below outline an assessment of the potential impacts to natural heritage features and provides the best management practices and approaches to minimize impacts to the natural heritage within the study area.

An impact assessment for Option 2 was not completed given that it is not feasible to implement Option 2.

6.1 Earthworks

The proposed works will result in the excavation, storage/stockpiling and grading/spreading of soils at the construction sites. Excess soil materials can also be generated that require management on- or off-site. A Soil Management Plan should be prepared in accordance with the *Preserving and Restoring Healthy Soil: Best Practices for Urban Construction* (TRCA 2012d). The Soil Management Plan should recommend appropriate soil management best practices and post-construction monitoring requirements. Excess soils generated at the construction sites shall be managed in accordance with the *Management of Excess Soil: A Guide for Best Management Practices* (MECP 2019) by a qualified engineer.

A site-specific Erosion and Sedimentation Control (ESC) Plan should be implemented prior to construction, maintained during construction, and removed after construction (once soils have stabilized). **Section 7** provides additional recommendations on erosion and sediment control within the study area.

6.2 Potential Impacts to Aquatic Habitats and Communities

Serious harm to fish and fish habitat can be assessed based on the following effects:

- Temporary or permanent disruption of site-specific habitat;
- Changes to water quality and quantity;
- Changes in water temperature; and,
- Barriers to fish passage.

The proposed works will not result in permanent impacts to fish or fish habitat. It is anticipated that there will be temporary impacts while flows are diverted around the excavation area. An increase in surface runoff has the potential to result in erosion and sedimentation of adjacent habitats and degradation of aquatic environs. Indirect effects are not expected for fish and fish habitat in Cooksville Creek with the implementation of erosion and sediment controls to prevent the suspension and/or run-off of soils (or other deleterious substances) from reaching the creek and the use of appropriate timing windows. As this is a warmwater watercourse, construction should occur between July 1 and March 31. By completing the construction in a timely manner, the barrier to fish passage created during site isolation will be temporary in duration. Mitigation to minimize these impacts are presented in **Section 7**.

6.3 Potential Impacts to Vegetation and Vegetation Communities

Impacts to vegetation as a result of the proposed sanitary sewer placement will result in the removal of a small portion of the cultural woodland/thicket community adjacent to Kirwin Avenue (**Figure 3**). Overall, impacts resulting in the loss of vegetation within the cultural woodland/thicket community are considered to be minor. Cultural vegetation communities typically persist in areas

that are regularly disturbed, and as a result, generally contain a high proportion of invasive and non-native plant species that are tolerant of these conditions. Mitigation measures to minimize impacts are presented in **Section 7**.

6.4 Potential Impacts to Tree Resources

The potential impact to tree resources within the study area have been addressed in the Arborist Report available under separate cover (LGL Limited 2024). A total of 17 trees have been identified for removal, based on the disturbance limits.

6.5 Potential Impacts to Wildlife and Wildlife Communities

The open cut crossing construction activities temporarily affect wildlife activity (through avoidance, noise which may disrupt calls/communication, direct conflict with equipment). Wildlife habitat may be affected through direct tree and vegetation removals, as well as the temporary construction disturbance.

However, due to the prevalence of the existing paved pathways and trail use within the woodland, impacts in this regard are expected to be minor or negligible in relation to the existing uses.

7. MITIGATION MEASURES

Where impacts cannot be avoided, mitigation measure have been designed to reduce or minimize impacts on the natural heritage system form and function. Impacts that cannot be mitigation may require a description of compensation or restoration measures.

7.1 Project Planning and General Mitigation

Construction related impacts can first be mitigated by minimizing the extent of disturbance wherever possible through coordination of all project related planning, including design, staging, and scheduling. Mitigation related to staging of construction includes prioritizing project components in such a way that disturbance within the same construction area would be minimized (i.e. coordination of all disturbance activities in a manner that reduces the impact at these locations). Consideration for mitigation and protection measures have included:

- Minimize vegetation and tree removals through design;
- Minimize construction area to the extent possible;
- Staging of in-water works and project activities, to minimize the area and duration of exposed soils;
- Cofferdam should be employed during construction, dewatering effluent will be treated prior to discharge to receiving watercourse;
- In-water work are to be performed in the dry, where construction works are isolated from creek flows;
- Ensure that any fish that may be trapped in work area be safely relocated outside of the work zone with appropriate permits and approvals in place;
- Use appropriate tree protection measures for any work around tree resources within the project area to help protect trees identified to be retained;
- Use previously disturbed areas for construction laydown and staging to the extent possible;

- No vegetation removal should occur between April 1 and August 31 of any given year in order to protect birds afforded protection under the Migratory Birds and Convention Act;
- No tree removal or pruning within the bat maternal roosting period for bats (May 1 to November 15. of any given year). Note, this timing window is weather dependant and this approach should be confirmed by MECP should construction be required at either end of the window;
- Locate site maintenance, vehicle washing and refuelling stations where contaminants are handled off-site, and outside of the source water protection area for the pipe intake; and,
- Ensure that a Spills Management Plan (including materials, instructions regarding their use, education of contract personnel, and emergency contact numbers) is on-site at all times for implementation in event of an accidental spill during construction. An emergency spill kit shall be kept on site. A response plan shall also be developed that is to be implemented immediately in the event of a sediment release.

7.2 Erosion and Sediment Control

The extent of construction related activity can be effectively isolated and secured from adjacent natural lands through the installation of erosion and sediment control measures to mitigate the potential for silt and sediment entry into surface water features and adjacent lands. To some extent, the isolation of the work area will also discourage the entry of wildlife into the work zone, thereby minimizing incidental encounter and the risk of incidental mortality during construction.

A standalone Erosion and Sediment Control (ESC) Plan should be developed and implemented for the site that minimizes risk of sediment transport into adjacent retained vegetation communities or to the aquatic habitat of Cooksville Creek during all phases of the project. The plan should reference the *Erosion and Sediment Control Guide for Urban Construction* (Toronto and Region Conservation Authority 2019). This plan should include:

- Methods to isolate the construction area, such as cofferdams;
- Timing of effective ESC measures, where ESCs shall be installed before starting work to prevent the entry of sediment into the watercourse or adjacent areas. Inspect regularly during the course of construction and conduct regular maintenance and repairs as necessary;
- Clearly identified stockpiling and staging areas; and,
- Develop a plan to dispose of any water accumulated onsite from dewatering or pooled stormwater.

7.3 Watercourse Restoration

In addition to the efforts made to reduce impacts to natural heritage features, where impacts are unavoidable, restoration is required. This section focuses on restoration recommendations and provides a preliminary estimate of the area required for channel restoration within Cooksville Creek.

The following guidelines will inform the watercourse restoration design.

- Channel should be stabilized immediately following construction;

- Channel and banks should be restored to the same or better condition than prior to construction; and,
- Revegetation along stream banks should include appropriate native shrub and tree cover to provide shade and stabilize soils.

7.4 Dewatering Plan

A temporary water control plan will be required in order to ensure construction across Cooksville Creek is completed in the dry. At the time of writing of this report, no plan was available. It is assumed that a pump around plan will be provided for review at a later date. This will include appropriately sized pumps and hoses to pump water around the construction area and maintain creek flows for the duration of construction.

Should any groundwater taking be required, plans need to be put in place for the discharge of the water that will not impact surface water.

7.5 Terrestrial Restoration

Restoration of the cultural woodland/thicket community should be undertaken post construction. At a minimum to the restoration should seeding and planting of native trees/shrubs within the area of the open cut crossing of Cooksville Creek.

7.5.1 General Restoration Recommendations

The recommendations below should be considered in the design of the restoration plans:

- Soil should be stabilized immediately post construction. Stabilization may include hydroseeding, or the use of materials such as jute mats, or straw mulch.
- Seed mixtures should include non-invasive species. The CVC has recommended seed mixes (August 2014). The guideline also gives guidance on the rate of application and when the seed should be planted.
- Utilize native plantings that are suitable for the soil, moisture, and light conditions of the site. These plantings should also be compatible with, and complement the existing vegetation communities.
- Trees should be planted on centres of 5m, with 1 metre centres for shrub species.
- When selecting vegetation for plantings, try to achieve a degree of structural and species diversity.
- Mulch and rodent guards may be needed to protect young tree stems. Larger planting stock may be required in grassy areas to due to competing herbaceous vegetation.
- Maintenance plans should include watering during summer dry spells for the first 2 years after planting at minimum.
- Restoration plans should indicate timing of the restoration works on the drawings, as well as phasing if applicable.
- The restoration plans should also indicate clearly the placement of protection measures for vegetation to be retained.

- Bareroot stock should only be installed while dormant in spring or after leaf fall in autumn. Planting of balled and burlapped and container-grown stock can be installed at any time during the growing season if adequate water is supplied.

7.5.2 Site specific recommendations

- Restoration should confirm space requirements for future and ongoing maintenance access to the existing and proposed infrastructure.
- Restoration should consider the use of fencing to protect restoration plantings given the heavy path use.

7.6 Tree Protection

Impacts to tree resources due to construction are expected. When any future construction is proposed, at a minimum, the following tree protection measures are recommended:

- Construction materials, equipment, soil, construction waste or debris, parking of vehicles, etc., shall not be placed or stored within the staked dripline or immediately adjacent of trees identified for protection;
- Prune any exposed roots with a diameter of less than 5 cm to promote regeneration and prevent infection. All roots greater than 5 cm in diameter should not be removed;
- Any tree removals, pruning or root cutting required is to be conducted by a qualified Arborist;
- Apply a slow-release deep root low nitrogen fertilizer to promote increased vigour;
- No signs or objects shall be displayed or affixed to any trees protected;
- Disposal of any liquids shall not occur within 1 metre of the staked Dripline or immediately adjacent to protected trees; and,
- Should any additional, incidental or accidental tree injuries occur during construction, a qualified Arborist shall be consulted to determine whether additional mitigation measures should be employed.

These efforts will help to ensure that impacts to retained trees are minimal and that the condition and character of these trees will not change, either in the short-term or long-term period. A tree protection plan and arborist report has been prepared under separate cover to ensure the protection of retained vegetation.

The Arborist Report and Tree Preservation Plan prepared by LGL is available under separate cover.

7.7 Potential Impacts to Migratory Birds and Compliance with Migratory Birds Act.

Background review and site investigations included documentation of numerous species listed under the *Migratory Birds Convention Act* (MBCA). The MBCA prohibits the killing, capturing, injuring, taking, or disturbing of migratory birds (including eggs) or the damaging, destroying, removing, or disturbing of nests. To protect birds in the breeding season, vegetation removals should be avoided between April 1 and August 31 of any given year. Nest sweeps can be conducted by a qualified avian biologist should clearing be required during this period, however, no clearing can be conducted if nesting birds are found in the area.

7.8 Displacement of Rare, Threatened or Endangered Wildlife or Significant Wildlife Habitat

Two candidate SAR Bat Maternal Roosting Habitat (cavity trees) were noted within the open cut construction area. To protect bats in the maternal roosting period, all cavity tree removals should be avoided between May 1 and November 15 of any given year (timing window subject to approval by MECP).

8. CONCLUSION

An impact assessment was performed for the proposed project disturbance area. **Table 5** provides a summary of the potential permitting and approvals that may be required for this project to date.

Table 5 Summary of Potential Environmental Permits or Approvals Required.

Legislation	Plan/Regulation/ By-law	Permit/Approval/Authorization	Permit or Approval Required
Fisheries Act		Harmful, Alteration, Disruption, Destruction (HADD). DFO review	Required for in-water works or works below high water mark. Not identified at this time, with the implementation of the appropriate mitigation.
Migratory Birds Convention Act	n/a	Not identified.	Not identified with appropriate mitigation.
Species at Risk Act	n/a	SARA permit.	Not identified.
Ontario Water Resources Act	Permit to Take Water (PTTW)	PTTW required for construction dewatering > 400,000L/day (see below).	Not anticipated, to be determined by the project hydrologist.
Environmental Protection Act	Regulation 63/16 Registrations under Part II of the Act-Water Taking	Environmental Activity and Sector Registration EASR (Water taking for Construction Site Dewatering) required for groundwater taking between 50,000- 400,000 Litres on a single day under normal operation.	To be determined by the project hydrologist.
Conservation Authorities	Ontario Regulation (CVC):	For project works within a regulated area, a permit under	Required.

Act	Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (O.Reg. 160/06).	O.Reg 160/06 will be required.	
Endangered Species Act	Several Regulations exist.	Ministry of the Environment, Conservation and Parks (MECP) administers the Endangered Species Act, 2007 (ESA) in Ontario. Activities that require harm to a species at risk or its habitat may be permitted through Ontario Regulation 242/08	Not required with appropriate mitigation for impacts to SAR bats.

Through background information review and field investigations the following key natural heritage features and species were identified on and adjacent to the study area:

- Cooksville Creek;
- Greenlands;
- Candidate SAR Bat Habitat (maternal roost cavity trees); and,
- CVC Regulated Areas.

Fish habitat conditions in Cooksville Creek are poor due to the urban nature of this creek, and the barriers to upstream movement of fish. Terrestrial vegetation was also noted to be disturbed, and urban in nature. Restoration of the channel and riparian vegetation should be undertaken in order to mitigate for impacts to aquatic and terrestrial habitat in the study area.

With appropriate mitigation, the construction of the sewer along Kirwin Avenue and across Cooksville Creek is not anticipated to have any negative impacts on the natural environment in the study area.

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Appendix A

Photo Apppendix

Project #TA9334
July 2023

Photo Appendix

Photo 1: Cooksville Creek upstream (east) of Kirwin Ave.

Photo 2: Cooksville Creek, further upstream facing west towards Kirwin Ave.

Photo 3: Cooksville Creek, upstream of Kirwin Ave facing north (upstream).

Photo 4: Bank restoration efforts upstream of Kirwin Ave.

Photo 5: Cooksville Creek downstream of Kirwin Ave, facing southwest.

Photo 6: Cooksville Creek substrate, cobble, covered in Cladophora.

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Photo Appendix

Photo 7: Cooksville Creek downstream (southwest) of Kirwin Ave, facing downstream.

Photo 8: Cooksville Creek, upstream of Jaguar Valley Dr, facing north (upstream).

Photo 9: Cooksville Creek, upstream of Jaguar Valley Dr, double concrete culverts.

Photo 10: Cooskville Creek west bank wall at Jaguar.

Photo 11: Cooksville Creek east bank at Jaguar.

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December 2023

Photo Appendix

Photo 12: Cooksville Creek downstream (southwest) of Kirwin Ave, facing downstream at riffle

Photo 13: Cooksville Creek, facing downstream from proposed crossing location.

Photo 14: Small cultural woodland with bat snag trees just west of Kirwin Ave.

Photo 15: Bat snag #23.

Photo 16: Bat snag #30

Appendix B

Vascular Plant List

Appendix B
Vascular Plant List

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Peel	CUW1/CUT1
	PINACEAE	**PINE FAMILY**						
*	*Picea pungens*	Colorado spruce	G5	SE1				X
	ULMACEAE	**ELM FAMILY**						
*	*Ulmus pumila*	Siberian elm	G?	SE3			X	X
	MORACEAE	**MULBERRY FAMILY**						
*	*Morus alba*	white mulberry	G?	SE5			X	X
	POLYGONACEAE	**SMARTWEED FAMILY**						
*	*Polygonum cuspidatum*	Japanese knotweed	G?	SE4			X	X
*	*Polygonum persicaria*	lady's-thumb	G?	SE5			X	X
*	*Rumex crispus*	curly-leaf dock	G?	SE5			X	X
	TILIACEAE	**LINDEN FAMILY**						
	Tilia americana	basswood	G5	S5			X	X
	SALICACEAE	**WILLOW FAMILY**						
*	*Salix alba*	white willow	G5	SE4			X	X
	Salix sp.	willow		?				X
	BRASSICACEAE	**MUSTARD FAMILY**						
*	*Alliaria petiolata*	garlic mustard	G5	SE5			X	X
*	*Hesperis matronalis*	dame's rocket	G4G5	SE5			X	X
	ROSACEAE	**ROSE FAMILY**						
	Prunus virginiana var. virginiana	choke cherry	G5T?	S5			X	X
*	*Rosa multiflora*	multiflora rose	G?	SE4			X	X
	FABACEAE	**PEA FAMILY**						
*	*Coronilla varia*	variable crown-vetch	G?	SE5			X	X
*	*Lotus corniculatus*	bird's-foot trefoil	G?	SE5			X	X

Appendix B
Vascular Plant List

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Peel	CUW1/CUT1
*	*Medicago sativa ssp. sativa*	alfalfa	G?T?	SE5			X	X
*	*Melilotus alba*	white sweet-clover	G?	SE5			X	X
*	*Robinia pseudo-acacia*	black locust	G5	SE5			X	X
	CORNACEAE	**DOGWOOD FAMILY**						
	Cornus sericea ssp. sericea	red-osier dogwood	G5	S5			X	X
	RHAMNACEAE	**BUCKTHORN FAMILY**						
*	*Rhamnus cathartica*	common buckthorn	G?	SE5			X	X
	VITACEAE	**GRAPE FAMILY**						
	Parthenocissus vitacea	inserted Virginia-creeper	G5	S5			X	X
	ACERACEAE	**MAPLE FAMILY**						
	Acer negundo	manitoba maple	G5	S5			X	X
*	*Acer platanoides*	norway maple	G?	SE5			X	X
	ANACARDIACEAE	**SUMAC FAMILY**						
	Rhus hirta	staghorn sumac	G5	S5			X	X
	GERANIACEAE	**GERANIUM FAMILY**						
*	*Geranium robertianum*	herb-robert	G5	SE5			X	X
	APIACEAE	**PARSLEY FAMILY**						
*	*Daucus carota*	wild carrot	G?	SE5			X	X
	LAMIACEAE	**MINT FAMILY**						
*	*Leonurus cardiaca ssp. cardiaca*	common motherwort	G?T?	SE5			X	X
	PLANTAGINACEAE	**PLANTAIN FAMILY**						
*	*Plantago major*	common plantain	G5	SE5			X	X
	OLEACEAE	**OLIVE FAMILY**						
	Fraxinus pennsylvanica	red ash	G5	S5			X	X

Appendix B
Vascular Plant List

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Peel	CUW1/CUT1
	ASTERACEAE	**ASTER FAMILY**						
	Ambrosia artemisiifolia	common ragweed	G5	S5			X	X
*	*Arctium minus*	common burdock	G?T?	SE5				X
*	*Cichorium intybus*	chicory	G?	SE5			X	X
	POACEAE	**GRASS FAMILY**						
*	*Bromus inermis ssp. inermis*	awnless brome	G4G5T?	SE5			X	X
*	*Dactylis glomerata*	orchard grass	G?	SE5			X	X

X – indicates presence/* - indicates non-native

Appendix C

Acronyms and Definitions

Appendix C
Acronyms and Definitions Used in Species Lists

Species Rank

GRANK	**Global Rank**
Global ranks are assigned by a consensus of the network of Conservation Data Centres, scientific experts, and The Nature Conservatory to designate a rarity rank based on the range-wide status of a species, subspecies or variety. The most important factors considered in assigning global ranks are the total number of known, extant sites world-wide, and the degree to which they are potentially or actively threatened with destruction. Other criteria include the number of known populations considered to be securely protected, the size of the various populations, and the ability of the taxon to persist at its known sites. The taxonomic distinctness of each taxon has also been considered. Hybrids, introduced species, and taxonomically dubious species, subspecies and varieties have not been included.	
Short Form	**Definition**
G1	**Extremely rare;** usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2	**Very rare;** usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to extinction.
G3	**Rare to uncommon**; usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
G4	**Common**; usually more than 100 occurrences; usually not susceptible to immediate threats.
G5	**Very common**; demonstrably secure under present conditions.
GH	Historic, no records in the past 20 years.
GU	Status uncertain, often because of low search effort or cryptic nature of the species; more data needed.
GX	Globally extinct. No recent records despite specific searches.
?	Denotes inexact numeric rank (i.e. G4?).
G	A "G" (or "T") followed by a blank space means that the NHIC has not yet obtained the Global Rank from The Nature Conservancy.
G?	Unranked**,** or, if following a ranking, rank tentatively assigned (e.g. G3?).
Q	Denotes that the taxonomic status of the species, subspecies, or variety is questionable.
T	Denotes that the rank applies to a subspecies or variety.

SRANK	**Provincial Rank**
Provincial (or Sub-national) ranks are used by the Ontario Ministry of Natural Resources Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario. By comparing the global and provincial ranks, the status, rarity, and the urgency of conservation needs can be ascertained. The NHIC evaluates provincial ranks on a continual basis and produces updated lists at least annually.	
Short Form	**Definition**
S1	**Critically Imperiled** in Ontario because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation.
S2	**Imperiled** in Ontario because of rarity due to very restricted range, very few populations (often 20 or fewer occurrences) steep declines or other factors making it very vulnerable to extirpation.
S3	**Vulnerable** in Ontario due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4	**Apparently Secure**—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5	**Secure**—Common, widespread, and abundant in Ontario.
SX	**Presumed Extirpated** – Species or community is believed to be extirpated from Ontario.
SH	**Possibly Extirpated** – Species or community occurred historically in Ontario and there is some possibility that it may be rediscovered.
SNR	**Unranked**—Conservation status in Ontario not yet assessed
SU	**Unrankable**—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA	**Not Applicable** —A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S#	**Range Rank** —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

COSEWIC	**Committee on the Status of Endangered Wildlife in Canada**
The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species that are considered to be at risk in Canada.	
Status	**Definition**
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

Not at Risk (NAR)	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)	A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.

COSSARO/OMNR	**Committee on the Status of Species at Risk in Ontario/Ontario Ministry of Natural Resources**
The Committee on the Status of Species at Risk in Ontario (COSSARO)/Ontario Ministry of Natural Resources (OMNR) assesses the provincial status of wild species that are considered to be at risk in Ontario.	
Status	**Definition**
Extinct (EXT)	A species that no longer exists anywhere.
Extirpated (EXP)	A species that no longer exists in the wild in Ontario but still occurs elsewhere.
Endangered (Regulated) (END–R)	A species facing imminent extinction or extirpation in Ontario which has be regulated under Ontario's *Endangered Species Act*.
Endangered (END)	A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's *Endangered Species Act*.
Threatened (THR)	A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
Special Concern (SC)	A species with characteristics that make it sensitive to human activities or natural events.
Not at Risk (NAR)	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)	A species for which there is insufficient information for a provincial status recommendation.

Species Status under Federal Legislation

MBCA	**Migratory Birds Convention Act**
The Canada *Migratory Birds Convention Act* provides for the protection of migratory birds in Canada and the United States. The provisions of this Act are implemented through the Migratory Bird Regulations. Bird species that are regulated under the *Migratory Birds Convention Act* are noted in the applicable species lists.	

SARA	**Species at Risk Act**
The Canada *Species at Risk Act* provides a framework for actions across Canada to ensure the survival of wildlife species and the protection of our natural heritage. It sets out how to decide which species are a priority for action and what to do to protect a species. It identifies ways governments, organizations and individuals can work together, and it establishes penalties for a failure to obey the law. Regulated species are listed in Schedules 1, 2 and 3 of the Act.	
Schedule 1 SARA (1)	Species that are currently covered under the Act.
Schedule 2 SARA (2)	Species that are endangered or threatened that have not been re-assessed by COSEWIC for inclusion on Schedule 1.

Schedule 3 SARA (3)	Species that are of special concern that have not yet been re-assessed by COSEWIC for inclusion on Schedule 1.

Species Status under Provincial Legislation

ESA	**Endangered Species Act**
The Ontario *Endangered Species Act* provides for the conservation, protection, restoration and propagation of species of fauna and flora of the Province of Ontario that are threatened with extinction. Regulated species are listed in Ontario Regulation 338.	

Schedule No.	**Short Form**	**Status**
Schedule 1 ESA (1)	EXT	The species of flora and fauna listed in Schedule 1 are declared to be threatened with extinction.
Schedule 2 ESA (2)	EXP	The species of flora and fauna listed in Schedule 2 are declared to be extirpated.
Schedule 3 ESA (3)	END	The species of flora and fauna listed in Schedule 3 are declared to be endangered.
Schedule 4 ESA (4)	THR	The species of flora and fauna listed in Schedule 4 are declared to be threatened.
Schedule 5 ESA (5)	SC	The species of flora and fauna listed in Schedule 5 are declared to be special concern.

FWCA	**Fish and Wildlife Conservation Act**
The Ontario *Fish and Wildlife Conservation Act* outlines the restrictions for hunting, trapping and fishing; handling of live wildlife; sale, purchase and transport of wildlife; and, licences that can be secured under the Act. Under Schedules 1 to 11 of the Act, wildlife are grouped for the purpose of regulating these species. These schedules are further defined below. Note: where there is a conflict between this Act and the Ontario *Endangered Species Act*, the provision with the most protection will prevail (s. 2 of the *Fish and Wildlife Conservation Act*).	

Schedule No.	**Short Form**	**Status**
Schedule 1	Furbearing – M	The species of fauna listed in Schedule 1 are declared to be furbearing mammals.
Schedule 2	Game – M	The species of fauna listed in Schedule 2 are declared to be game mammals.
Schedule 3	Game – B	The species of fauna listed in Schedule 3 are declared to be game birds.
Schedule 4	Game – R	The species of fauna listed in Schedule 4 are declared to be game reptiles.
Schedule 5	Game – A	The species of fauna listed in Schedule 5 are declared to be game amphibians.
Schedule 6	Specially Protected – M	The species of fauna listed in Schedule 6 are declared to be specially protected mammals.
Schedule 7	Specially Protected – R	The species of fauna listed in Schedule 7 are declared to be specially protected birds (raptors).

FWCA	Fish and Wildlife Conservation Act	
The Ontario *Fish and Wildlife Conservation Act* outlines the restrictions for hunting, trapping and fishing; handling of live wildlife; sale, purchase and transport of wildlife; and, licences that can be secured under the Act. Under Schedules 1 to 11 of the Act, wildlife are grouped for the purpose of regulating these species. These schedules are further defined below. Note: where there is a conflict between this Act and the Ontario *Endangered Species Act*, the provision with the most protection will prevail (s. 2 of the *Fish and Wildlife Conservation Act*).		
Schedule No.	**Short Form**	**Status**
Schedule 8	Specially Protected – B	The species of fauna listed in Schedule 8 are declared to be specially protected birds (other than raptors).
Schedule 9	Specially Protected – R	The species of fauna listed in Schedule 9 are declared to be specially protected reptiles.
Schedule 10	Specially Protected – A	The species of fauna listed in Schedule 10 are declared to be specially protected amphibians.
Schedule 11	Specially Protected – I	The species of fauna listed in Schedule 11 are declared to be specially protected invertebrates.

Local Species Status

TRCA	Toronto and Region Conservation Authority
The TRCA assigns a level of conservation concern for flora and fauna (L1 to L5) in its watersheds (TRCA 2003). The L Rank is determined based on four factors: local occurrence, population trend, habitat dependence, and sensitivity to development.	
L-Rank	**Definition**
L5	Able to withstand high levels of disturbance; generally secure throughout the jurisdiction, including the urban matrix. May be of very localized concern in highly degraded areas.
L4	Able to withstand some disturbance; generally secure in rural matrix; of concern in urban matrix.
L3	Able to withstand minor disturbance; generally secure in natural matrix; considered to be of regional concern.
L2	Unable to withstand disturbance; some criteria are very limiting factors; generally occur in high-quality natural areas, in natural matrix; probably rare in the TRCA jurisdiction; of concern regionally.
L1	Unable to withstand disturbance; many criteria are limiting factors; generally occur in high-quality natural areas in natural matrix; almost certainly rare in the TRCA jurisdiction; of concern regionally.
LX	Extirpated from our region with remote chance of rediscovery. Presumably highly sensitive.
LH	Hybrid between two native species. Usually not scored unless highly stable and behaves like a species (e.g. *Equisetum x nelsonii*)
L+	Exotic. Not native to TRCA jurisdiction. Includes hybrids between a native species and an exotic
L+?	Origin uncertain or disputed, i.e. may or may not be native.

BSC	Bird Studies Canada

The Bird Studies Canada *Conservation Priorities for the Birds of Southern Ontario* (1999), based on work completed by Bird Studies Canada, the Canadian Wildlife Service and the MNR identifies bird species of high conservation priority. This list was prepared to assist municipalities in identifying significant natural heritage features, through using the information regarding the presence of birds of conservation priority in their municipality.

Birds of conservation priority have been noted (BSC) in the appropriate species lists.