

Appendix F.1 – Natural Heritage Report

*Kennedy Road Environmental Assessment between
Steeles Avenue and Major Mackenzie Drive*



Natural Environment Report

**KENNEDY ROAD MUNICIPAL CLASS ENVIRONMENTAL
ASSESSMENT STUDY FROM STEELES AVENUE TO
MAJOR MACKENZIE DRIVE
CITY OF MARKHAM, REGIONAL MUNICIPALITY OF YORK**

prepared for:



prepared by:



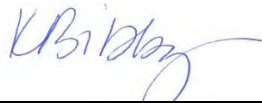
JULY 2020



NATURAL ENVIRONMENT REPORT

KENNEDY ROAD MUNICIPAL CLASS ENVIRONMENTAL
ASSESSMENT STUDY FROM STEELES AVENUE TO
MAJOR MACKENZIE DRIVE
CITY OF MARKHAM, REGIONAL MUNICIPALITY OF YORK

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LGL Project # TA8730

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1.0 INTRODUCTION

The Regional Municipality of York (York Region) is undertaking a Schedule 'C' Municipal Class Environmental Assessment (Class EA) for improvements to Kennedy Road from Steeles Avenue to Major Mackenzie Drive, City of Markham, York Region. The study limits are presented in **Figure 1** including the intersections of Kennedy Road with Major Mackenzie Drive and Steeles Avenue.

This Class EA is being conducted by HDR Corporation on behalf of York Region. LGL Limited, as a sub-consultant to HDR, is providing natural environment services. This Natural Environment Report – Existing Conditions documents the natural environment existing conditions information based on secondary sources and data collection during the 2017 field season. The potential effects of this project on the natural environment, including environmental protection measures, will be presented in the final Natural Environment Report.

A tree inventory was completed for the study area by an ISA Certified Arborist, and the results of this assessment are presented under separate cover in the *Arborist Report* (LGL 2017).

1.1 LGL Limited Team

The LGL Limited staff that conducted the natural environment assessment for this project are presented below with their respective roles and qualifications.

<u>Name and Title</u>	<u>Qualifications</u>	<u>Project Role</u>
Grant Kauffman, Vice-President, Ontario Region	M.E.S. (Environmental Assessment)	Project Manager
Katherine Bibby, Environmental Planner	MCIP, RPP (Ontario Professional Planners Institute) M.Sc.Pl. (Environmental Planning)	Natural Sciences Coordinator
Judson Venier, Senior Fisheries Biologist	M.Sc. (Fisheries)	Senior Fisheries Biologist
Nancy Falkenberg, Senior Botanist/Ecologist	M.Sc. (Ecology/Botany) MNR Designated Butternut Health Assessor	Senior Ecologist
Lisa Catcher, Botanist/Certified Arborist	B.Sc. (Ecology/Botany) ISA Certified Arborist	Arborist Field Support – Amphibian Surveys

David Smith, Wildlife Technician	Fish and Wildlife Diploma	Wildlife Specialist
Stephanie Lillie, Fisheries Biologist	B.Sc. (Fisheries) Certified Inspector of Sediment and Erosion Control	Fisheries Biologist Field Support – Amphibian Surveys
Todd Hagedorn, Terrestrial Ecologist	B.Sc. (Terrestrial Ecology)	Wildlife Ecologist

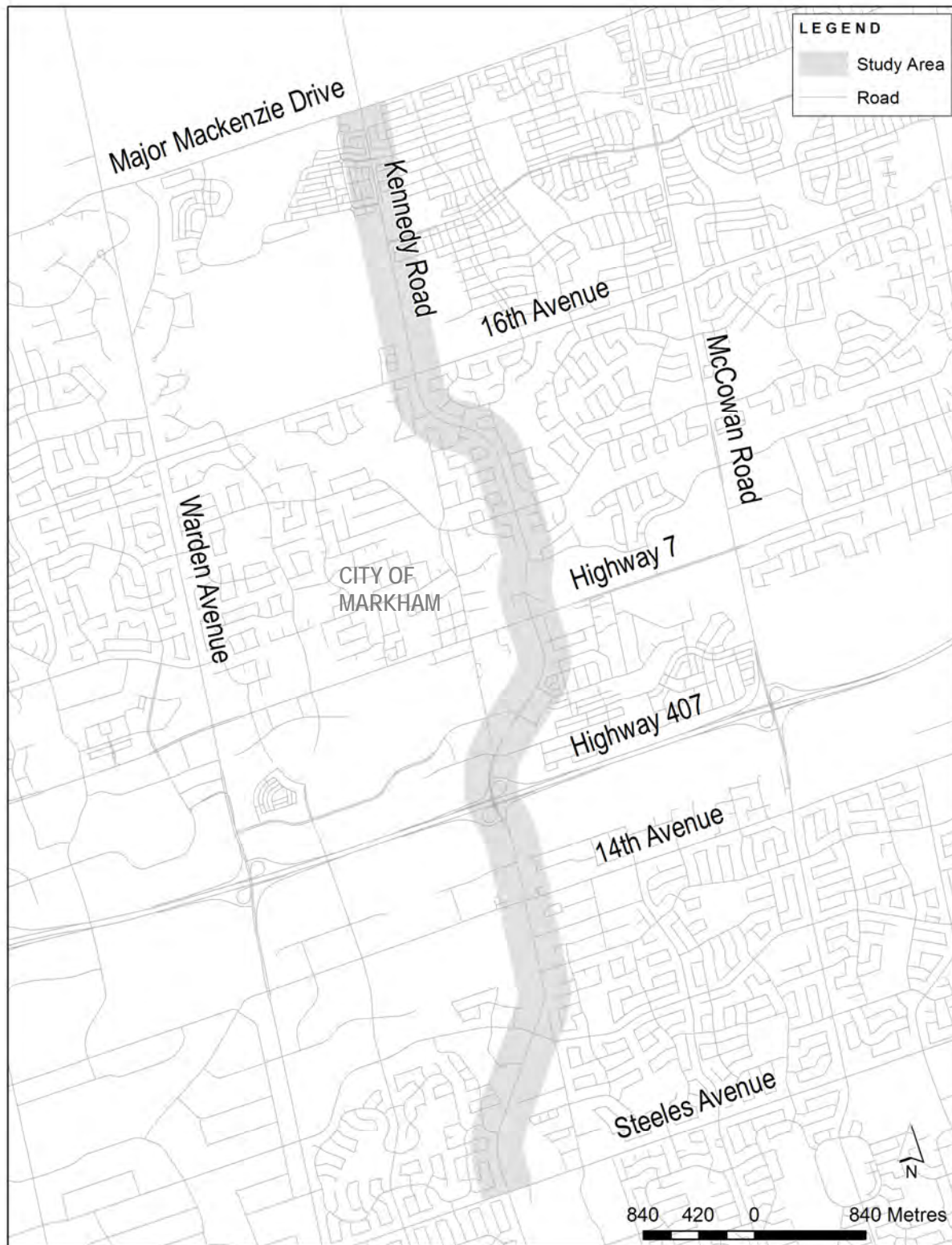


FIGURE 1. KEY PLAN

2.0 EXISTING CONDITIONS

The following discussion outlines the existing environmental conditions within the study area and identifies natural heritage areas and/or features of environmental sensitivity and/or significance. Information is based on secondary data sources and the field investigations undertaken during the 2017 field season. The field investigations and documentation of natural heritage features within the study area has been completed following the TRCA Environmental Impact Statement Guidelines (2014).

2.1 Physiography and Soils

The study area is located within two physiographic regions: the South Slope from Steeles Avenue to 407 ETR and the Peel Plain from 407 ETR to Major Mackenzie Drive (TRCA 2007). The South Slope physiographic region occupies approximately 2,400 km² and extends from the Niagara Escarpment in the west to the Trent River in the east (Chapman and Putnam 1984). The South Slope predominately consists of shallow shale and till plains which slope gently in a southeasterly direction towards Lake Ontario. The topography is mostly subdued and includes low-relief drumlins and moraines. The Peel Plain is comprised of clay soils spread across over 750 km² in the central parts of York, Peel and Halton Regions (Chapman and Putnam 1984). The Rouge River, among many other rivers in this region, have carved valleys through this landscape. The underlying materials consist of till with large amounts of shale and limestone.

Based on a review of soil mapping for the study area, the historical mapping (Hoffman and Richards 1954) identifies Woburn loam, Milliken sandy loam, Berrien sandy loam, Bottom Lands, Peel clay and Cashel clay. However, due to urban development, the soils within the study area have been disturbed. The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) AgMaps does not identify any soils within the study area, likely as it has undergone urban development and the soil regime has been modified in many areas. The following soils are described as they were classified by Hoffman and Richards in the Soil Survey (1954).

2.1.1 Woburn loam

Woburn loam is found in areas with moderately sloping topography and steep slopes in certain locations. This soil type is susceptible to erosion, particularly in areas with steep slopes. Drainage is generally good, and is well suited for general farming activities (Hoffman and Richards 1955). Woburn loam soils are found generally along the 407 ETR corridor.

2.1.2 Milliken loam and sandy loam

Milliken loam soils are moderately to well drained and found in areas with smooth gently sloping to smooth moderately sloping topography. Drainage is good, and potential for

erosion is low. Milliken sandy loam soils are lower in fertility than the Milliken loam soils (Hoffman and Richards 1955). These soils are found at the south limit of the study area, from Steeles Avenue to south of the 407 ETR, and a small section just north of the 407 ETR.

2.1.3 Berrien sandy loam

Berrien sandy loam soils are the imperfectly drained member of the Bookton catena. Areas with this soil have heavy clay till at depths of just under 1 m, under the sandy deposits. In some areas the clay is at the surface between the sandy swells. Areas with this soil series are typically smooth and gently sloping (Hoffman and Richards 1955). Berrien soils are found from approximately north of the 407 ETR to Carlton Road.

2.1.4 Bottom lands

Bottom land soils are low lying along study area watercourses which are subject to flooding. These soils typically have poor drainage.

2.1.5 Peel clay

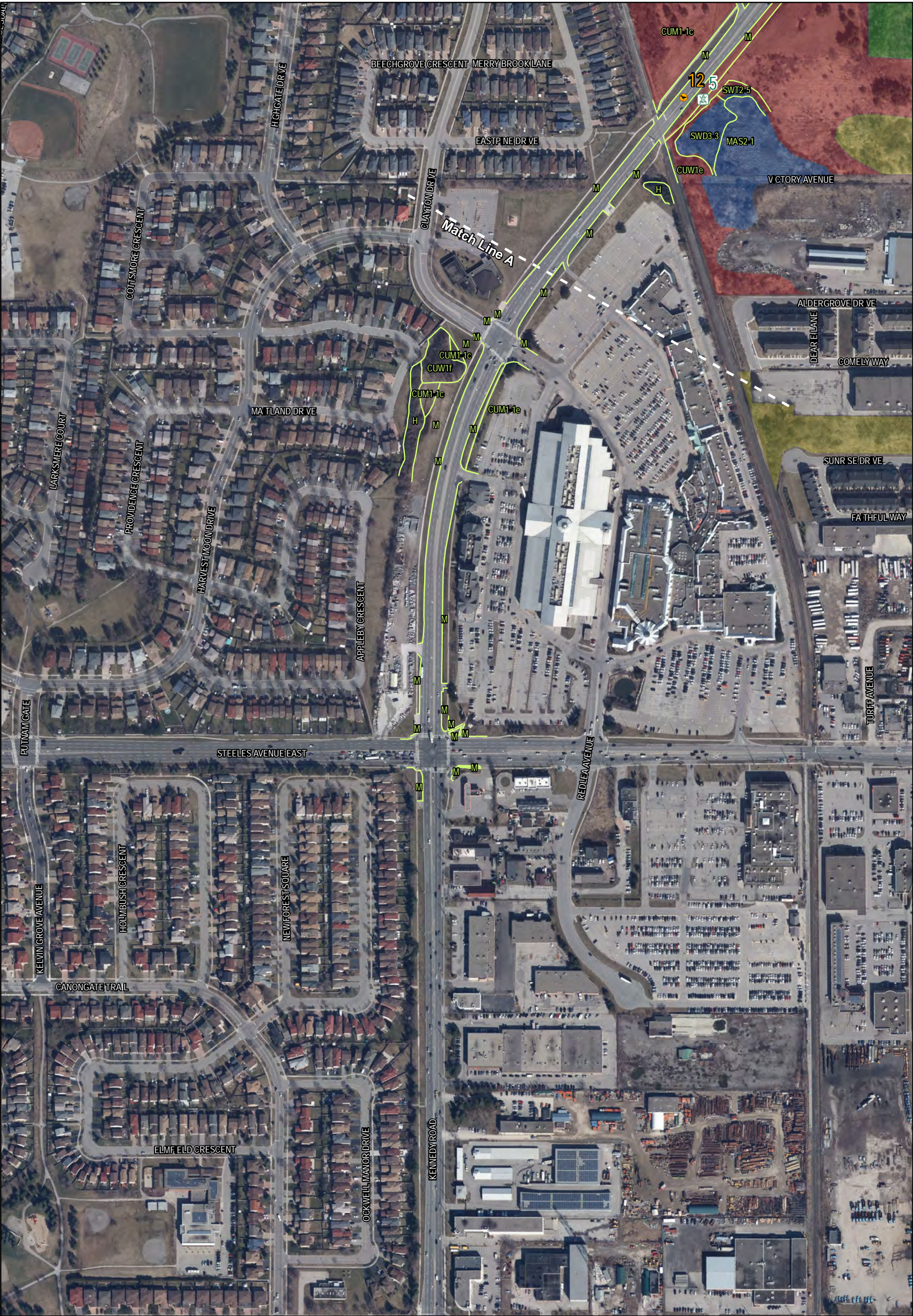
Peel clay soils are the imperfectly drained member of the Cashel catena. Peel clay is formed from stonefree lacustrine materials, and is a neutral to slightly acidic soil with clay at depths of just less than 1 m. Areas with this soil series are typically smooth and gently sloping and potential for erosion is low (Hoffman and Richards 1955). Peel clay is found south of Major Mackenzie Drive to approximately Carlton Road.

2.1.6 Cashel clay







Cashel clay are found in the Cities of Markham and Vaughan and generally occur in areas with moderate topography. These soils have good drainage, and while predominantly stone free, can contain pieces of shale. Cashel clay is prone to sheet erosion and gully erosion where in proximity to watercourses (Hoffman and Richards 1955). Cashel clay is found north of Major Mackenzie Drive.

2.2 Aquatic Habitats and Communities

The study area is located in the Rouge River watershed, within the jurisdiction of the Toronto and Region Conservation Authority (TRCA) and the Ministry of Natural Resources and Forestry (MNR), Aurora District Office. There are two watercourses that cross Kennedy Road within the study area: the Rouge River and a Tributary of the Rouge River. The locations of both watercourses are presented in **Figures 2A to 2D**.



Natural Heritage

-  Anuran Frog Call Survey Station
-  Breeding Bird Survey Station
- Natural Cover Habitat
 -  Forest
 -  Meadow
 -  Wetland
 -  Successional

- Vegetation Communities
-  Vegetation Community Boundary
 - CUM1-1c** Dry-Moist Old Field Meadow Type
 - CUW1f** Mineral Cultural Woodland Ecosite
 - MAS2-1** Cattail Mineral Shallow Marsh Type
 - SWD3-3** Swamp Maple Mineral Deciduous Swamp Type
 - SWT2-5** Red-osier Mineral Thicket Swamp Type
 - H** Hedgerow
 - M** Manicured

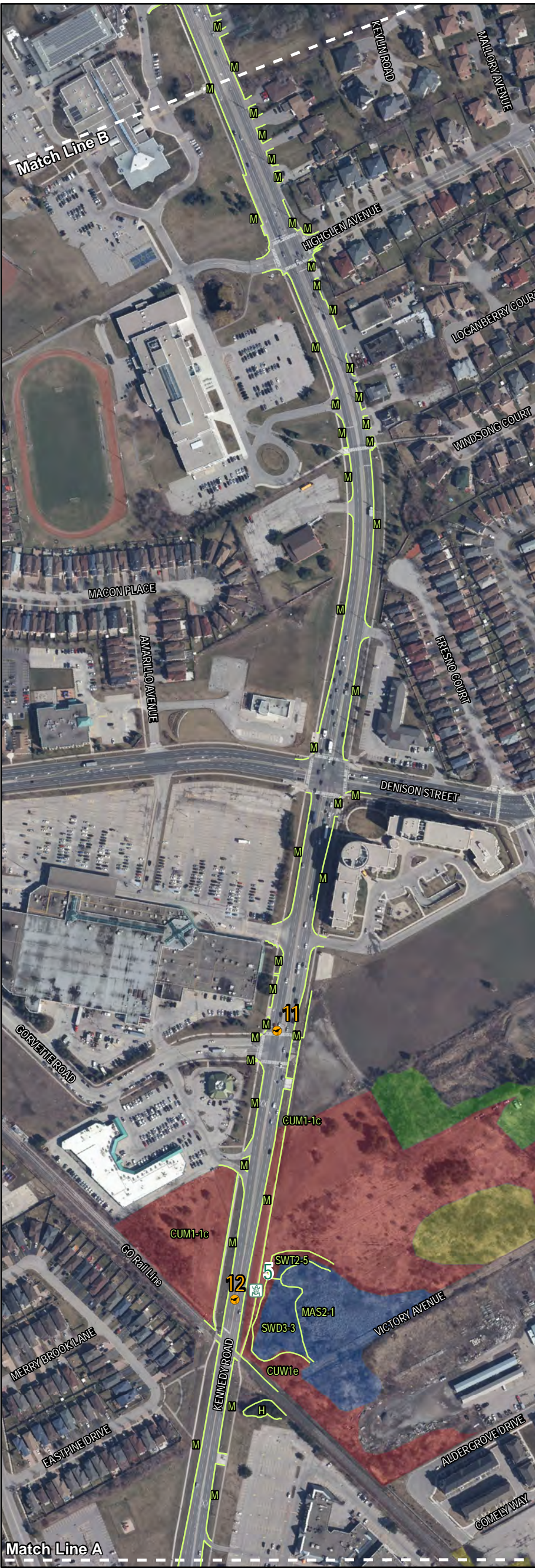


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Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ontario Ministry of Natural Resources and Forestry (LIO).



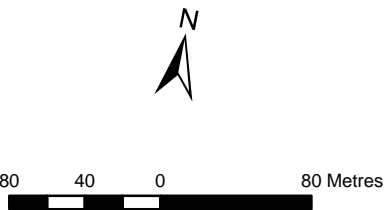
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Natural Heritage

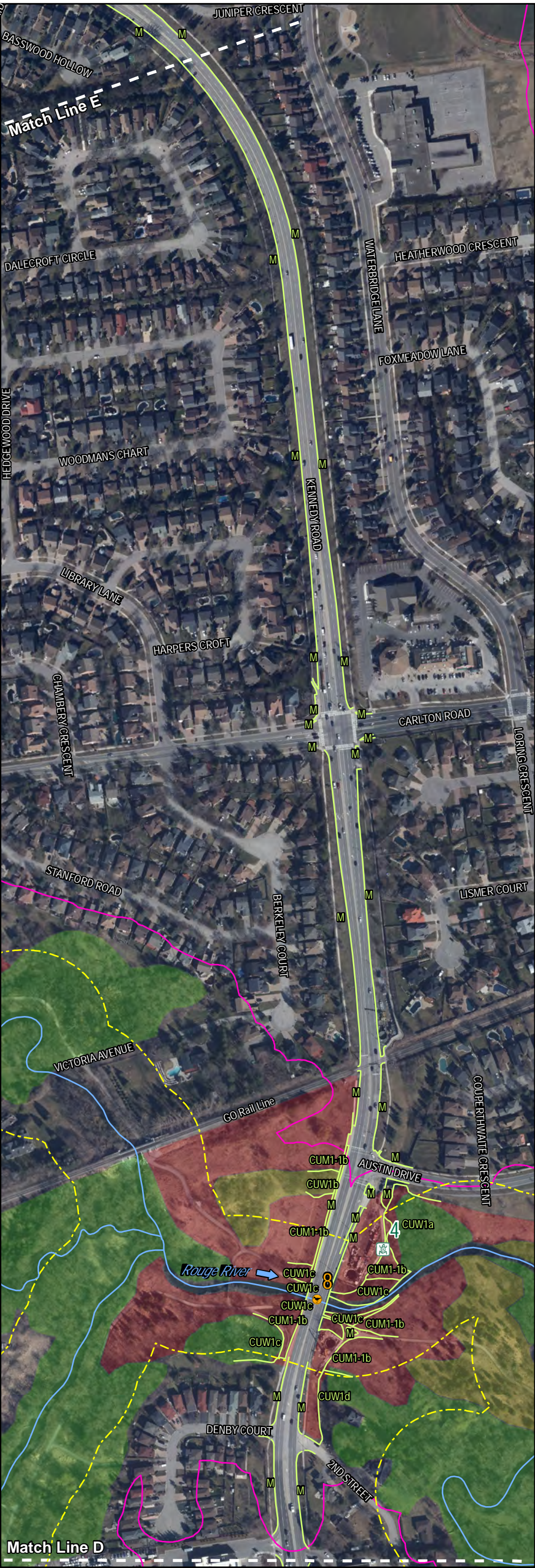
- Anuran Frog Call Survey Station
- Breeding Bird Survey Station
- Natural Cover Habitat
 - Forest
 - Meadow
 - Wetland
 - Successional

- Vegetation Communities
- Vegetation Community Boundary
 - CUM1-1c Dry-Moist Old Field Meadow Type
 - CUM1e Mineral Cultural Woodland Ecosite
 - MAM Meadow Marsh
 - MAS2-1 Cattail Mineral Shallow Marsh Type
 - SWD3-3 Swamp Maple Mineral Deciduous Swamp Type
 - SWD2-3 Red-osier Mineral Thicket Swamp Type
 - Ag Agriculture
 - H Hedgerow
 - M Manicured



Project: TA8730	Figure: 2B
Date: November, 2017	Prepared By: MWF
Scale: 1 : 4000	Checked By: KSB

Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ontario Ministry of Natural Resources and Forestry (LIO).



Natural Heritage

- Watercourse
- Watercourse Flow Direction
- Anuran Frog Call Survey Station
- Breeding Bird Survey Station
- Regulation Limit

Natural Cover Habitat

- Forest
- Meadow
- Successional

- Greenbelt Urban River Valley
- Vegetation Communities
- Vegetation Community Boundary
- CUM1-1(b) Dry-Moist Old Field Meadow Type
- CUW1(a-d) Mineral Cultural Woodland Ecosite
- M Manicured

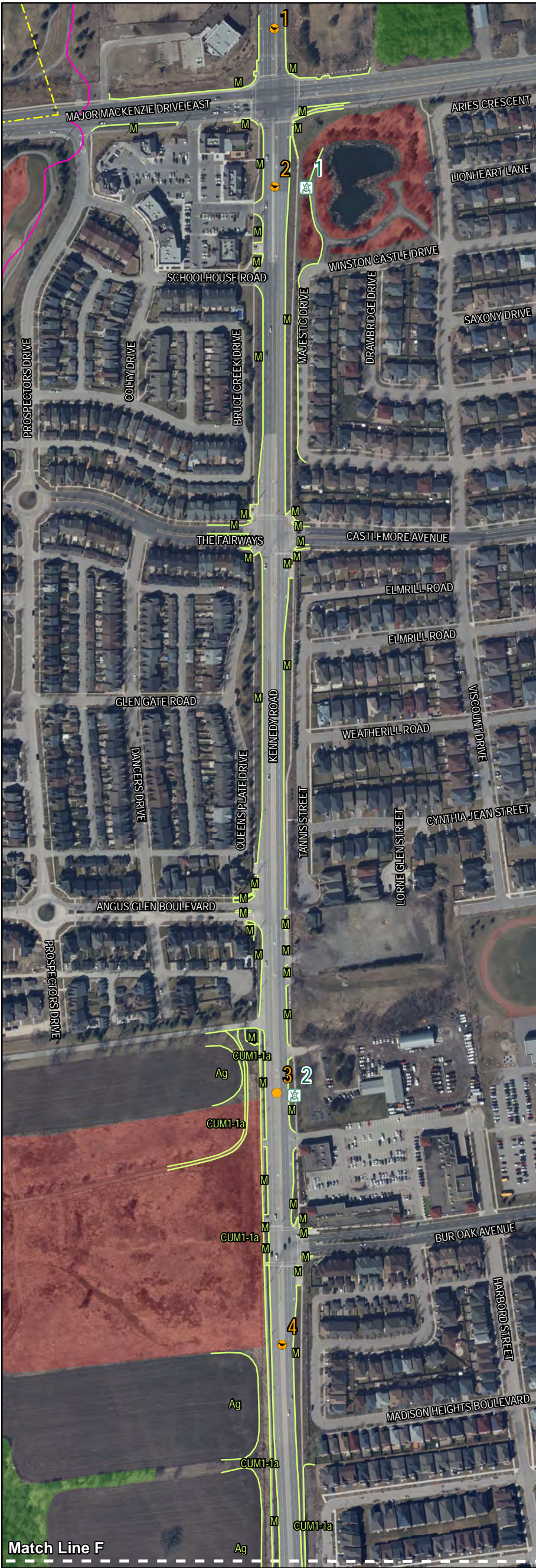


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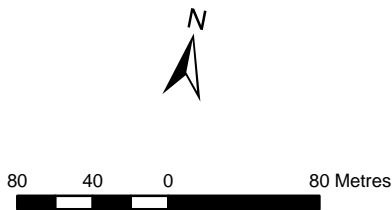
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Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ontario Ministry of Natural Resources and Forestry (LNO), Ministry of Municipal Affairs and Housing.

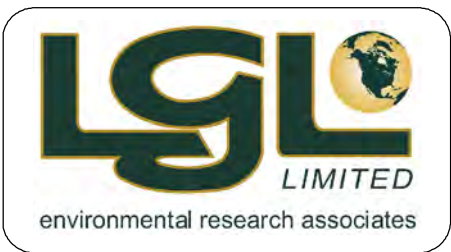


Natural Heritage

- Regulation Limit
- Greenbelt Urban River Valley
- Anuran Frog Call Survey Station
- Breeding Bird Survey Station
- Natural Cover Habitat
 - Forest
 - Meadow
- Vegetation Communities
 - Vegetation Community Boundary
 - CUM1-1a Dry-Moist Old Field Meadow Type
 - Ag Agriculture
 - M Manicured



Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ontario Ministry of Natural Resources and Forestry (LIO), Ministry of Municipal Affairs and Housing.



Project: TA8730	Figure: 2D
Date: November, 2017	Prepared By: MWF
Scale: 1 : 4000	Checked By: KSB

LGL conducted a secondary source review to identify the fish community within the watersheds. The secondary source review included a species at risk screening through aquatic species at risk mapping (DFO 2017) and the Natural Heritage Information Centre (NHIC) database (MNR 2017). Background review also included correspondence with the MNR Aurora District Office (February 14, 2017). LGL also reviewed the Rouge River Watershed Fisheries Management Plan (TRCA/MNR 2010), Rouge River State of the Watershed Report (2007), and a Class Environmental Assessment previously conducted by LGL Limited along 16th Avenue from Woodbine Avenue to York/Durham Line (LGL Limited 2016). The fish species information for the Rouge River compiled from these sources and incidental observations during field investigations is presented in **Table 1**. LGL also reviewed fish data at the MNR Aurora District office, but all of the data were for sites too far removed from the Kennedy Road study area so this information was not used in this report.

The study area falls within two fisheries management zones (FMZ): Central Main Rouge River (FMZ 5) from north of Steeles Avenue to south of 16th Avenue, and Bruce Creek (FMZ 3) from south of 16th Avenue to Major Mackenzie Drive. Refer to **Figure 3** for the location of these zones within the study area. No watercourses for FMZ 3 are located within the study area. Target species for the Central Main Rouge River (FMZ 5) are Largemouth Bass (*Micropterus salmoides*), Yellow Perch (*Perca flavescens*), Brassy Minnow (*Hybognathus hankinsoni*), Rainbow Darter (*Etheostoma caeruleum*), and Rainbow Trout (*Oncorhynchus mykiss*). The Central Main Rouge is classified as warmwater habitat (July 1 to March 31 timing window). There is evidence of sedimentation at the Rouge River crossing as a result of the backwater effect of the Milne Reservoir. Chinook Salmon are known to move through this section of the Rouge River.

An LGL field investigation was conducted on July 4, 2017. Weather conditions at the time of the investigation were sunny, wind at 9 km/h out of the north and an air temperature of 22°C. Physical habitat features were surveyed in sufficient detail to enable mapping and identification of key habitat types. The physical habitat attributes assessed included: (a) instream cover, (b) bank stability, (c) substrate characteristics, (d) stream dimensions, (e) barriers, (f) stream morphology, (g) terrain characteristics, (h) stream canopy cover, (i) stream gradient, (j) aquatic vegetation, (k) ground water seepage areas, and (l) general comments. **Figure 2C** presents the location of the watercourse crossings identified within the study area. An aquatic habitat summary is presented below which describes existing conditions at each of the watercourse crossings. Representative photographs of the crossings were also taken during investigations and are provided in **Appendix A**.

TABLE 1.
HISTORICAL FISH COLLECTION RECORDS WITHIN THE STUDY AREA

Scientific Name	Common Name	Tributary of Rouge River	Rouge River	COSEWIC	SARA	MNR	Provincial
<i>Lethenteron appendix</i>	American Brook Lamprey		x	-	-	-	S3
<i>Carassius auratus</i>	Goldfish		x,z	-	-	-	SNA
<i>Chrosomus eos</i>	Northern Redbelly Dace		x	-	-	-	S5
<i>Clinostomus elongatus</i>	Redside Dace		z	END	SC	END	S2
<i>Cyprinus carpio</i>	Common Carp		z	-	-	-	SNA
<i>Luxilus cornutus</i>	Common Shiner		x,z	-	-	-	S5
<i>Pimephales notatus</i>	Bluntnose Minnow		x,z	-	-	-	S5
<i>Pimephales promelas</i>	Fathead Minnow		x,z	-	-	-	S5
<i>Rhinichthys cataractae</i>	Longnose Dace		x,z	-	-	-	S5
<i>Rhinichthys atratulus</i>	Blacknose Dace		x,z	-	-	-	SNR
<i>Semotilus atromaculatus</i>	Creek Chub		x,z,y	-	-	-	S5
<i>Catostomus commersonii</i>	White Sucker		x,z,y	-	-	-	S5
<i>Ameiurus nebulosus</i>	Brown Bullhead		x	-	-	-	S5
<i>Noturus flavus</i>	Stonecat		x,z	-	-	-	S4
<i>Oncorhynchus mykiss</i>	Rainbow Trout		x,z	-	--	-	SNA
<i>Salmo trutta</i>	Brown Trout		x	-	-	-	SNA
<i>Culaea inconstans</i>	Brook Stickleback		x,z	-	-	-	S5
<i>Ambloplites rupestris</i>	Rock Bass		x	-	-	-	S5
<i>Micropterus salmoides</i>	Largemouth Bass		x	-	-	-	S5
<i>Lepomis gibbosus</i>	Pumpkinseed		x,z	-	-	-	S5
<i>Etheostoma nigrum</i>	Johnny Darter		x,z	-	--	-	S5
<i>Etheostoma caeruleum</i>	Rainbow Darter		x,z	-	-	-	

Note: x = TRCA Collection Data (May 2016)

y = LGL observations (May/August 2016 at 16th Avenue (from Class EA from Yonge Street to York-Durham Line); June 2017 in study area)

z = Secondary Sources; Draft Rouge River Watershed Fisheries Management Plan (TRCA 2010), LGL records from previous 16th Avenue project (2007)

- S4

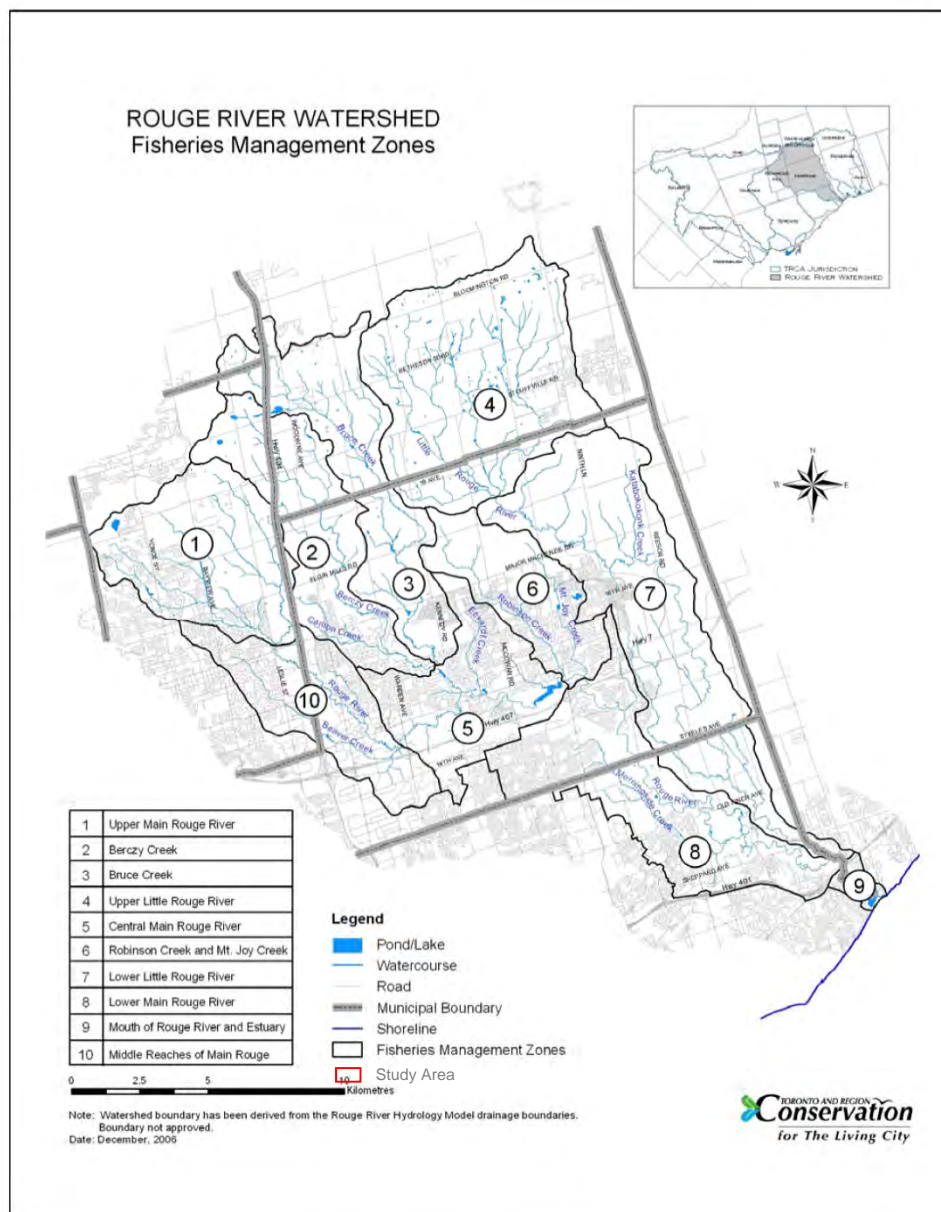


FIGURE 3. FISHERIES MANAGEMENT ZONES IN THE ROUGE RIVER

2.2.1 Tributary of Rouge River

The Tributary of Rouge River crosses Kennedy Road through twin corrugated steel pipe arch (CSPA) culverts (situated at a skew to the roadway) approximately 135 m north of the YMCA Boulevard/Helen Avenue intersection. This small watercourse has been channelized in the past to accommodate the urbanization of the area and it consists of roadside ditch, semi-natural channel and armoured, channelized sections.

The tributary appears to originate in the vicinity of the 407 ETR to the south of Helen Avenue (likely from an outlet to a stormwater pond), flows north along the edge of the auto dealership (Volkswagen) on the south side of Helen Avenue where it makes a 90° turn to the west and proceeds along the south side of Helen Avenue for approximately 80 m. It then makes another 90° turn to the north and enters an approximately 60 m long culvert through which it crosses Helen Avenue to the north. The watercourse exits the culvert on the west side of the car dealership on the north side of Helen Avenue (BMW) and proceeds as a roadside ditch along Kennedy Road for approximately 60 m to its crossing (through the twin CSPA culverts mentioned above). These CSPA culverts are approximately 45 m long and all low flows are conveyed via the south culvert. From the outlet of the Kennedy Road crossing, water is conveyed to the north for approximately 30 m through a semi-natural channel to another concrete culvert (approximately 20 m long) under a portion of the Ford car dealership. From there the flows are joined by another small tributary coming from the west. The water flows proceed for approximately 6 m and makes a sharp turn to the northeast before entering another culvert located between the Ford and Honda auto dealerships (this culvert is approximately 13 m long). From there it flows to the north through a channelized area adjacent to the auto dealerships for approximately 85 m before entering another concrete culvert under the Honda auto dealership access from Unionville Gate (this culvert is approximately 17 m long). The watercourse then flows through a short section of channel (approximately 6 m) before entering another concrete culvert that conveys flows under Unionville Gate (this culvert is approximately 30 m long). From the north side of Unionville Gate, the watercourse flows generally to the north for approximately 300 m before entering the Rouge River.

Upstream (south) of Helen Avenue, this Tributary of Rouge River consists of a densely-vegetated roadside ditch dominated by *Phragmites*, with some small patches of cattails. Water was flowing at the time of the site visit and flow was diffuse within the vegetated ditch. Substrates consist of gravel, sand, silt and detritus. The ditch is between 3 m and 5 m wide and water depth is less than 10 cm.

Downstream (north) of the Helen Avenue crossing, the roadside ditch running along the east side of Kennedy Road is narrower (2 m to 2.5 m) with a defined channel at the base of steep (approximately 2:1) slopes. Instream vegetation is dominated by cattails and bulrush. The slopes are manicured grass and, in some areas, the grass is mowed

to the edge of the water. Channel width is approximately 0.3 m and depth is 10 cm. Substrates are comprised of rip rap, gravel, sand and silt.

Downstream of the Kennedy Road crossing, the watercourse consists of a 30 m long, low-gradient channel flowing through a semi-natural “valley”. Riparian vegetation in this area consists of older deciduous trees that shade the channel well. There is much filter cloth on the banks indicating that channel works have occurred in the past. Channel width was approximately 1 m and depth 15 cm. Substrates consist of cobble, gravel, silt and detritus. No instream vegetation was present and instream cover is limited to small woody debris. Morphology is comprised solely of run/flat habitat.

Downstream of the 20 m long culvert mentioned above, the watercourse is joined by another from the west. This second tributary was not flowing at the time of the site visit. This short section of channel is dominated by cattails and substrates are similar to what was found in the previous section. Water flow begins to accelerate in this area, however, as gradient increases. As a result, the channel is narrower here (approximately 0.5 m) and the depths shallower (approximately 10 cm).

The next section of channel is approximately 85 m long and is situated at the bottom of an “artificial valley” formed by armourstone retaining walls. This channel meanders through dense *Phragmites* and cattails and is overhung by a few deciduous trees. Morphology is dominated by runs with a few riffles. Substrates consist of sand, cobble, silt and detritus. The channel width is approximately 0.5 m throughout the reach and approximately 10 cm in depth. Bankfull width is approximately 5.5 m and bankfull depth 50 cm. These characteristics are also present in the small 6 m long section of channel located between the previous section and the Unionville Gate crossing.

Downstream of Unionville Gate, the channel flows through more semi-natural habitat. There is evidence of channelization in this area with filter cloth present. Directly downstream of the culvert is a short riffle approximately 0.4 m wide and 10 cm deep that flows into a plunge pool (1.5 m wide, 35 cm deep) via an approximately 15 cm drop. This drop likely forms a barrier to fish passage during low flow periods.

TRCA (2010) indicates that this Tributary of Rouge River provides coolwater habitat within the study area, but its timing window is still warmwater (i.e., July 1 to March 31). There were no fish collection data from this watercourse and no fish were observed during the site visit. It is unknown whether this Tributary of Rouge River supports direct fish habitat. However, the small barrier mentioned above would prevent fish from moving upstream from downstream habitats only during low flow periods and it is possible that during higher flow, fish passage could occur. Therefore, this Tributary of Rouge River should be considered direct fish habitat at this time.

2.2.2 Rouge River

The Rouge River crosses Kennedy Road between Highway 7 and Austin Drive. This watercourse is part of the Central Main Rouge River (Fisheries Management Zone 5) that connects Toogood Pond in the west with Milne Reservoir in the east. The Rouge River is a warmwater riverine habitat, which is not suitable for Brook Trout (*Salvelinus fontinalis*) or Redside Dace, both sensitive coldwater/coolwater species. This section of the Rouge River is identified as a migratory corridor for lake run species such as Rainbow Trout (*Oncorhynchus mykiss*). Stream health for this section is poor, due to sedimentation impacts (TRCA 2007).

The Rouge River in the vicinity of the Kennedy Road crossing consists of a wide, deep, slow-flowing, turbid watercourse. Upstream of the crossing, morphology is completely comprised of run habitat. The river at this location is fairly straight with short (1 m), steep, muddy banks. Further upstream, the river bends and there is some bank undercutting. Riparian vegetation consists of areas of mature trees interspersed with areas of grass/forb-dominated vegetation. The entire riparian area is within parkland. Channel width is approximately 11 m and depth is greater than 100 cm at the crossing. Channel widths are fairly consistent throughout the upstream reach investigated. Substrates appear to consist of fines (muck, silt, detritus) with some boulders. Instream cover is provided by large woody debris and overhanging trees. No instream vegetation and very little emergent riparian vegetation was observed upstream.

Flows are conveyed under Kennedy Road through a large bridge structure. Pedestrian paths are present on either side of the river under the bridge. The run morphology observed upstream continues and the channel width and depth remain approximately 11 m and >100 cm, respectively. Although the floodplain is relatively flat, the banks are steep, approximately 1 m high and sparsely vegetated. Instream cover is similar to that observed upstream. Bankfull width is estimated at 13 m and bankfull depth at 1.5 m.

The fish community in the Central Main Branch of the Rouge River includes 15 species, largely composed of warmwater species and includes many generalist species (Blacknose Dace, Brook Stickleback, Bluntnose Minnow (*Pimephales notatus*), Common Carp (*Cyprinus carpio*), Creek Chub (*Semotilus atromaculatus*), Fathead Minnow (*Pimephales promelas*); TRCA 2007). The limited range of habitat characteristics have resulted in fewer warmwater habitat specialist species being present within this Central Main Branch (TRCA 2007). During LGL's field investigation on July 4, 2017 many cyprinids were observed in the study area. A full list of fish species previously documented in this general area of the Rouge River from historic sampling can be found in **Table 1**.

2.2.3 Species at Risk

The NHIC database indicates that one species at risk, Redside Dace, has historic (1989) occurrence records in the study area. According to correspondence with the MNRF, Redside Dace have been recorded in Robinson Creek located to the east of the study area. The Rouge River to the west of Kennedy Road within the study area is identified as Redside Dace “occupied or recovery” habitat on current DFO species at risk mapping. Given the old records of the species in the NHIC database, and the poor habitat conditions for this species within the Rouge River at Kennedy Road, it is likely that this watercourse constitutes recovery habitat only, and potentially, only historic habitat. The study team is in the process of confirming this with the Ministry of Natural Resources and Forestry.

2.3 Vegetation and Vegetation Communities

The geographical extent, composition, structure and function of the vegetation communities were identified through air photo interpretation and a field investigation. Air photos were interpreted to determine the limits and characteristics of the vegetation communities in the study area. Field investigations of the vegetation communities along Kennedy Road from Steeles Avenue to Major Mackenzie Drive were conducted on May 23 and August 23, 2017. These investigations were conducted within the road right-of-way and adjacent habitat, to the extent possible. These investigations were carried out to ground truth the boundaries of the vegetation communities and to conduct botanical surveys.

The vegetation communities were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee *et al.* 1998). A plant list and a description of the general structure of vegetation communities were obtained during the field investigation. Plant species status was reviewed for Ontario (Oldham 2009), for York Region (Varga 2000 and Riley 1989), and the Toronto and Region Conservation Authority (TRCA 2012). Vascular plant nomenclature follows Newmaster *et al.* (1998) with a few exceptions that have been updated to Newmaster *et al.* (2005).

2.3.1 Vegetation Communities

Vegetation communities identified within the study area consist primarily of manicured areas with amenity trees planted. The manicured areas consist of strips of grass dominated habitat that are regularly mown, with planted amenity trees. Several Mineral Cultural Woodland (CUW1) communities were identified, including several associated with the Rouge River. Wetland communities were identified in an isolated natural area just south of Gorvette Road (north of Steeles Avenue), and east of Kennedy Road. Mineral Cultural Meadow communities were also identified within portions of the study

area typically associated with past or current disturbance activities, and these communities are dominated by disturbance tolerant, non-native plant species.

Wetland Communities

A Swamp Maple Mineral Deciduous Swamp (SWD3-3) was identified within the study area, south of Gorvette Street (north of Steeles Avenue), east of Kennedy Road and immediately north of a railway line. This deciduous swamp is dominated by Freeman's maple with a well-established, large corkscrew willow (*Salix matsudana*) observed at the southwest corner of this vegetation community. Ground flora within this community is rare (sparse) and much of the ground is bare.

A Red-osier Mineral Thicket Swamp (SWT2-5) is located along the northern border of the Swamp Maple Mineral Deciduous Swamp. This community is dominated by red-osier dogwood (*Cornus sericea*), and cattails (*Typha* sp.) were observed along its margins, with reed canary grass (*Phalaris arundinacea*) occasional to abundant within the ground layer. This small community is bounded by Mineral Cultural Meadow (CUM1-1c) to the north and west.

A Cattail Mineral Shallow Marsh (MAS2-1) is located east of the Swamp Maple Mineral Deciduous Swamp and Red-osier Mineral Thicket Swamp communities. This wetland community is dominated by glaucous cattail (*Typha X glauca*). Emergent plant species along the edges of this community include red-osier dogwood, Freeman's maple and species observed as rare (sparse) within the community include purple loosestrife (*Lythrum salicaria*).

Cultural Communities

Cultural vegetation communities identified during LGL's botanical investigations include Mineral Cultural Meadows (CUM1-1 a to c) and Mineral Cultural Woodlands (CUW1 a to f). 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 disturbance tolerant. Such species include smooth brome (*Bromus inermis*), Canada goldenrod (*Solidago canadensis*), bird's-foot trefoil (*Lotus corniculata*), tufted vetch (*Vicia cracca*), and common plantain (*Plantago major*). Several of these areas include *ad hoc* paths. The natural area associated with the Rouge River includes numerous early to mid-successional vegetation communities several of which are bisected by established paths that include a connection from Main Street to the west, which continues east of Kennedy Road.

Overall, the vegetation communities identified within the study area are considered widespread and common in Ontario and are secure globally. The vegetation communities identified during LGL's botanical investigations are delineated in **Figures 2A to 2D** and are described in **Table 2**.

TABLE 2.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Community Characteristics
TERRESTRIAL – CULTURAL			
CUM	Cultural Meadow		
CUM1-1 (a-c)	Dry-Moist Old Field Meadow	<p>Emergent Trees/Shrubs: includes silver maple (<i>Acer saccharinum</i>), red ash (<i>Fraxinus pennsylvanica</i>), Manitoba maple (<i>Acer negundo</i>), common buckthorn (<i>Rhamnus cathartica</i>), red-osier dogwood (<i>Cornus sericea</i>), and Russian olive (<i>Elaeagnus angustifolia</i>).</p> <p>Ground cover: includes smooth brome (<i>Bromus inermis</i>), common dandelion (<i>Taraxacum officinale</i>), bird's-foot trefoil (<i>Lotus corniculatus</i>), Kentucky and Canada bluegrasses (<i>Poa pratensis</i> and <i>P. canadensis</i>), tufted vetch (<i>Vicia cracca</i>), common plantain (<i>Plantago major</i>) and Canada thistle (<i>Cirsium arvense</i>).</p>	<ul style="list-style-type: none"> • Cultural communities (CU). • Tree cover and shrub cover < 25% (M). • Mineral soil (1). • This community can occur on a wide range of soil moisture regimes (Dry-Moist) (-1).
CUW	Cultural Woodland		
CUW1 (a-f)	Mineral Cultural Woodland	<p>Canopy: includes Manitoba maple, scotch pine (<i>Pinus sylvestris</i>), Freeman's maple (<i>Acer X freemanii</i>), Norway maple, black walnut (<i>Juglans nigra</i>), and trembling aspen (<i>Populus tremuloides</i>).</p> <p>Understory: includes common buckthorn, Russian olive, tartarian honeysuckle (<i>Lonicera tatarica</i>), Manitoba maple, and riverbank grape (<i>Vitis riparia</i>).</p> <p>Ground cover: includes garlic mustard (<i>Alliaria petiolata</i>), common burdock (<i>Arctium minus</i> ssp. <i>minus</i>), yellowish enchanter's nightshade (<i>Circaea lutetiana</i> ssp. <i>canadensis</i>), bluegrasses, common buckthorn, red ash, and swallow-wort (<i>Cynanchum rossicum</i>).</p>	<ul style="list-style-type: none"> • Cultural communities (CU). • 25% < tree cover < 35% (W). • Mineral soil (1). • Pioneer community resulting from, or maintained by, anthropogenic-based influences.

TABLE 2.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Community Characteristics
WETLAND			
SWD	Deciduous Swamp		
SWD3-3	Swamp Maple Mineral Deciduous Swamp	Canopy: includes Freeman's maple. Understory: includes Freeman's maple, red ash and red-osier dogwood. Ground cover: includes Manitoba maple.	<ul style="list-style-type: none"> • Tree or shrub cover >25% and dominated by hydrophytic shrub and tree species (SW). • Deciduous tree cover >75% of canopy cover. • Red maple, silver maple, swamp maple and Manitoba maple (3). • Freeman's maple dominant swamp (-3).
SWT	Swamp Thicket		
SWT2-5	Red-osier Mineral Thicket Swamp	Emergent: includes white elm (<i>Ulmus americana</i>) and Freeman's maple. Canopy: includes red-osier dogwood, red ash, and Manitoba maple. Understory: includes red-osier dogwood, common buckthorn, Manitoba maple and sandbar willow (<i>Salix exigua</i>). Ground cover: includes reed canary grass (<i>Phalaris arundinacea</i>), and narrow-leaved cattail (<i>Typha angustifolia</i>).	<ul style="list-style-type: none"> • Tree or shrub cover >25% and dominated by hydrophytic shrub and tree species (SW). • Tree cover <25%, hydrophytic shrubs >25% (T). • Areas where flooding duration is short – substrate aerated by early to mid-summer (2). • Red-osier dogwood dominant thicket swamp (-5).
MAS	Shallow Marsh		
MAS2-1	Cattail Mineral Shallow Marsh	Emergent: red-osier dogwood. Ground cover: includes glaucous and narrow-leaved cattails (<i>Typha X glauca</i>), reed canary grass and purple loosestrife (<i>Lythrum salicaria</i>).	<ul style="list-style-type: none"> • Tree and shrub cover <25%. Hydrophytic emergent macrophyte cover >25% with variable flooding regimes (water depth <2m) (MA). • Water up to 2 m deep (S). • Mineral soil (2). • Cattails dominant (-1).

TABLE 2.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Community Characteristics
OTHER*			
Planted	Manicured lawns, planted boulevard trees, etc.		
M	Manicured grasses and planted shrubs and/or trees	<p>Areas where large expanses of grass/shrubs/trees are maintained and/or planted.</p> <p>Trees/shrubs: includes Norway maple (<i>Acer platanoides</i>), horse chestnut (<i>Aesculus hippocastanum</i>), Colorado spruce (<i>Picea pungens</i>), Norway spruce (<i>Picea abies</i>), white pine (<i>Pinus strobus</i>), Kentucky coffee-tree, basswood (<i>Tilia americana</i>), and red oak (<i>Quercus rubra</i>).</p> <p>Ground cover: includes Kentucky and Canada bluegrass, common dandelion, bird's-foot trefoil, and common plantain.</p>	
H	Hedgerow	<p>Trees/shrubs: Includes white and Norway spruce (<i>Picea glauca</i> and <i>P. abies</i>), Austrian pine (<i>Pinus nigra</i>), and trembling aspen.</p> <p>Ground cover: includes garlic mustard and blue grasses.</p>	

*Codes not defined by ELC

2.3.2 Flora

A total of 135 plant species were recorded within the study area. Five of these plants could only be identified to genus and are not included in the following calculations. Of the 130 plants identified to species, 66 (51%) plant species identified are native to Ontario and 64 (49%) plant species are considered introduced and non-native to Ontario. Many of the native species identified were observed within wetland and woodland communities within the vicinity of the study area, and includes some of the variety of tree species planted within manicured areas surveyed. A list of vascular plants is presented in **Appendix B**.

2.3.3 Species at Risk

One species, Kentucky coffee-tree (*Gymnocladus dioica*) regulated as Threatened by the Ontario *Endangered Species Act, 2007* was observed during LGL's botanical investigation within the study area. This tree species was planted as amenity trees in road rights-of-way and within the cultural meadow (CUM1-1d) (see **Figures 2A to 2D**). Consultation by LGL Limited's project arborist with the Ministry of Natural Resources and Forestry (MNRF) Area Biologist (Mr. Bohdan Kowalyk in January 2016) confirmed that the streetscape Kentucky coffee-trees are not treated as protected under the *Endangered Species Act, 2007*, due to their non-native origin. Consequently, no consultation with the MNRF is required in regards to the Kentucky coffee-trees.

Table 3 outlines rare plant species and where they were found within the study area. None of the species outlined in **Table 3** are provincial plant species of concern (S1 to S3) and all of these species have populations that are considered secure. Plant species identified are all L3 TRCA species of concern or are species observed as rare in York Region (TRCA 2012, Varga 2000 and Riley 1989). Based on a review of plant location data provided by TRCA, no other species of TRCA concern or species rare in York Region were located within the study area. Estimates for black walnut (*Juglans nigra*) indicates that this species population is apparently secure provincially (S4) (see **Appendix C** for rarity definitions). White spruce (*Picea glauca*), white oak (*Quercus alba*) and black walnut were all observed as planted within the manicured strips adjacent to Kennedy Road. Black walnut was also observed as naturally occurring within several cultural meadow and cultural woodland communities.

TABLE 3.
SIGNIFICANT PLANT SPECIES IDENTIFIED WITHIN THE STUDY AREA

Scientific Name	Common Name	Vegetation Community	Status		
			SRank	TRCA	York (Riley/Varga)
<i>Picea glauca</i>	white spruce	M, H	S5	L3	
<i>Quercus alba</i>	white oak	M	S5	L3	R6
<i>Juglans nigra</i>	black walnut	M, CUM1-1a and b, CUW1e and f	S4	L5	R1
<i>Toxicodendron radicans</i> var. <i>rydbergii</i>	poison-ivy	CUM1-1c	S5	L5	R3

2.4 Wildlife and Wildlife Habitat

Field investigations were conducted to document wildlife and wildlife habitat and to characterize the nature, extent and significance of wildlife usage within the study area between April and July of 2017. Wildlife investigations were focused within and adjacent to the existing Kennedy Road right-of-way from Steeles Avenue to Major Mackenzie Drive, City of Markham. Direct observations, calls and tracks were used to record wildlife present within the study area. A breeding bird survey and anuran survey were also completed. A summary of survey date(s), tasks, weather and personnel for each visit is presented in **Table 4**. The methodology and results of these surveys are described in the following sections.

TABLE 4.
SUMMARY OF DATE OF INVENTORY, TASK, WEATHER AND PERSONNEL

Date of Inventory	Task	Weather	LGL Personnel
April 19, 2017	Anuran survey	Partial cloud cover, 12°C, 24km/hr	David Smith, Stephanie Lillie
May 18, 2017	Anuran survey	24°C, 5km/hr	Lisa Catcher, Stephanie Lillie
July 11, 2017	Anuran survey	25°C, no wind	Lisa Catcher, Stephanie Lillie
June 14, 2017	Breeding Bird survey and incidental wildlife survey	No clouds, 16°C, calm	Todd Hagedorn
June 26, 2017	Breeding Bird survey and incidental wildlife survey	Partial cloud cover, 17°C, Light breeze	Todd Hagedorn

2.4.1 Wildlife Habitat

The study area is located in a predominantly urban setting with higher quality wildlife habitat limited to several natural heritage features. A summary of natural heritage features identified within the study area is provided below.

The Rouge River crosses Kennedy Road just north of the intersection of Highway 7 and Kennedy Road at Denby Valley Park on the west side and Austin Drive Park on the east side. The three vegetation communities that are found in this area are old field

meadows, cultural woodlands, and manicured areas. Given the relatively large and contiguous nature of this natural area, it is likely that it provides locally significant habitat for wildlife species typically associated with wetland/swamp, aquatic, riparian zone and forest/forest edge habitat types. Natural heritage features associated with Denby Valley Park and Austin Drive Park maintain connectivity with natural areas to the north, south, east and west. On the local landscape scale, this natural area is likely to provide significant wildlife movement opportunity and function.

A number of deciduous swamp and shallow marsh communities are located across the study area. Anuran (frogs and toads) breeding evidence and bird species identified within or in the vicinity of these aquatic habitats indicate that they provide anuran breeding habitat and breeding habitat for aquatic and semi-aquatic bird species (see **Section 2.4.2.1**). Deciduous forested communities provide forest and forest edge habitat for a number of species and also serve as corridor/movement habitat for wildlife species.

Two storm water management ponds are also located in the study area. The first pond (Berczy Square) is located on the north east corner of Kennedy Road and 16th Avenue and the second pond (Mattamy Pond) is located on the south east corner of Kennedy Road and Major Mackenzie Drive East (**Figure 2D**). These ponds were found to provide habitat for aquatic and semi-aquatic wildlife species and are likely to provide breeding habitat for anuran and bird species.

Cultural meadow, manicured, and agricultural habitat types were found across the study area and were generally associated with agricultural, commercial and residential lands. Agricultural lands which were more actively managed such as row crops (e.g., corn, soy, etc.) contained little wildlife diversity. Manicured habitats contained a limited wildlife assemblage and generally support species which tolerate highly disturbed areas. Cultural meadows were found to contain a moderately diverse wildlife assemblage. These communities provide nesting habitat for some bird species. Three areas with larger meadow communities are in the study area, including west and east of Kennedy Road north and south of 407 ETR, on the east side of Kennedy Road near Bur Oak Avenue, and on the west and east side of Kennedy Road south of Gorvette Road (north of Steeles Avenue).

2.4.2 Fauna

Based on field observations and secondary source data from the TRCA and the Milliken Secondary Plan Area (North-South Environmental Inc. 2016), 62 species of wildlife could be verified in the study area and the majority of these records came from identification (through calls and sightings) of bird species with more modest numbers of herpetofauna and mammal species identified. The wildlife assemblage is for the most part typical of urban settings and includes wildlife species that are tolerant of human

activity and habitat disturbance. A summary of wildlife species documented in the study area during field investigations is presented in **Table 5**.

2.4.2.1 Anuran Survey

Methodologies outlined in the Marsh Monitoring Program Protocol (2000) were applied to confirm presence/absence of anuran species, document potential breeding habitat/areas, and confirm the nature, extent and significance of amphibian usage. Five stations were strategically placed where amphibian breeding habitat was suspected, based on air-photo interpretation and a review of the study area (see **Figures 2A to 2D**). Anuran surveys within the study area were conducted on three separate nights during the spring and summer of 2017, ran from one half hour after sunset and ended prior to midnight and were conducted during appropriate weather conditions (see **Table 4**). Investigations were undertaken during periods of peak anuran breeding activity and vocalization. The final anuran survey was conducted late in the peak of anuran breeding activity due to unseasonable cool weather, which made scheduling amphibian surveys more challenging. The July 11, 2017 site visit was undertaken late in the season to make sure that the third visit had temperatures of 17°C (or greater) as per TRCA protocol (2014). The timing of this visit is within the Marsh Monitoring Program the timing window which closes on July 15, but is just outside the timing window of June 15-30 set by the TRCA.

2.4.2.2 Herpetofauna Species

Anuran breeding evidence was documented for two species during 2017 surveys. Vocalizing male American Toad (*Anaxyrus americanus*) and Green Frog (*Lithobates clamitans*) were noted within the study area or in the immediate vicinity. A summary of anuran species and their respective call level codes is presented in **Table 6**. Overall, given the urban and disturbed nature of the study area, anuran use of the area is expected to be limited, but most prevalent within aquatic and riparian habitat.

Secondary source data from the TRCA indicates that Eastern Gartersnake (*Thamnophis sirtalis*) and Pond Slider (*Trachemys scripta*) were previously recorded in the vicinity of the study area. The Pond Slider is an exotic/non-native species. The Milliken Secondary Plan – Natural Heritage and Hydrological Study (North South Environmental 2016) documented a single vocalizing Wood Frog (*Lithobates sylvatica*), immediately north of the CN rail crossing and approximately 60 m east of Kennedy Road, in the Swamp Maple Mineral Deciduous Swamp ELC vegetation community. The location of the Wood Frog observation was found in close proximity to LGL anuran station #5 (see **Figure 2B**). LGL noted American Toad calling at this location, as described above.

TABLE 5.
WILDLIFE SPECIES DOCUMENTED WITHIN THE STUDY AREA BY LGL AND SECONDARY SOURCE DATA

Wildlife	Scientific Name	Common Name	Species Status under Legislation/ Local Sensitivity				Source of Species Identification		
			Canada SARA	Ontario ESA	Legal Status	Local	LGL ¹	Secondary Source (November 2016) ²	Secondary Source (TRCA) ³
Insects	<i>Danaus plexippus</i>	Monarch	SC	SC	FWCA(P)			*	
Herpetofauna	<i>Anaxyrus americanus</i>	American Toad					*	*	
	<i>Lithobates sylvatica</i>	Wood Frog				L2		*	
	<i>Lithobates clamitans</i>	Green Frog				L4	*		*
	<i>Thamnophis sirtalis</i>	Eastern Gartersnake				L4			*
	<i>Trachemys scripta</i>	Pond Slider (red-eared slider)			L4				*
Birds	<i>Branta canadensis</i>	Canada Goose			MBCA	L5	*		
	<i>Anas platyrhynchos</i>	Mallard			MBCA	L5	*		
	<i>Ardea Herodias</i>	Great Blue Heron			MBCA	L3	*		
	<i>Accipiter cooperii</i>	Cooper's Hawk			FWCA(P)	SWH/INT/L4			*
	<i>Buteo jamaicensis</i>	Red-tailed Hawk			FWCA(P)	L5	*	*	
	<i>Rallus limicola</i>	Virginia Rail			MBCA	L3			*
	<i>Charadrius vociferous</i>	Killdeer			MBCA	L5	*		
	<i>Actitis macularius</i>	Spotted Sandpiper			MBCA	L4	*		*
	<i>Scolopax minor</i>	American Woodcock			MBCA	L3		*	
	<i>Larus delawarensis</i>	Ring-billed Gull			MBCA	L4	*		
	<i>Larus argentatus</i>	Herring Gull			MBCA	L4	*		
	<i>Columba livia</i>	Rock Pigeon				L5	*	*	
	<i>Zenaida macroura</i>	Mourning Dove			MBCA	L5	*	*	
	<i>Ceryle alcyon</i>	Belted Kingfisher			FWCA(P)	L4			*
	<i>Picoides pubescens</i>	Downy Woodpecker			MBCA	L5	*	*	
	<i>Picoides villosus</i>	Hairy Woodpecker			MBCA	SWH/L4			*
	<i>Colaptes auratus</i>	Northern Flicker			MBCA	L4	*		
	<i>Tyrannus</i>	Eastern Kingbird			MBCA	L5	*	*	*

TABLE 5.
WILDLIFE SPECIES DOCUMENTED WITHIN THE STUDY AREA BY LGL AND SECONDARY SOURCE DATA

Wildlife	Scientific Name	Common Name	Species Status under Legislation/ Local Sensitivity				Source of Species Identification		
			Canada SARA	Ontario ESA	Legal Status	Local	LGL ¹	Secondary Source (November 2016) ²	Secondary Source (TRCA) ³
Birds (continued)	<i>Myiarchus crinitus</i>	Great-crested Flycatcher			MBCA	L4	*		
	<i>Empidonax alhorum</i>	Alder Flycatcher			MBCA	L3		*	
	<i>Sayornis phoebe</i>	Eastern Phoebe			MBCA	L4		*	
	<i>Vireo gilvus</i>	Warbling Vireo			MBCA	L5	*	*	
	<i>Vireo olivaceus</i>	Red-eyed Vireo			MBCA	INT/L4	*		*
	<i>Cyanocitta cristata</i>	Blue Jay			FWCA(P)	L5	*	*	
	<i>Corvus brachyrhynchos</i>	American Crow			MBCA	L5	*		
	<i>Hirundo rustica</i>	Barn Swallow	-	THR	MBCA	L3	*		*
	<i>Tachycineta bicolor</i>	Tree Swallow			MBCA	L4	*		*
	<i>Poecile atricapillus</i>	Black-capped Chickadee			MBCA	L5	*	*	
	<i>Sitta Canadensis</i>	Red-breasted Nuthatch			MBCA	SWH/INT/L4			*
	<i>Poliophtila caerulea</i>	Blue-gray Gnatcatcher			MBCA	SWH/INT/L4			*
	<i>Turdus migratorius</i>	American Robin			MBCA	L5	*	*	
	<i>Dumetella carolinensis</i>	Gray Catbird			MBCA	L4	*	*	*
	<i>Mimus polyglottos</i>	Northern Mockingbird			MBCA	L4	*	*	
	<i>Sturnus vulgaris</i>	European Starling				L5	*	*	
	<i>Bombycilla garrulus</i>	Cedar Waxwing			MBCA	L5	*	*	
	<i>Dendroica petechia</i>	Yellow Warbler			MBCA	L5	*	*	
	<i>Geothlypis trichas</i>	Common Yellowthroat			MBCA	L4			*
	<i>Setophaga ruticilla</i>	American Redstart			MBCA	SWH/L3	*		
	<i>Spizella passerine</i>	Chipping Sparrow			MBCA	L5	*		
	<i>Spizella pusilla</i>	Field Sparrow			MBCA	L3		*	
	<i>Melospica melodia</i>	Song Sparrow			MBCA	L5	*	*	
	<i>Melospiza georgiana</i>	Swamp Sparrow			MBCA	L4			*

TABLE 5.
WILDLIFE SPECIES DOCUMENTED WITHIN THE STUDY AREA BY LGL AND SECONDARY SOURCE DATA

Wildlife	Scientific Name	Common Name	Species Status under Legislation/ Local Sensitivity				Source of Species Identification		
			Canada SARA	Ontario ESA	Legal Status	Local	LGL ¹	Secondary Source (November 2016) ²	Secondary Source (TRCA) ³
Birds (continued)	<i>Cardinalis cardinalis</i>	Northern Cardinal			MBCA	L5	*	*	
	<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak			MBCA	L4			*
	<i>Passerina cyanea</i>	Indigo Bunting			MBCA	L4	*		*
	<i>Agelaius phoeniceus</i>	Red-winged Blackbird				L5	*	*	
	<i>Quiscalus quiscula</i>	Common Grackle				L5	*	*	
	<i>Molothrus ater</i>	Brown-headed Cowbird				L5	*	*	
	<i>Icterus galbula</i>	Baltimore Oriole			MBCA	L5	*		
	<i>Carpodacus mexicanus</i>	House Finch			MBCA	L5	*	*	
	<i>Carduelis tristis</i>	American Goldfinch			MBCA	L5	*	*	
	<i>Passer domesticus</i>	House Sparrow				L5	*		
Mammals	<i>Sylvilagus floridanus</i>	Eastern Cottontail			FWCA(G)	L4	*	*	
	<i>Tamiasciurus hudsonicus</i>	Red Squirrel			FWCA(F)	L4			*
	<i>Sciurus carolinensis</i>	Eastern Gray Squirrel			FWCA(G)	L4		*	
	<i>Ondatra zibethica</i>	Muskrat				L4			*

SARA – federal *Species at Risk Act*:

END - Endangered
THR – Threatened
SC - Special Concern

ESA - *Endangered Species Act, 2007*

END – Endangered
THR – Threatened
SC - Special Concern

Source of Species Identification:

¹Species recorded within the study area during field investigations (LGL 2017).

²Species identified by secondary source data, Natural Heritage and Hydrologic Study – Milliken Secondary Plan Area, North – South Environmental Inc. November 2016.

³Species identified by secondary source data, TRCA 2017.

Other:

Significant Wildlife Habitat Technical Guide:

SWH – Area Sensitive Species

INT - Interior Species

TRCA – Toronto and Region Conservation Authority L Rank (1-5) – Sensitive Species include those ranked as L1 to L3.

For definitions of species ranks, refer to **Appendix C**.

Legal Status:

MBCA - *Migratory Birds Convention Act*

ESA - *Endangered Species Act, 2007*

SARA - *Species at Risk Act*

FWCA - *Fish and Wildlife Conservation Act*

(P) Protected Species (G) Game species (F) Furbearing mammals

TABLE 6.
AMPHIBIAN SURVEY OF STUDY AREA AND ADJACENT LANDS BY LGL LIMITED

Station	Scientific Name	Common Name	SARA	ESA	Local	Legal Status	Call Level Code
1	<i>Anaxyrus americanus</i>	American Toad			L4		1
2*	-	-					-
3	<i>Lithobates clamitans</i>	Green Frog			L4		2
4*	-	-					-
5	<i>Anaxyrus americanus</i>	American Toad			L4		3

* - No anuran species/individuals documented

Call Level Codes – Abundance Count (according to Bird Studies Canada):

Call Level One (1) – Individual males can be counted accurately.

Call Level Two (2) - Frogs can be generally counted but calls overlap thus no exact number can be obtained.

Call Level Three (3) - Calls continuous and overlapping, no reasonable estimate of numbers.

A single species of conservation concern was identified from secondary data sources. The Milliken Secondary Plan identified a single calling Wood Frog which was identified in the vicinity of LGL anuran survey stations #5 (see **Figure 2B**). This species is typically associated with wetland and forest communities.

2.4.2.3 Breeding Bird Survey

Breeding bird surveys were conducted during the 2017 breeding bird season to document breeding bird evidence (BBE) and to characterize the nature, extent and significance of breeding bird usage of the habitats within the study area. The dates, weather, and personnel during each survey are described in **Table 4**. Survey methodology and breeding bird behaviours used as evidence of breeding success were categorized according to the Breeding Bird Atlas five-year surveys organized by Bird Studies Canada (Cadman et al., 2007). Locations of the 12 breeding bird point count stations are shown in **Figures 2A to 2D**.

2.4.2.4 Breeding Birds

The study area contained a moderate number of breeding bird species representing several habitat types. A summary of the bird species, species ranks, breeding evidence, and station location is presented in **Table 7**.

TABLE 7.
BREEDING BIRD SPECIES DOCUMENTED IN THE STUDY AREA BY LGL LIMITED

Scientific Name	Common Name	SARA ¹	ESA ¹	Legal Status ¹	Other ¹	BBE ²	Station # ³
<i>Anas platyrhynchos</i>	Mallard			MBCA		FY	2,7
<i>Charadrius vociferus</i>	Killdeer			MBCA		S	1,2,3,6
<i>Actitis macularius</i>	Spotted Sandpiper			MBCA		T	7
<i>Columba livia</i>	Rock Dove (Pigeon)					H	10,11,12
<i>Zenaida macroura</i>	Mourning Dove			MBCA		H	2,3,4,6,8,9
<i>Picoides pubescens</i>	Downy Woodpecker			MBCA		S	8
<i>Colaptes auratus</i>	Northern Flicker			MBCA		S	3,4,10
<i>Myiarchus crinitus</i>	Great-crested Flycatcher			MBCA		S	8
<i>Tyrannus</i>	Eastern Kingbird			MBCA		S	4,11,12
<i>Vireo olivaceus</i>	Red-eyed Vireo			MBCA	INT	S	8
<i>Vireo gilvus</i>	Warbling Vireo			MBCA		S	1,8
<i>Cyanocitta cristata</i>	Blue Jay			FWCA (P)		H	5,8
<i>Corvus brachyrhynchos</i>	American Crow			MBCA		H	5,6
<i>Tachycineta bicolor</i>	Tree Swallow			MBCA		H	3,4,9
<i>Hirundo rustica</i>	Barn Swallow	-	THR	MBCA		H	1, 2, 4,5,6, 11
<i>Poecile atricapillus</i>	Black-capped Chickadee			MBCA		S	5
<i>Turdus migratorius</i>	American Robin			MBCA		FY	1,2,5,6,8,10
<i>Dumetella carolinensis</i>	Gray Catbird			MBCA		S	8,12
<i>Mimus polyglottos</i>	Northern Mockingbird			MBCA		H	11
<i>Sturnus vulgaris</i>	European Starling					FY	1,2,3,4,5,6, 7,8,9,10,11
<i>Bombycilla garrulus</i>	Cedar Waxwing			MBCA		H	1,2,8
<i>Setophaga ruticilla</i>	American Redstart			MBCA	SWH	S	8
<i>Dendroica petechia</i>	Yellow Warbler			MBCA		S	8,12
<i>Spizella passerina</i>	Chipping Sparrow			MBCA		S	2
<i>Melospica melodia</i>	Song Sparrow			MBCA		S	4,5,6,8,9,10 ,12
<i>Cardinalis</i>	Northern Cardinal			MBCA		S	3,11
<i>Passerina cyanea</i>	Indigo Bunting			MBCA		S	8
<i>Agelaius phoeniceus</i>	Red-winged Blackbird					CF	1,2,3,4,8,9, 10,11,12
<i>Quiscalus quiscula</i>	Common Grackle					T	1,2,7,8,10,1 2
<i>Molothrus ater</i>	Brown-headed Cowbird					S	1,5,8
<i>Icterus galbula</i>	Baltimore Oriole			MBCA		H	12
<i>Carpodacus mexicanus</i>	House Finch			MBCA		S	8

TABLE 7.
BREEDING BIRD SPECIES DOCUMENTED IN THE STUDY AREA BY LGL LIMITED

Scientific Name	Common Name	SARA ¹	ESA ¹	Legal Status ¹	Other ¹	BBE ²	Station # ³
<i>Carduelis tristis</i>	American Goldfinch			MBCA		T	1,2,3,5,6 7,8,11
<i>Passer domesticus</i>	House Sparrow					T	3,4,6,7,8,11

¹For definitions of species ranks, refer to **Appendix C**.

²BBE - Breeding Bird Evidence (according to Bird Studies Canada):

Possible Breeding: H - Species observed in its breeding season in suitable nesting habitat.
S - Singing male present in its breeding season in suitable nesting habitat.

Probable Breeding:

T - Permanent territory presumed through registration of territorial song on at least two days, a week or so apart, at the same place.
A - Agitated behaviour or anxiety calls of an adult.

Confirmed Breeding:

NU - Used nest or egg shell found (occupied or laid within the period of study).
FY - Recently fledged young or downy young, including young incapable of sustained flight.
CF - Adult carrying food for young.
NE - Nest containing eggs.
NY - Nest with young seen or heard.

³Breeding Bird Point Count Station.

Breeding evidence was obtained for 34 species of birds. Of these 34 species, breeding evidence was confirmed in four species, suspected in another four species and twenty-six species were identified as having the potential to breed within the study area (see **Table 7**). Confirmed breeding by bird species was generally documented based on fledged young, including species such as European Starlings (*Sturnus vulgaris*), American Robin (*Turdus migratorius*), and Mallard (*Anas platyrhynchos*). These same species which were confirmed as breeding were also commonly encountered species across the study area, except for Mallard. Species which were most commonly encountered across the study area were generally species associated with open-country/agricultural/residential or highly disturbed habitat types.

Six species including Cooper's Hawk (*Accipiter cooperii*), Hairy Woodpecker (*Picoides villosus*), Red-eyed Vireo (*Vireo olivaceus*), Red-breasted Nuthatch (*Sitta Canadensis*), Blue-gray Gnatcatcher (*Poliophtila caerulea*), and American Redstart (*Setophaga ruticilla*) are considered area-sensitive and/or interior species according to the Significant Wildlife Habitat Technical Guide (MNRF 2000) as indicated in **Table 5**. Species that are both area-sensitive and interior species include Cooper's Hawk, Red-Breasted Nuthatch, and Blue-gray Gnatcatcher. Area-sensitive species include Hairy Woodpecker, and American Redstart. The Red-eyed Vireo is classified as an interior species.

Barn Swallow (*Hirundo rustica*) was the only species at risk identified by secondary sources in/near the study area. The location of the TRCA Barn Swallow record was at Toogood Pond, which is near Kennedy Road and The Bridle Trail. Barn Swallow was observed by LGL during the 2017 breeding bird surveys. All Barn Swallows were observed foraging. The location of Barn Swallow observations are: the intersection of Kennedy Road and Major Mackenzie Drive East (Breeding Bird Stations 1 and 2), fields on the west side of Kennedy Road near its intersection with Wilfred Murison Avenue (Breeding Bird Stations 4, 5, and 6), and on both sides of Kennedy Road south of Gorvette Road (Breeding Bird Station 11). A possible nesting structure was noted approximately 300 m west of Kennedy Road near the intersection with Bur Oak Avenue and will be discussed further in **Section 2.4.3**.

Species of conservation concern that were identified from the TRCA or North-South Environmental Inc. data include Virginia Rail (*Rallus limicola*), American Woodcock (*Scolopax minor*), Alder Flycatcher (*Empidonax alnorum*), Barn Swallow, and Field Sparrow (*Spizella pusilla*). This group of species can be found in habitats such as meadows, thickets, and wetlands. LGL also observed a second group of species of conservation concern which included Great Blue Heron (*Ardea herodias*), Barn Swallow, and American Redstart. This species observed by LGL can be found in wetlands, meadows, and forests.

2.4.2.5 Mammal Species

One mammal species was identified by LGL during field investigations in the study area. A single eastern cottontail (*Sylvilagus floridanus*) was observed south of the intersection of Kennedy Road and Major Mackenzie Drive East.

The TRCA data shows red squirrel (*Tamiasciurus hudsonicus*), and muskrat (*Ondatra zibethica*) to be in the vicinity of the study area. Eastern cottontail and eastern gray squirrel (*Sciurus carolinensis*) were observed as part of the Milliken Secondary Plan (North South Environmental 2016). The mammal species documented represent an assemblage that readily utilizes human influenced landscapes.

2.4.3 Species at Risk

Forty-two recorded bird species are protected under the *Migratory Birds Convention Act* (MBCA) and four bird species are protected under the *Fish and Wildlife Conservation Act* (FWCA). Six bird species are not afforded any legislative protection. The four mammal species identified are each afforded protection under the FWCA. Monarch (*Danau plexippus*) butterfly is also protected under the FWCA. Two species identified, including Red-eyed Vireo and American Redstart, are considered area-sensitive or interior species according to the Significant Wildlife Habitat Technical Guide (MNRF 2000) (see **Table 5**).

Of the 62 wildlife species recorded within the study area, two are listed/regulated under the Ontario *Endangered Species Act, 2007* (ESA). Barn Swallow is regulated as 'Threatened' under the ESA. The other species, the Monarch, is listed on the Species at Risk in Ontario List as 'Special Concern'; however, this species is not regulated and consequently does not receive protection under the ESA. An information request was sent to the MNRF, Aurora District on February 13, 2017 requesting information on species at risk previously identified within proximity to the study area. A response from MNRF on February 14, 2017 indicated that records for Snapping Turtle (*Chelydra serpentina*), Eastern Wood-pewee (*Contopus virens*), Bobolink (*Dolichonyx oryzivorus*), and Barn Swallow exist within the vicinity of the study area. The MNRF also indicated there was potential for endangered bat species, including eastern small-footed myotis (*Myotis leibii*), little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), and tri-coloured bat (*Perimyotis subflavus*).

For each of the species identified above, their respective legal status, biological requirements, habitat suitability of the study area, and likelihood of presence within the study area and survey results (where appropriate) are discussed below and summarized in **Table 8**.

Snapping Turtle

MNRF data provided on February 14, 2017 indicated that records for Snapping Turtle exist within the vicinity of the study area. The Snapping Turtle is listed as 'Special Concern' under the ESA and SARA; however, this species is not a regulated species (Endangered or Threatened) under the ESA. The Snapping Turtle is generally associated with aquatic setting such as lakes, ponds, bays and inlets. This is a highly aquatic species but Snapping Turtles may leave the water to seek out new aquatic habitats or to lay eggs. Suitable habitat for Snapping Turtle within the study area would generally be limited to the storm water management ponds, swamps and river communities identified across the site. Potential exists for Snapping Turtles (from surrounding aquatic communities) to use road-shoulders present within the study area as nesting habitat. Similarly, Snapping Turtles from surrounding areas may use habitats within the study area during overland movements from one aquatic area to another.

TABLE 8.
WILDLIFE SPECIES AT RISK SUMMARY

Scientific Name	Common Name	Location (s)	ESA	SARA	Last Observed Date	Preferred Habitat*	Potential Habitat in Study Area
<i>Chelydra serpentina</i>	Snapping Turtle	MNRF record in vicinity of study area	SC	SC	Unknown	Aquatic habitats	Aquatic habitats suitable to support this species are present within the study area. Potential exists for Snapping Turtles (from surrounding aquatic communities) to use road-shoulders present within the study area as nesting habitat. Similarly, Snapping Turtles from surrounding areas may use habitats within the study area during overland movements from one aquatic area to another.
<i>Dolichonyx oryzivorus</i>	Bobolink	MNRF record in vicinity of study area	THR	-	Unknown	Open country and agricultural	Open country and agricultural habitat types identified during 2017 surveys were not suitable to support Bobolink.
<i>Hirundo rustica</i>	Barn Swallow	TRCA record in vicinity of study area; over Toogood Pond. Breeding Bird Stations: 1, 2, 4,5,6, 11	THR	-	2017	Open country and agricultural	Open country and agricultural habitat types at the locations identified provide habitat suitable to support foraging Barn Swallow. A number of structures (e.g., barns, shed, and outbuildings) in the area could provide nesting habitat for Barn Swallow were identified a distance from the study area. No Barn Swallow nests were found within culverts or bridge structures present in the study area.
<i>Contopus virens</i>	Eastern Wood-pewee	MNRF record in vicinity of study area	SC	-	Unknown	Forest species, typically associated with forest openings, clearing or edges	Forest and forest edges habitat types identified during 2017 surveys were not suitable to support Eastern Wood-pewee.
<i>Myotis leibii</i> , <i>Myotis lucifugus</i> , <i>Myotis septentrionalis</i> , <i>Perimyotis subflavus</i>	Eastern small-footed myotis, little brown myotis, northern myotis, and tri-coloured bat	MNRF record in vicinity of study	END	-	Unknown	Forests, roost under loose bark and in the cavities of trees.	Forest communities within the study area have the potential to function as suitable habitat for the species. Specifically, forested areas that contain mature trees include the Rouge River valley, and the swamp on the east side of Kennedy Road north of the Pacific Mall and the railway.

*Preferred habitat is based on a review of secondary sources; however, these species may be found in other habitats.
For definitions of the acronyms used in this table, refer to **Appendix C**

Bobolink

As noted above, Bobolink is regulated as 'Threatened' under the Ontario ESA. Bobolinks are typically described as residents of grassland communities with an abundance of grass species that are typical of old fields. Bobolinks are also commonly associated with agricultural lands. Bobolinks were not observed during breeding bird surveys conducted in 2017. Open country and agricultural habitat types identified during 2017 surveys did not contain suitable vegetation to support Bobolink.

Barn Swallow

As noted above, Barn Swallow is regulated as 'Threatened' under the ESA. Barn Swallow generally builds mud nests on bridges, walls, ledges and barns (Cadman et al. 2007). Barn Swallow typically forages in open areas such as agricultural lands, meadows or water. Barn Swallows were observed foraging at a number of locations during breeding bird surveys conducted in 2017 (see **Table 7** and **Figures 2A to 2D**). One structure (e.g., barns, shed, outbuildings) was identified as potential nesting habitat for Barn Swallow. This structure was a barn in the old field on the west side of Kennedy Road between the intersections of Wilfred Murison Avenue and Kennedy Road to Angus Glen Boulevard and Kennedy Road. However, the structure identified was approximately 300 m from the study area. No Barn Swallow nests were found in culverts or bridge structures present in the study area. No habitats considered suitable for nesting (e.g. bridges, larger culverts or man-made structures) were identified within the study area.

Eastern Wood-pewee

Eastern Wood-pewee is listed as 'Special Concern' under the ESA and SARA; however, this species is not a regulated species (Endangered or Threatened) under the ESA. Eastern Wood-pewee is a forest species, typically associated with forest openings, clearing or edges. Eastern Wood-pewee were not observed at any locations during breeding bird surveys conducted in 2017. Forest and forest edges habitat types identified during 2017 surveys were not suitable to support Eastern Wood-pewee.

Bats

There are currently four bat species listed as 'Endangered' under the Ontario *Endangered Species Act, 2007* (ESA), including: eastern small-footed myotis; little brown myotis; northern myotis; and, tri-colored bat. The MNRF administers the ESA in the province of Ontario. The ESA affords protection for both individuals of these species (subsection 9(1)) and their habitat (subsection 10(1)). Given that species-specific habitat regulations have not yet been developed for SAR bats, habitat is protected according to the general definition provided in the ESA. Specifically, according to section 2(1), the Act protects "an area, on which the species depends, directly or indirectly, to carry on its life processes, including processes such as reproduction, rearing, hibernation, migration or feeding". Mature trees which could contain suitable

habitat for SAR bats were identified within the study area. Forested areas that contain mature trees include the Rouge River valley, and the swamp on the east side of Kennedy Road north of the Pacific Mall and the railway.

2.5 Greenbelt Plan

The Greenbelt Plan was established under Section 3 of the *Greenbelt Act*, 2005, and took effect on December 16, 2004. The *Greenbelt Plan* was updated recently and a revised plan was released by the Ministry of Municipal Affairs in 2017. The *Greenbelt Plan* area is comprised of a number of plan areas, including: the *Niagara Escarpment Plan* area, *Oak Ridges Moraine Conservation Plan* area, *Parkway Belt West Plan* area, and the *Greenbelt Plan* 'Protected Countryside' and 'Urban River Valley'.

The Greenbelt Plan identifies portions of the Rouge River north of Major Mackenzie Drive as part of the Protected Countryside and Natural Heritage System of the Greenbelt Plan area. The Rouge River is identified as a 'River Valley Connection'. The limits of this designation are presented on **Figures 2A to 2D**. The Greenbelt Plan recognizes the importance of these connections to the ecosystems of the region. It is recommended that local governments and agencies:

1. Consider how activities and land use change both within and abutting the Greenbelt relate to the areas of external connections identified in this Plan;
2. Promote and undertake appropriate planning and design to ensure that external connections are maintained and/or enhanced; and,
3. Undertake watershed based planning, which integrates supporting ecological systems with those systems contained in this Plan.

Section 6 of the *Greenbelt Plan* outlines the policies that apply to the 'Urban River Valley' land use designation. Only publicly owned lands are subject to the policies of the 'Urban River Valley' designation. This designation is subject to the applicable Official Plan policies as long as they have regard for the objectives of the *Greenbelt Plan*. All existing, expanded or new infrastructure subject to the *Environmental Assessment Act*, is permitted provided that it supports the needs of adjacent settlement areas or serves the significant growth and economic development expected in southern Ontario and supports the goals and objectives of the *Greenbelt Plan*.

Section 3.2.6.2 of the *Greenbelt Plan* (2017) outlines policies for considering land conversions or redevelopment in or abutting the urban river valley, and to strive for approaches that:

- Establish or increase the extent or width of a vegetation protection zone in natural self-sustaining vegetation, especially in the most ecologically sensitive areas (i.e. near the stream and below the stable top of bank);

- Increase or improve fish habitat in streams and in the adjacent riparian lands;
- Include landscaping and habitat restoration that increase the ability of native plants and animals to use the valley systems as both wildlife habitat and movement corridors; and
- Seek to avoid or, if avoidance is not possible, minimize and mitigate adverse impacts associated with the quality and quantity of urban runoff into the valley systems.

These considerations will be reviewed and addressed during this Municipal Class EA Study.

2.6 Designated Natural Areas

Based on a review of the Natural Heritage Information Centre (NHIC) database, there are no Provincially Significant Wetlands (PSWs) or Areas of Natural and Scientific Interest (ANSIs) located within the study area, nor are any located within 120 m of the study area.

The Regional Municipality of York Official Plan identifies the Rouge River valleylands as part of the Regional Greenlands System. The City of Markham Official Plan identifies a Greenway System. This system includes: a small area between Denison Street and Steeles Avenue, the Rouge River area and lands on the north side of Major Mackenzie Drive. The Greenlands System Schedule of the City of Markham Official Plan is presented in **Figure 4**.

The lands located on the north side of Major Mackenzie Drive are identified as part of the Greenbelt Plan area (as further described in **Section 2.5**), and part of the Rouge Watershed Protection Area. The Rouge Watershed Protection Area is defined in the Official Plan as including “the Rouge watercourses, their associated valleylands and riparian zones, key natural heritage features and key hydrologic features associated with the corridor and associated vegetation protection zones” (Markham Official Plan, 3.1.4). The delineation and management of the Rouge Watershed Protection Area was determined in the Rouge North Management Plan. A series of criteria are outlined in the City of Markham Official Plan for evaluating development, redevelopment or site alteration within this area. Should the improvements to Kennedy Road require any work within this area, these policies will be further assessed.

The TRCA has mapped natural cover within its jurisdiction, generally as forest, meadow and wetland within the study area. Areas of forest identified include the lands surrounding the Rouge River and valleylands. Areas of meadow are generally identified between Gorvette Road and Steeles Avenue, surrounding the 407 ETR/Kennedy Road interchange, meadows associated with the Rouge River, a field on the west side of Kennedy Road across from Bur Oak Avenue, and at the pond at the south-east

quadrant of Major Mackenzie Drive and Kennedy Road (Mattamy Pond). Wetlands are identified near Gorvette Road and are classified as Swamp Maple Mineral Deciduous Swamp (SWD3-3), Red Osier Mineral Thicket Swamp (SWT2-5) and Cattail Mineral Shallow Marsh (MAS2-1). Refer to **Figures 2A to 2D** for further information.

2.7 TRCA Regulation Limit

A portion of the study area is located within the Regulation Limit under Ontario Regulation 166/06 Toronto and Region Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. The areas within the Regulation Limit include the lands in the vicinity of the Rouge River. Refer to **Figure 2C** for the location of the Regulation Limit within the study area. A permit will be required for the improvements to Kennedy Road during detail design.

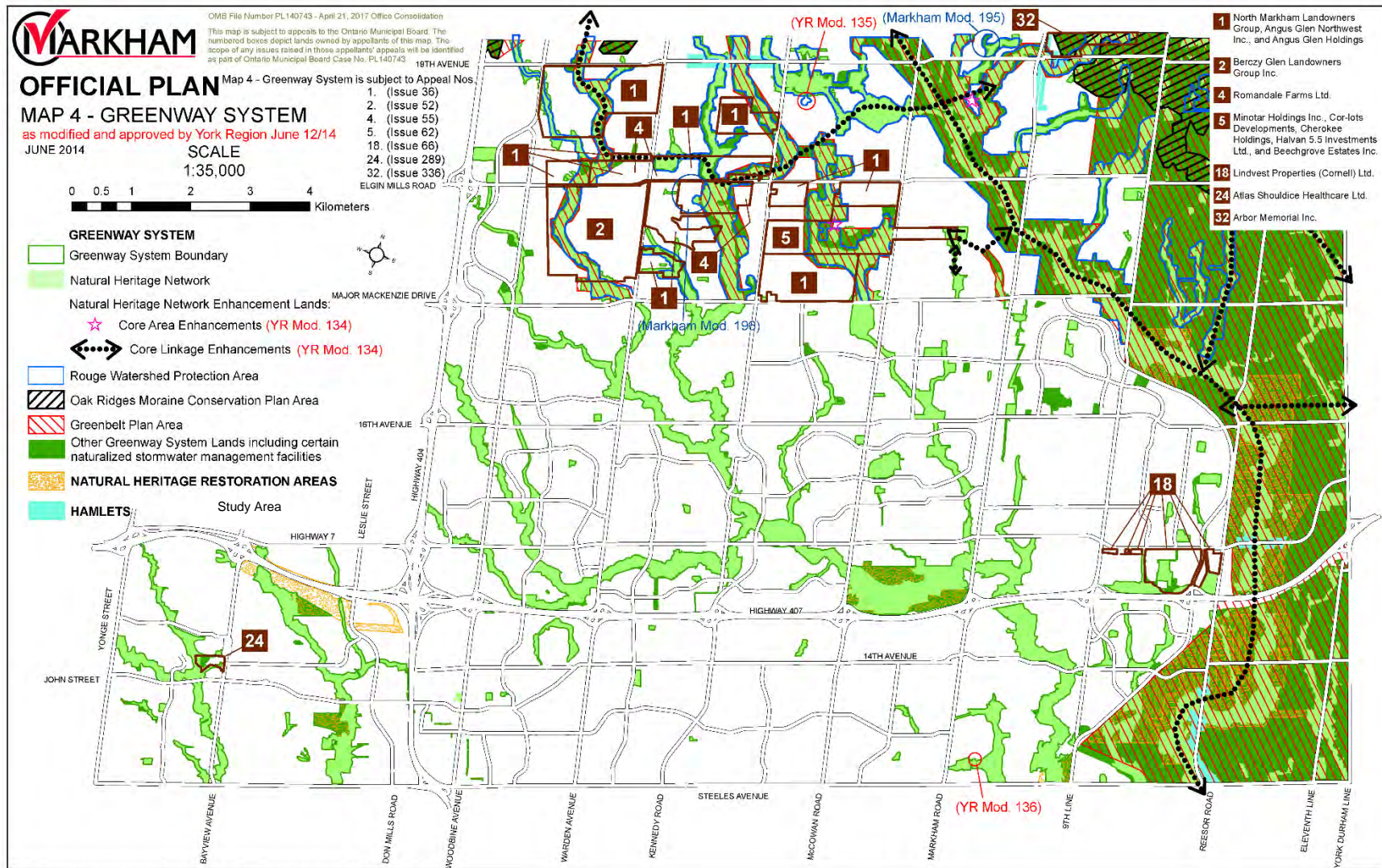


FIGURE 4. CITY OF MARKHAM GREENWAY SYSTEM

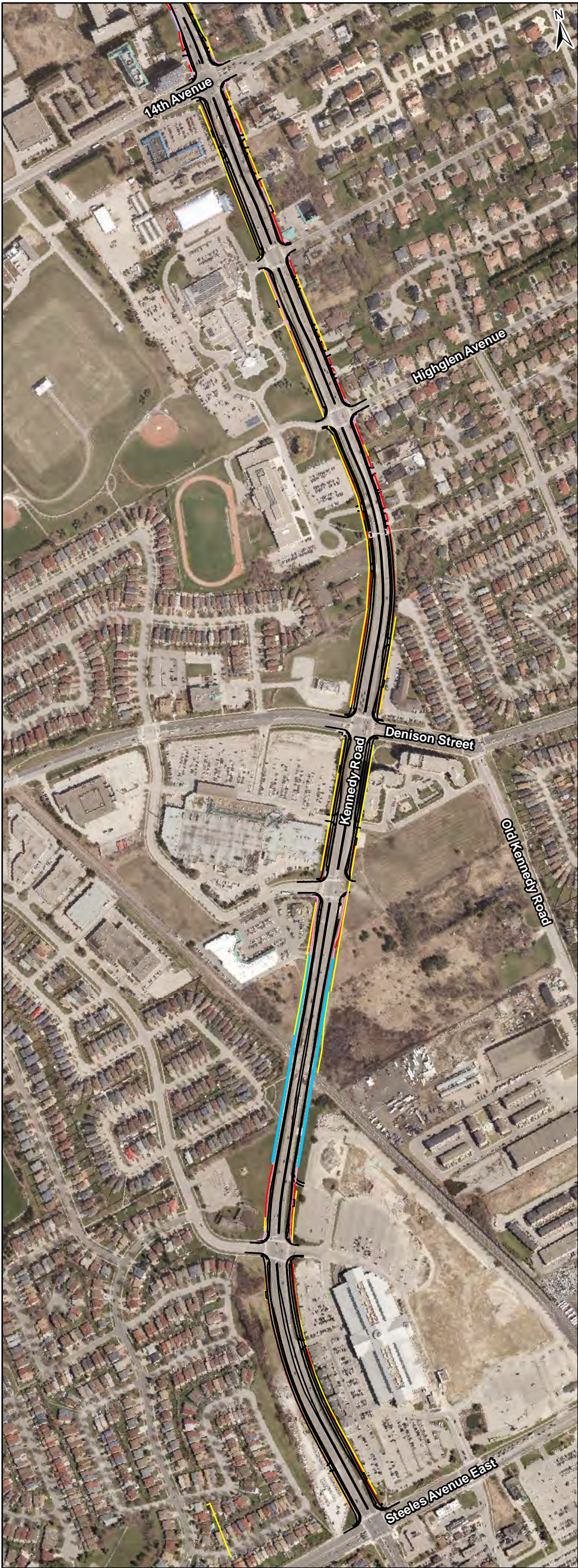
3.0 PROJECT DESCRIPTION

Kennedy Road from Steeles Avenue to Major Mackenzie Drive currently exists as a four-lane arterial urban road. Kennedy Road will be widened to six lanes generally about the centreline using a best fit approach to provide for a Transit/HOV lane in each direction. Bus bays and transit facilities will be provided along the corridor. A Multi-Use Path will be implemented on both sides of the road. A separate active transportation bridge will be provided along both sides of Kennedy Road through the 407 ETR interchange. The GO Rail crossings located north of Clayton Drive and north of Austin Drive will be maintained at grade and active transportation facilities will be provided on both sides of the road. These GO Rail crossings will ultimately be grade separated at some point in the future. The existing CNR overpass located south of 407 ETR will be replaced and the Miller Avenue Extension addressed in a separate Class EA will be maintained. The VIVA Rapidway proposed from YMCA Boulevard to Highway 7 will be shifted to share the Transit/HOV curb lanes. Lane widths and multi-use trail widths will be narrowed to achieve a best fit to avoid encroachment into the Hagerman Cemetery, the St. Philips Cemetery and the Bethesda Cemetery.

The Rouge River Bridge will be replaced to accommodate an additional lane of traffic in each direction and active transportation facilities located on both sides of Kennedy Road.

Based on York Region's 2019 10-Year Roads and Transit Capital Construction Program, the section of Kennedy Road from 14th Avenue to Highway 7 is scheduled for construction in 2023. There is no current timeframe for the construction of the sections of Kennedy Road from Steeles Avenue to 14th Avenue or from Highway 7 to Major Mackenzie Drive.

The proposed design of Kennedy Road is shown in **Figure 5**. Typical cross-sections for Kennedy Road based on 36 m and 43 m rights-of-way are presented in **Figure 6**.



Proposed Design

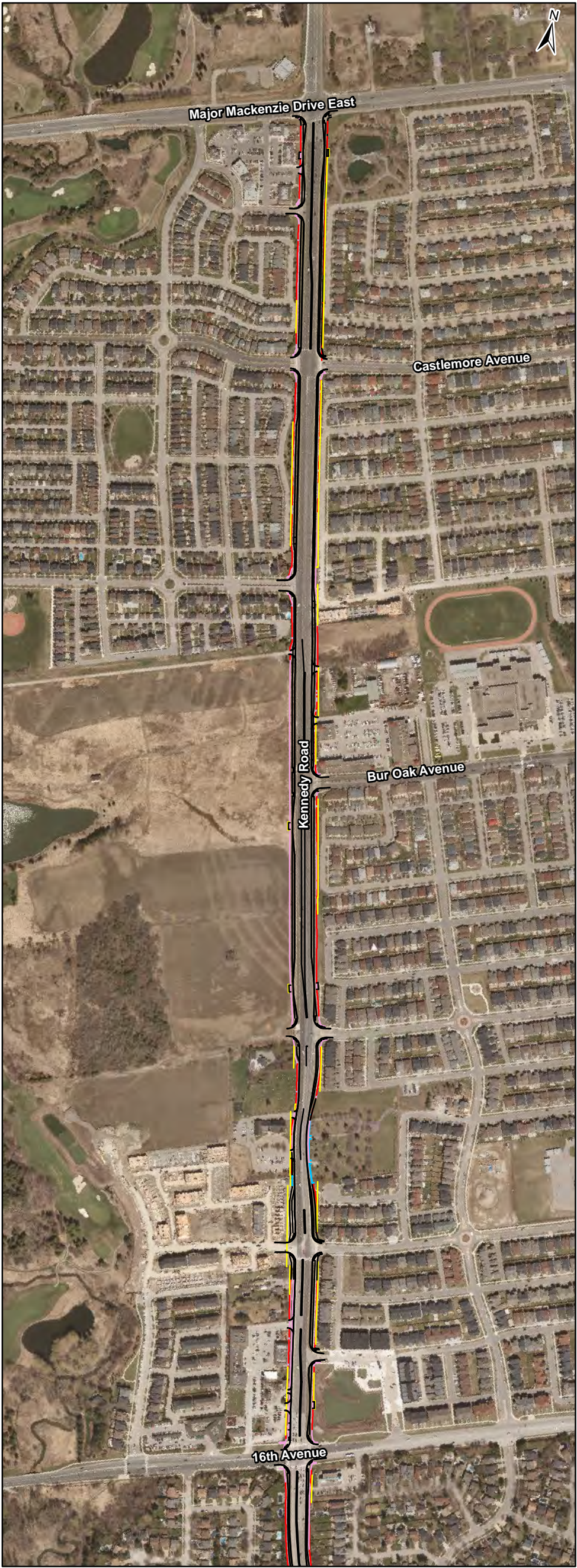
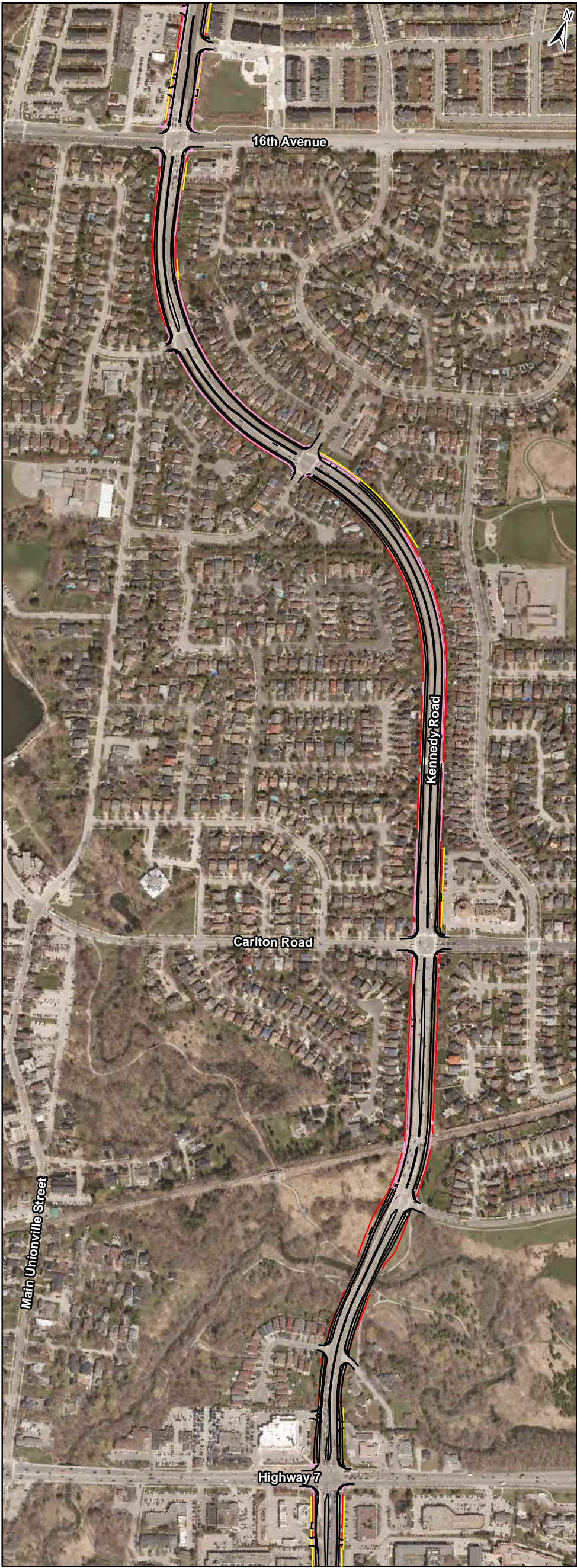
- Grading Fill and Cut
- Proposed Boulevard
- Proposed Retaining Wall
- Proposed Right of Way
- Proposed Design (Curb, Edge of Pavement, Sidewalk and Bus Pads/Shelters)

Aerial photo: Regional Municipality of York 2019 orthoimagery

0 50 100 200 300 Meters



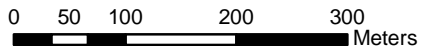
Project	TA8730	Figure	5A
Date	July, 2020	Prepared By	AJ
Scale	1:6,800	Verified By	GNK



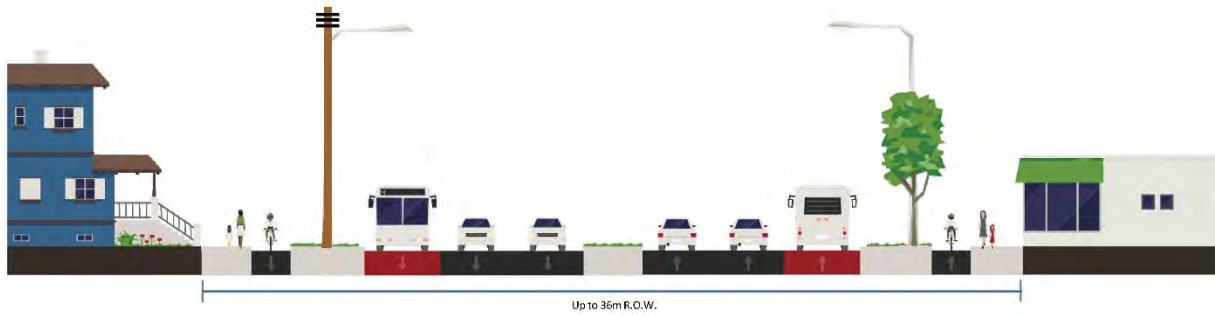
Proposed Design

- Grading Fill and Cut
- Proposed Boulevard
- Proposed Retaining Wall
- Proposed Right of Way
- Proposed Design (Curb, Edge of Pavement, Sidewalk and Bus Pads/Shelters)

Aerial photo: Regional Municipality of York 2019 orthoimagery



Project	TA8730	Figure	5B
Date	July, 2020	Prepared By	AJ
Scale	1:6,800	Verified By	GNK



36 Metre Right-of-Way



43 Metre Right-of-Way

FIGURE 6. TYPICAL CROSS-SECTION FOR KENNEDY ROAD

4.0 IMPACT ASSESSMENT AND ENVIRONMENTAL PROTECTION

4.1 Soils

The soils located along Kennedy Road are susceptible to erosion and will be impacted during construction as a result of clearing, excavation and grading. Consequently, soil disturbance associated with drainage improvements, grading revisions, culvert/bridge replacement, etc. may result in erosion of, and sedimentation to, sensitive receiving watercourses. For this reason, standard erosion and sediment control measures will be followed during construction in accordance with Ontario Provincial Standard Specification (OPSS) 805 – Construction Specification for Temporary Erosion and Sediment Control Measures (2010) to minimize construction-related impacts on surface water quality and fish habitat. Site-specific erosion and sedimentation control measures to be implemented prior to construction will be identified during detail design following best management practices recommended in the following documents:

- Erosion and Sediment Control Guideline for Urban Construction (Greater Golden Horseshoe Area Conservation Authorities 2006);
- Best Management Practices Manual for Fisheries (MTO 2017); and,
- Environmental Guide for Erosion and Sediment Control during Construction of Highway Projects (MTO 2007).

These guidance documents will be used to prepare a detailed Erosion and Sediment Control Plan that will implement a multi-barrier solution that includes:

- placing rock flow checks at regular intervals in ditches down-gradient from areas of soil disturbance in rural sections;
- protecting inlets to catch basins and maintenance holes in urban sections;
- placing silt fence along stream margins in areas of soil disturbance;
- managing stormwater during construction to prevent contact with exposed soils;
- implementing erosion control products within exposed areas such as erosion control blankets, coir logs, tackifiers and mulch, etc.;
- implementing temporary stormwater treatment measures during construction including sediment bags, sediment basins/ponds, diversion swales, pumping/drawdown of sediment basins/ponds, etc.
- limiting the extent and duration that soils are exposed to the elements to the minimum area and time necessary to perform the work;
- applying seed and mulch, tackifier and/or erosion control blanket in areas of soil disturbance to provide adequate slope protection and long-term slope stabilization; and,

- monitoring and maintenance of erosion and sedimentation control measures during construction to ensure their effectiveness.

Temporary erosion and sediment controls shall be inspected on a regular basis in accordance with the following documents:

- Erosion and Sediment Control Inspection Guide (TRCA 2008);
- Silt Smart: Erosion and Sediment Control Effectiveness Monitoring and Rapid Response Protocol for Large Urban Development Sites (CVC, MNRF, MECP and DFO 2012); and,
- Construction Administration and Inspection Task Manual (MTO 2007).

As a minimum, erosion and sediment control facilities shall be inspected on a daily basis during installation, prior to forecasted major storm events, during snowmelt and following significant storm events. Inspections for routine maintenance of erosion and sediment controls shall occur once per week, unless maintenance/repairs are required upon inspection and after significant storm events.

These environmental protection measures will greatly reduce the potential for soil erosion and impairment of surface water quality and fish habitat.

4.2 Aquatic Habitats and Communities

Improvements to Kennedy Road between Steeles Avenue and Major Mackenzie Drive have the potential to result in impacts to aquatic habitats and communities. Effects on these features related to these modifications could include:

- temporary disruption or permanent loss of site-specific habitat;
- temporary changes to water quality;
- changes in water temperature; and,
- barriers to fish passage.

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:

- 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 Act. If a HADD is unavoidable, authorization from DFO under Subsection 35(2) of the *Fisheries Act* may be issued.

The Tributary of the Rouge River located north of YMCA Boulevard currently flows through twin CSP culverts. To accommodate the wider road platform for Kennedy Road improvements and to meet freeboard requirements, which are currently deficient, the twin CSPs will be replaced with two longer, increased capacity pre-cast 1.8 m span embedded concrete box culverts.

Immediately north of the Rouge River Crossing is the crossing of the Go Transit Stouffville Railway Corridor crossing north of Austin Drive. To accommodate the future grade separation of the rail and road (identified as the Ultimate Vision subject to a future grade separation study) the Rouge River bridge will be replaced. This is because either an Overpass or Underpass at the rail crossing will require raising of the Kennedy Road profile and subsequent raising of the bridge. As such to accommodate the Ultimate Vision grade separation of the crossing of the Go Transit Stouffville Railway Corridor crossing north of Austin Drive, the Rouge River bridge will be replaced. In the interim the Recommended Design at the Go Transit Stouffville Railway Corridor crossing north of Austin Drive is to provide an at-grade crossing for the widened Kennedy Road. To accommodate this recommendation also results in widening of the Rouge River bridge to provide two additional traffic lanes and multi-use paths for Active Transportation. The bridge super structure requires full replacement to accommodate the proposed widening with widened abutments. Modification to the existing bridge is required to accommodate the proposed widening. The superstructure will be fully replaced with a wider structure (30.744m) matching the existing span, depth and elevation of the existing structure. The abutments will be extended to support this wider superstructure and a flatter 1% cross slope will be used. These measures are recommended to minimize increases to the Regional upstream flood levels and overtopping that currently exists with the existing structure.

Bridge and culvert works at the Rouge River and its tributary will require in-water work. The in-water works at the Rouge River and its tributary do not meet the criteria for the measures to protect fish and fish habitat and will, therefore, require DFO screening under the *Fisheries Act*. In addition, works within Redside Dace habitat may require permitting under the Ontario *Endangered Species Act, 2007* and the Canada *Species at Risk Act*. At the very least, consultation with the Ministry of Environment, Conservation

and Parks (MECP) regarding the ESA and DFO regarding SARA will need to be conducted during detail design to determine additional steps. In addition, the thermal regimes of all watercourses should be reviewed during detail design to confirm construction timing windows.

Further details regarding works, net environmental effects and site-specific mitigation proposed at the crossings can be found in the sections below.

4.2.1 Temporary Disruption or Permanent Loss of Site-Specific Habitat

The bridge and culvert works at the Rouge River and its tributary have the potential to result in the permanent loss of localized fish habitat. In order to minimize the potential for adverse effects, the new culvert/bridge will be as short as possible and all works will be performed in-the-dry by using temporary flow bypass systems and cofferdams to isolate the work areas. Where possible, in-water works will be avoided altogether. Construction will also be staged such that both water flow and traffic flow can be maintained.

To reduce the potential for serious harm to fish habitat, the following environmental protection measures will be implemented:

- in-water work/work within riparian habitat at the Rouge River should be permitted from July 1 to September 15 (to be confirmed by MECP and TRCA during detail design) due to the presence of Redside Dace recovery habitat and July 1 to March 31 at the Tributary of the Rouge River;
- work areas will be delineated with construction fencing to minimize the area of disturbance;
- appropriate sediment control structures will be installed prior to and maintained during construction to prevent entry of sediments into the watercourse;
- where cofferdams are to be employed, unwatering effluent will be treated prior to discharge to receiving watercourse;
- cofferdams will be constructed using pea gravel bags or equivalent to isolate the work area and maintain flow;
- where cofferdams are to be deployed, a fish screen will be used at the end of the dewatering pump to prevent fish impingement and/or entrainment;
- fish isolated by construction activities will be captured and safely released to the watercourse;
- good housekeeping practices related to materials storage/stockpiling, equipment fuelling/ maintenance, etc. will be implemented during construction; and,
- disturbed riparian areas will be vegetated and/or covered with an erosion control blanket as quickly as possible to stabilize the banks and minimize the potential for erosion and sedimentation.

These environmental protection measures will greatly reduce the potential adverse effects to fish and fish habitat resulting from construction activities.

4.2.2 Temporary Change to Water Quality

The construction associated with the proposed works has the potential to alter water quality through on-site erosion of exposed materials and the subsequent impairment of downstream water quality with sediments and other contaminants.

Changes to water quality will be mitigated through the isolation of the work areas behind cofferdams, the treatment of effluent from unwatering prior to its release back into the receiving watercourses, and the deployment and maintenance of erosion and sediment controls (silt fencing, flow checks, etc.) which will prevent sediments from reaching the watercourses from exposed soils upslope. To improve storm water quality, roadway runoff should be directed to existing storm water management (SWM) facilities where technically feasible and sufficient permanent pool volume is available within the SWM facility. In addition, all exposed areas should be vegetated as quickly as possible once the work is completed.

The implementation of these mitigation measures should eliminate potential changes to water quality to the receiving watercourses.

4.2.3 Changes in Water Temperature

The thermal regime of a receiving watercourse may be altered by storm water runoff or removal of riparian vegetation that shades the watercourse. In the summer, runoff can become superheated through contact with paved surfaces, which, when discharged to a receiving watercourse can result in thermal shock, thereby injuring or killing aquatic organisms. Coldwater or coolwater streams are usually considered more sensitive to changes in water temperature than warmwater streams.

It is expected that there will be no significant increase in temperature as a result of the proposed works as long as appropriate storm water management strategies are implemented (see **Section 4.1.2**).

4.2.4 Barriers to Fish Passage

No barriers to fish passage will result from this project.

4.2.5 Restoration/Enhancement

The riparian areas at crossings supporting fish habitat may be affected by the culvert/bridge works and construction of potential retaining walls. Restoration, enhancement and/or compensation will focus on these main areas of impact.

The goal of the restoration/enhancement plan is to provide an overall benefit to the watercourse at these locations through restoration of riparian habitat. Restoration of

disturbed riparian areas associated with culvert/bridge and retaining wall works should focus on the replacement and enhancement of the riparian vegetation that will be affected by the proposed works. These restoration and enhancement works will increase the diversity of habitat in relation to what is present by increasing riparian cover, increase habitat diversity and provide good floodplain connectivity.

4.2.6 Permits and Approvals During Detail Design

4.2.6.1 Fisheries Act

As discussed above in **Section 4.2**, the proposed in-water works at the Rouge River and its tributary, may not meet the criteria for the measures to protect fish and fish habitat. Therefore, this portion of the project will likely require a review by DFO during detail design.

4.2.6.2 Species at Risk Act

The works proposed at the Rouge River have the potential to adversely affect Redside Dace listed under Schedule 1 of SARA. During detail design, consultation with DFO and MECP regarding the works proposed at this crossing will be conducted to determine whether a permit is required.

4.2.6.3 Endangered Species Act

During detail design, consultation with the MECP to determine permit requirements under the Ontario *Endangered Species Act, 2007* will be undertaken. If required, the necessary permit(s) will be secured at that time.

4.2.6.4 TRCA Regulation 166/06

Based on a review of TRCA mapping, both watercourses located within the study area are subject to *Ontario Regulation 166/06* TRCA Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. A permit from the TRCA, pursuant to *O. Reg. 166/06*, will be secured during detail design.

4.3 Vegetation Communities

The Kennedy Road widening has the potential to result in adverse effects to vegetation and vegetation communities including:

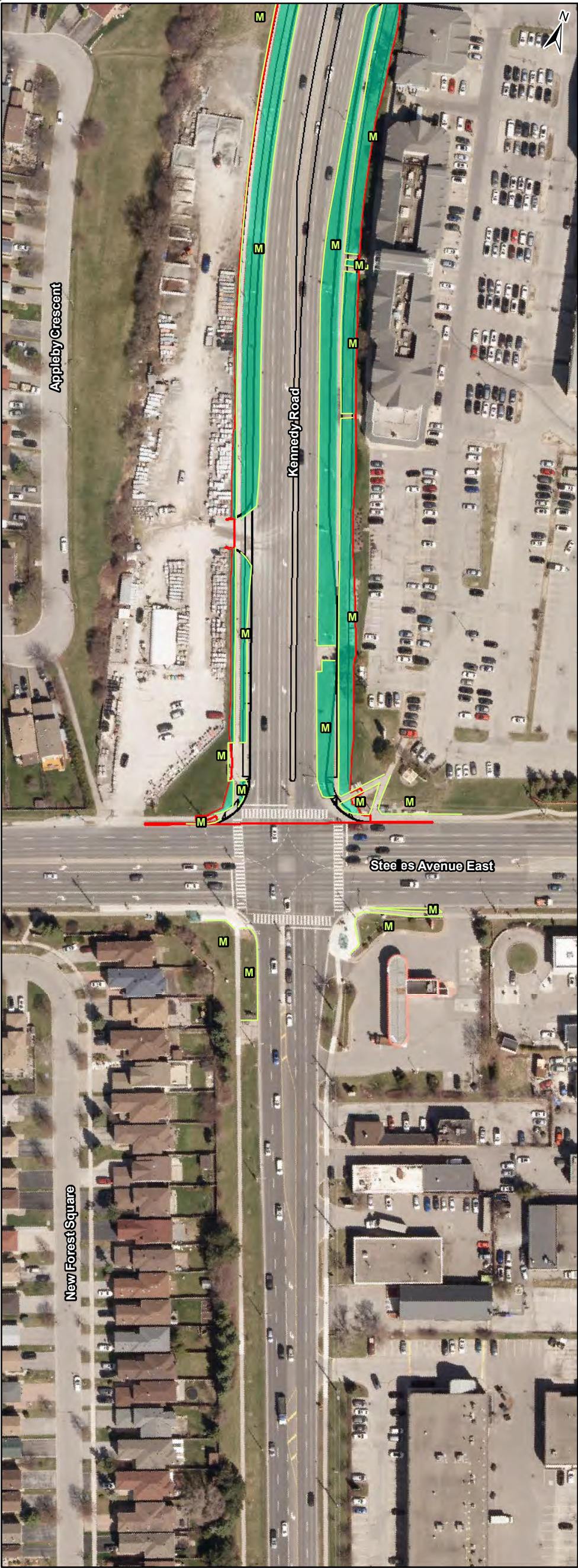
- Displacement of and/or disturbance to vegetation and vegetation communities; and,
- Displacement of and/or disturbance to Rare, Threatened or Endangered Vegetation and Vegetation Communities.

4.3.1 Displacement of and/or disturbance to vegetation and vegetation communities
Vegetation will be cleared to accommodate the widening of Kennedy Road. A total of 122,290 m² (12.23 ha) of vegetation will be removed, with 85.8% of the removals comprising human-influenced (manicured and hedgerow) vegetation communities.

Other vegetation communities to be removed consist of natural/semi-natural vegetation communities including: cultural (17,385 m²); and, wetland (2 m²). **Table 9** provides a summary of the total area of vegetation communities that will be removed for the proposed widening of Kennedy Road. The location of vegetation removals is presented in **Figures 7A to 7J**.

TABLE 9. IMPACTS TO VEGETATION COMMUNITIES LOCATED WITHIN THE STUDY AREA

Vegetation Community Type	Vegetation Community	Area Impacted (m²)
Cultural	Dry-Moist Old Field Meadow (CUM1-1)	16,676.05
	Mineral Cultural Woodland (CUW1)	497.25
	Cultural Thicket (CUT1)	211.28
	Sub-total	17,384.58
Wetland	Swamp Maple Mineral Deciduous Swamp (SWD3-3)	1.55
	Sub-total	1.55
Human Influenced	Manicured (M)	104,888.24
	Hedgerow (H)	15.57
Sub-total		104,903.80
Grand Total		122,289.93



Vegetation Communities – Impact Assessment

- Disturbance Limit
- Proposed Design
- Vegetation Community Boundary
- Impacted Vegetation Community Area
- Vegetation Communities

CUM1-1 (a,c)

Dry-Moist Old Field Meadow Type

CUW1f

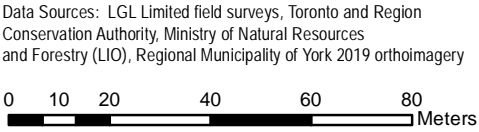
Mineral Cultural Woodland Ecosite

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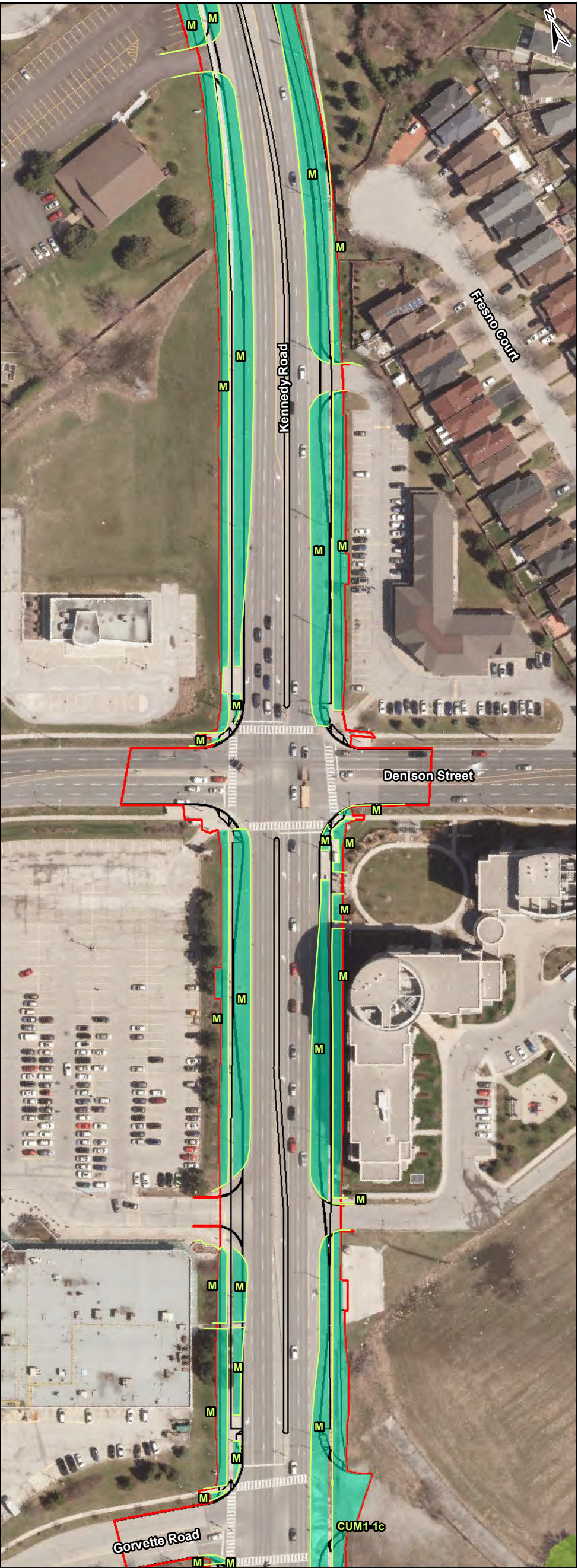
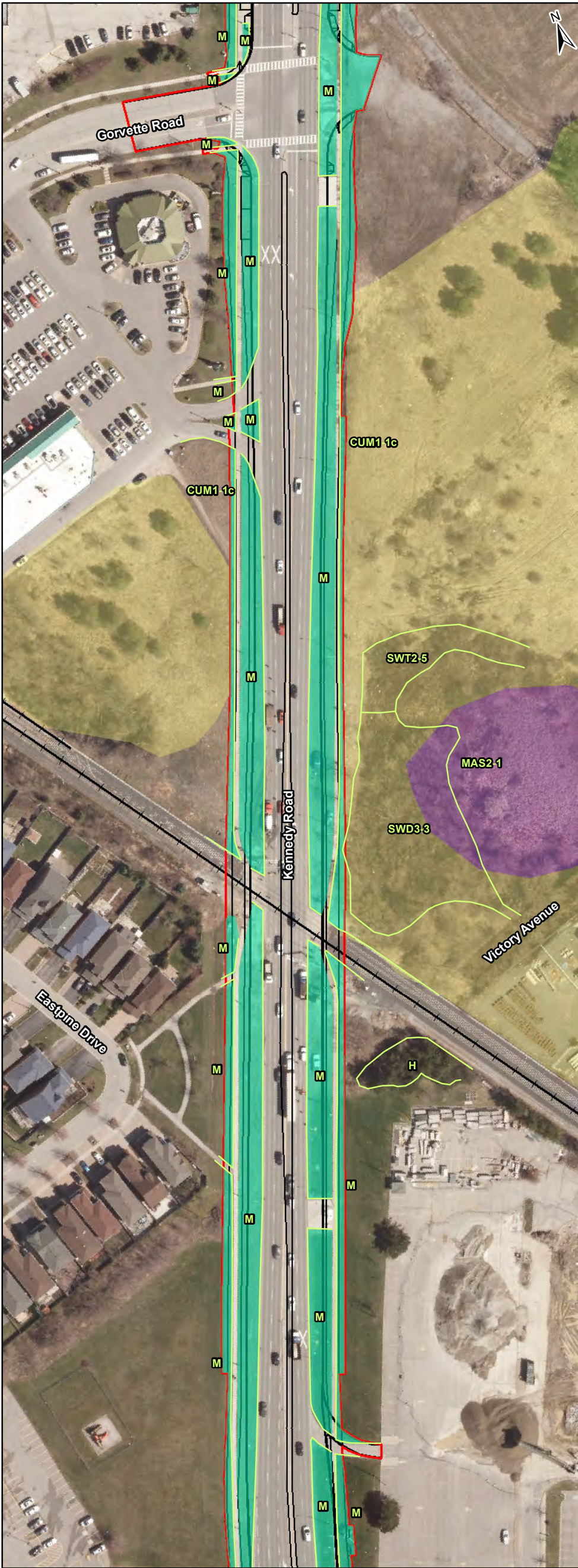
Hedgerow

M

Manicured



Project	TA8730	Figure	7A
Date	April, 2020	Prepared By	AJ
Scale	1:1,500	Verified By	GNK



Vegetation Communities – Impact Assessment

- Disturbance Limit
- Proposed Design
- Railway
- Natural Cover Habitat**

Forest
- Meadow
- Wetland

Vegetation Communities

Vegetation Community Boundary

Impacted Vegetation Community Area

CUM1 1c Dry-Moist Old Field Meadow Type

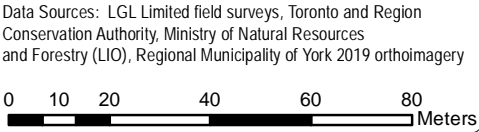
H Hedgerow

M Manicured

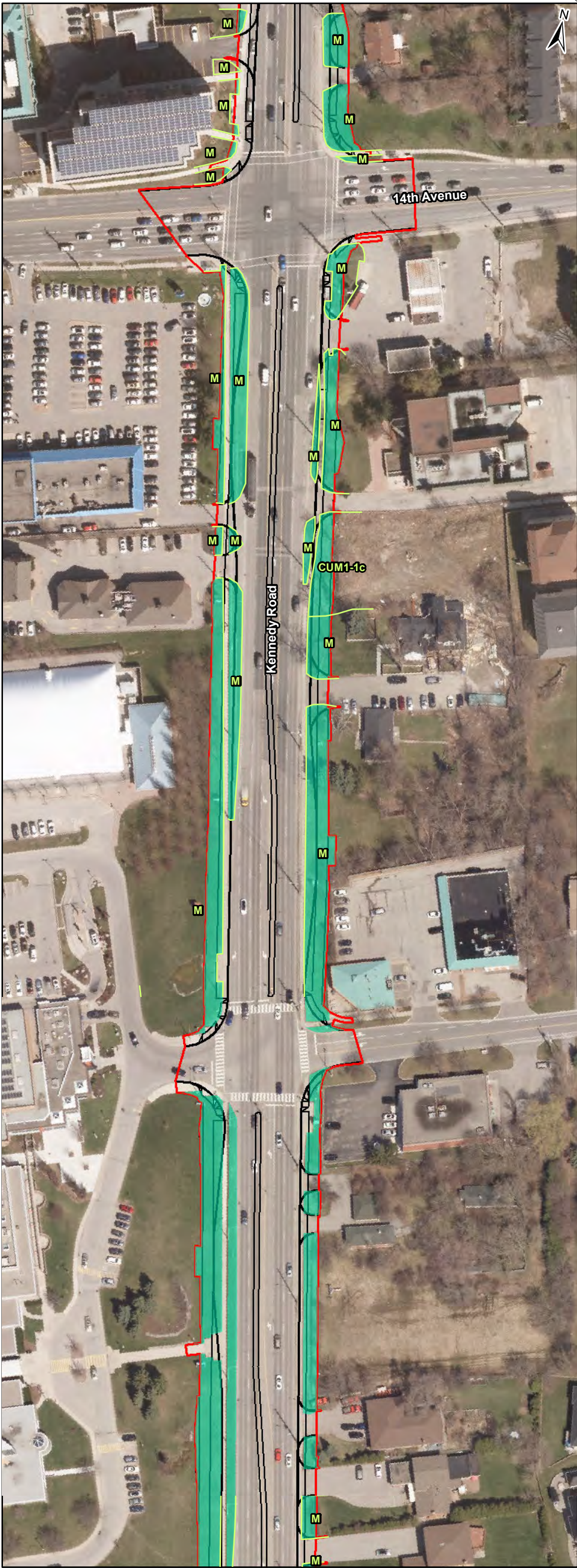
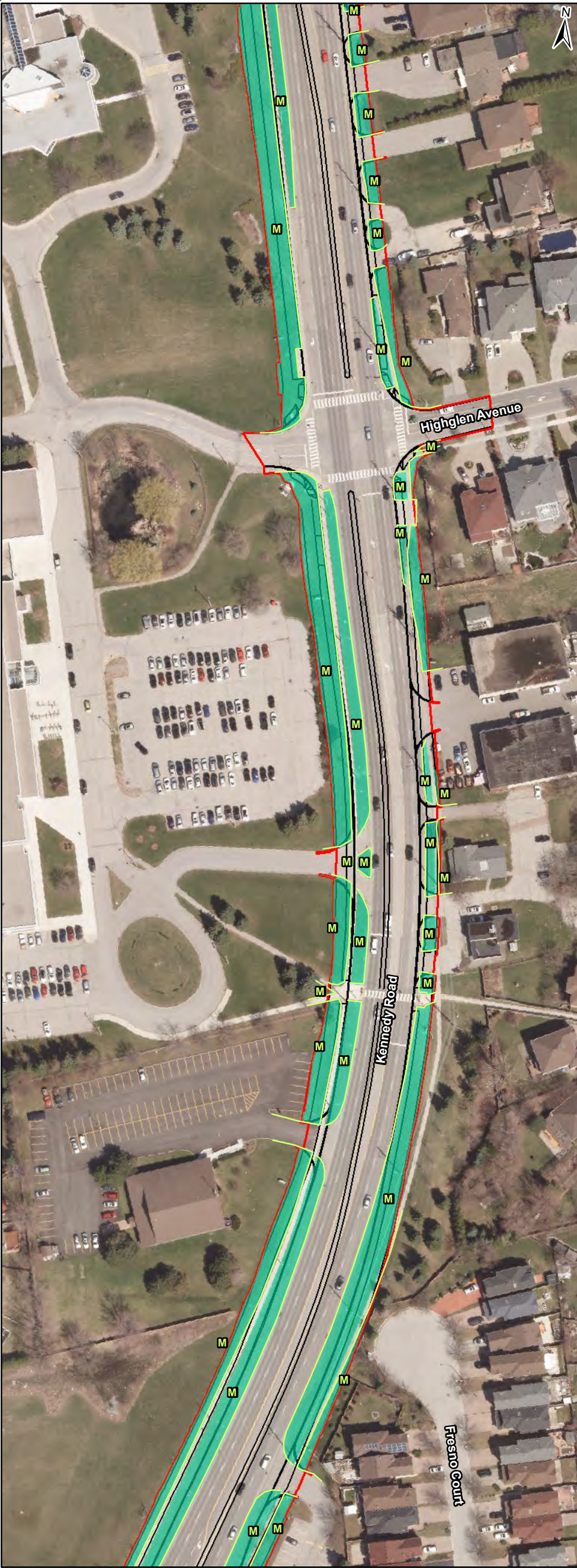
MAS2 1 Cattail Mineral Shallow Marsh Type

SWD3 3 Swamp Maple Mineral Deciduous Swamp Type

SWT2 5 Red-osier Mineral Thicket Swamp Type



Project	TA8730	Figure	7B
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Scale	1:1,500	Verified By	GNK

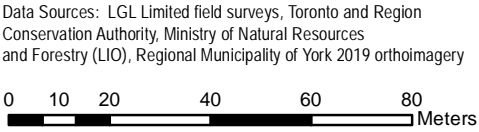


Vegetation Communities – Impact Assessment

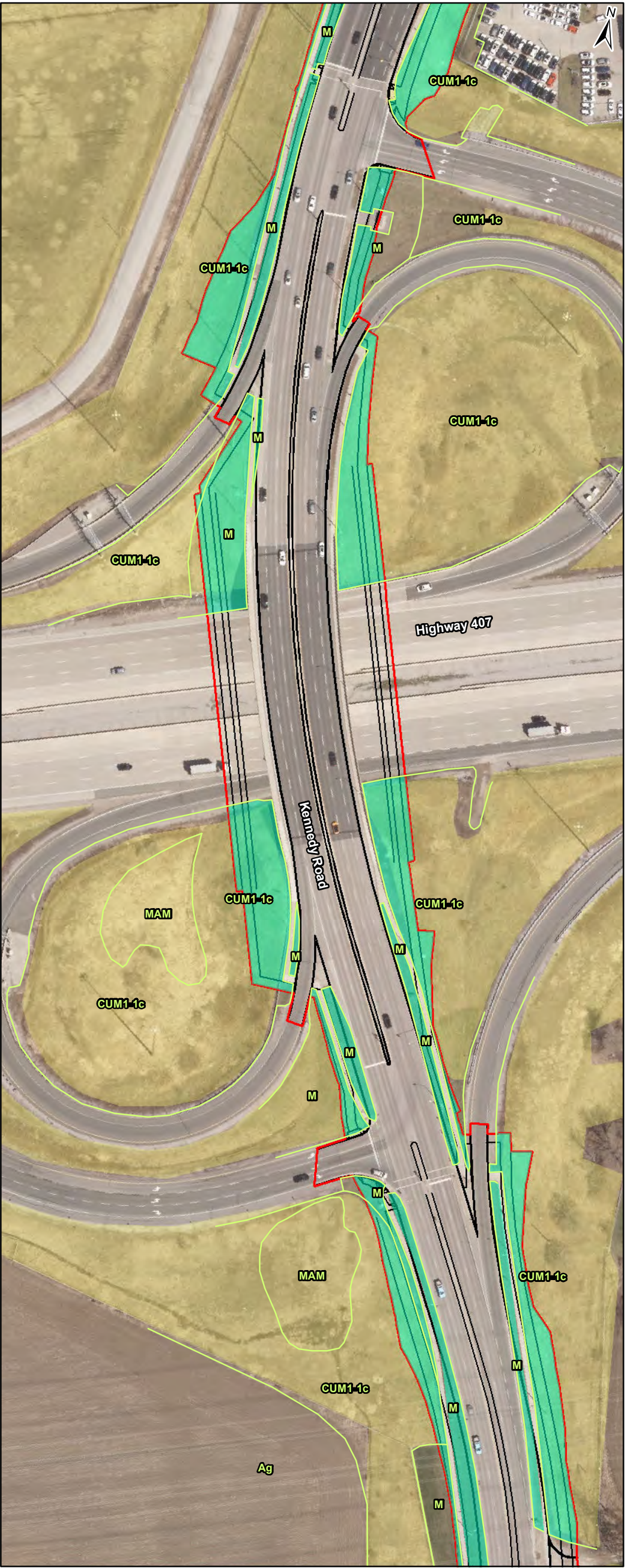
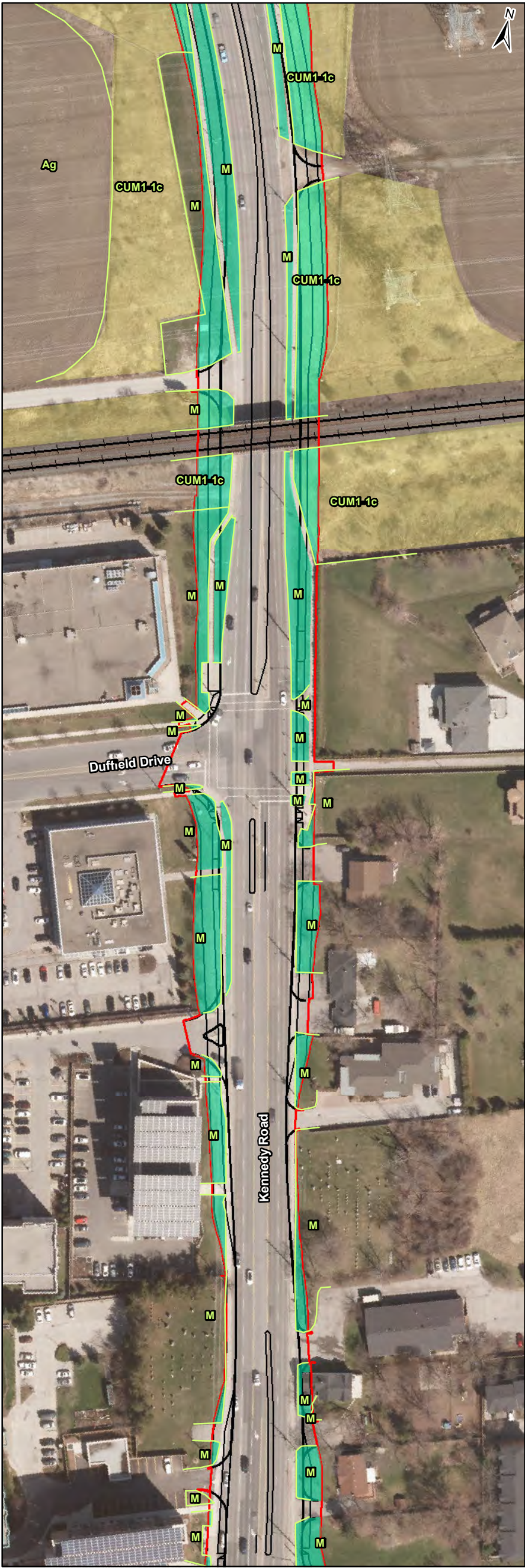
- Disturbance Limit
- Proposed Design
- Vegetation Community Boundary
- Impacted Vegetation Community Area
- Vegetation Communities**
- CUM1-1c

Dry-Moist Old Field Meadow Type
- M

Manicured



Project	TA8730	Figure	7C
Date	April, 2020	Prepared By	AJ
Scale	1:1,500	Verified By	GNK



Vegetation Communities – Impact Assessment

- Disturbance Limit
- Proposed Design
- Railway
- Natural Habitat Cover: Meadow
- Vegetation Community Boundary
- Impacted Vegetation Community Area
- Vegetation Communities**
- Ag

Agriculture
- CUM1-1c

Dry-Moist Old Field Meadow Type
- M

Manicured
- MAM

Meadow Marsh

Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ministry of Natural Resources and Forestry (LIO), Regional Municipality of York 2019 orthomagey

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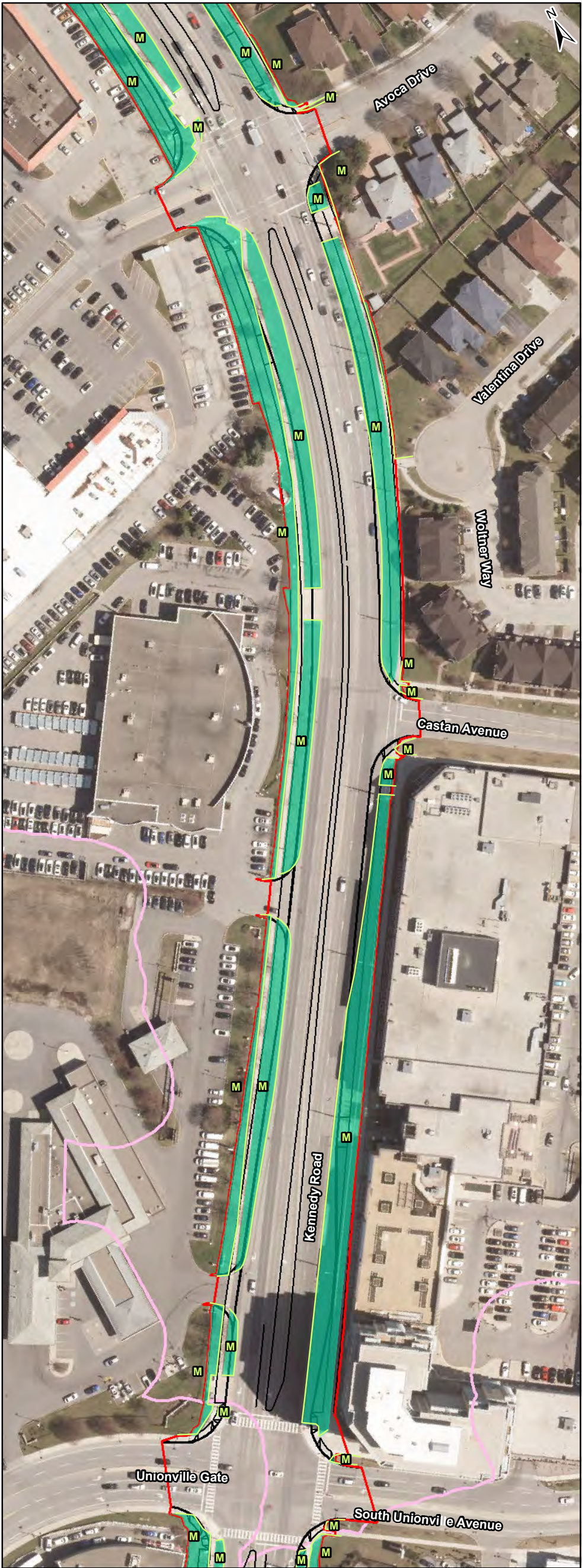
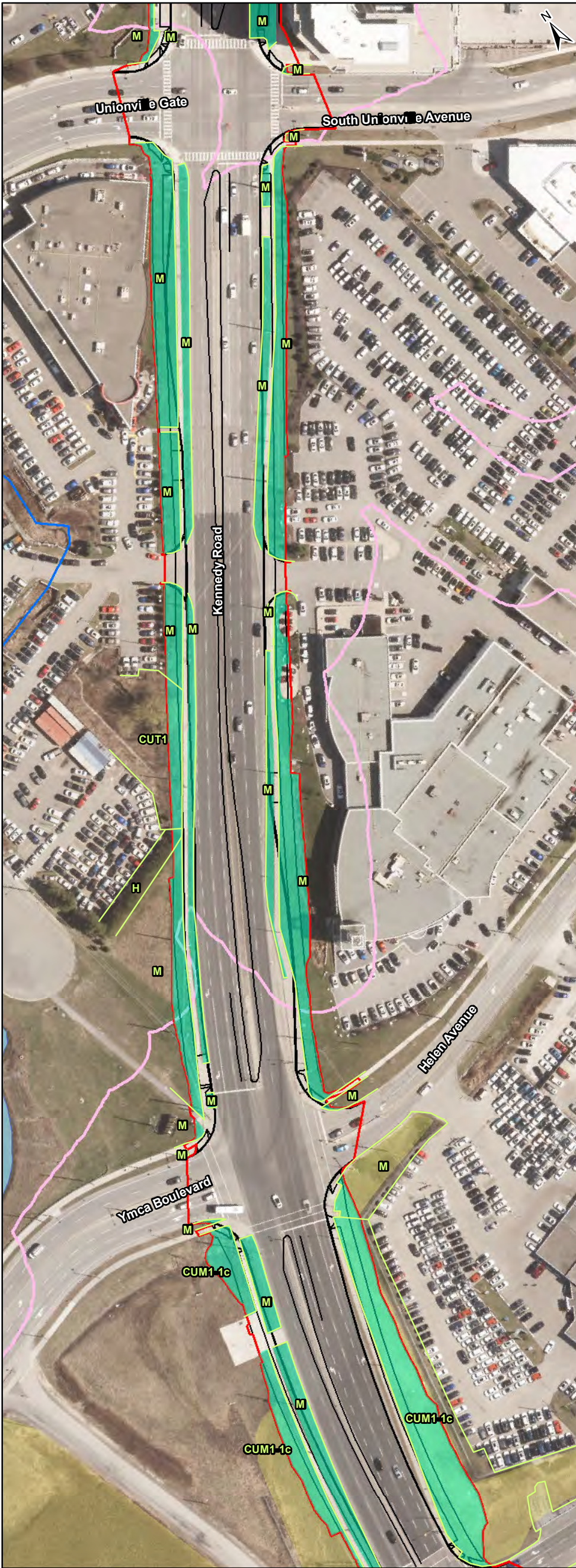
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Meters



Project	TA8730	Figure	7D
Date	April, 2020	Prepared By	AJ
Scale	1:1,500	Verified By	GNK



Vegetation Communities – Impact Assessment

- Disturbance Limit
- Proposed Design
- Watercourse
- Waterbody
- Regulation Limit (TRCA)
- Natural Habitat Cover: Meadow
- Vegetation Community Boundary

Impacted Vegetation Community Area

Vegetation Communities

CUM1-1c Dry-Moist Old Field Meadow Type

CUT1 Mineral Cultural Thicket Ecosite

H Hedgerow

M Manicured

Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ministry of Natural Resources and Forestry (LIO), Regional Municipality of York 2019 orthoimagery

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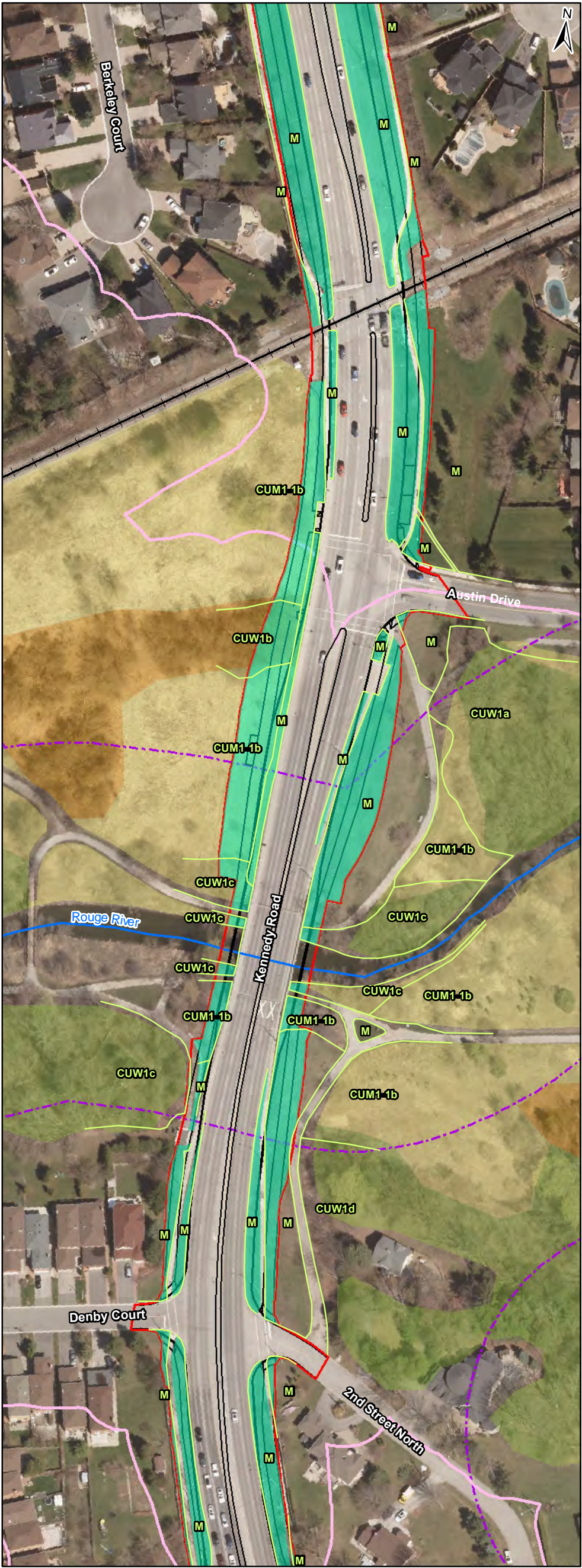
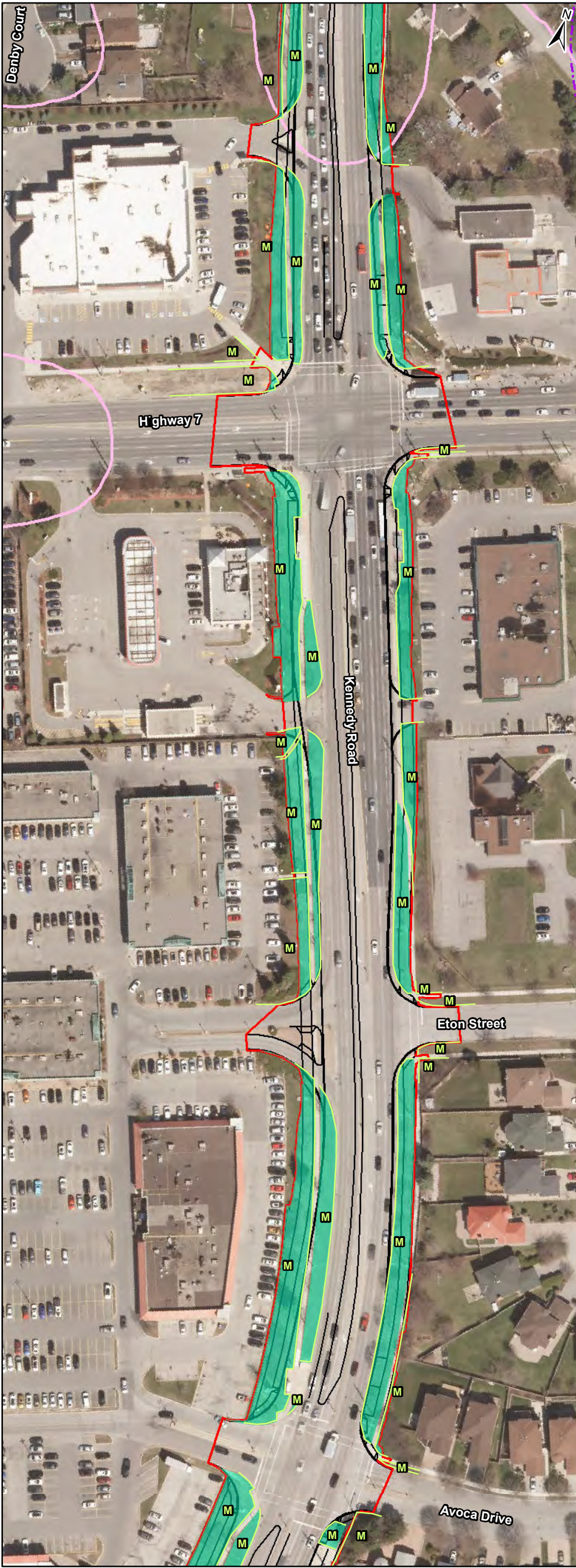
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Meters



Project	TA8730	Figure	7E
Date	April, 2020	Prepared By	AJ
Scale	1:1,500	Verified By	GNK



Vegetation Communities – Impact Assessment

- Disturbance Limit
- Proposed Design
- Railway
- Watercourse
- Regulation Limit (TRCA)
- Greenbelt Urban River Valley

Natural Cover Habitat

Forest

Meadow

Successional Forest

Vegetation Communities

Vegetation Community Boundary

Impacted Vegetation Community Area

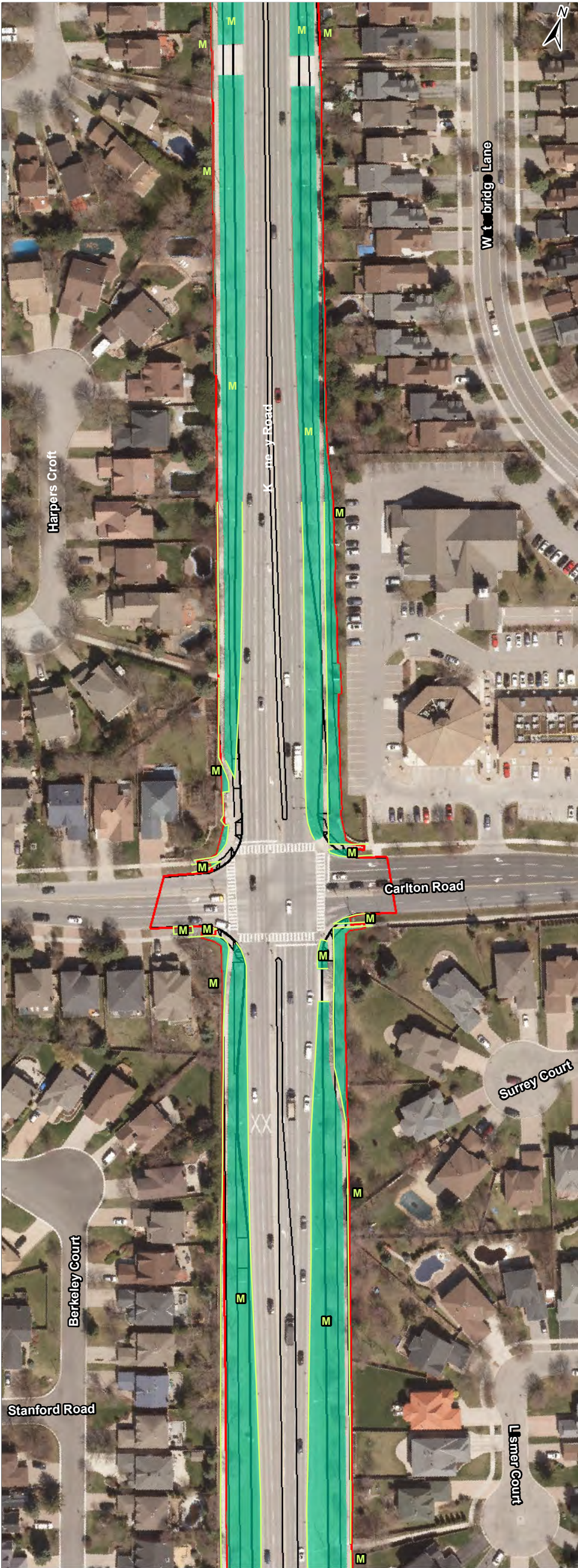
- CUM1Dry-Moist Old Field Meadow Type
- CUW1aMineral Cultural Woodland Ecosite
- MManicured

Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ministry of Natural Resources and Forestry (LIO), Regional Municipality of York 2019 orthomagey



environmental research associates

Project	TA8730	Figure	7F
Date	April, 2020	Prepared By	AJ
Scale	1:1,500	Verified By	GNK




Vegetation Communities – Impact Assessment

-  Disturbance Limit
 -  Proposed Design
 -  Vegetation Community Boundary
 -  Impacted Vegetation Community Area
- Vegetation Communities**
-  Manicured

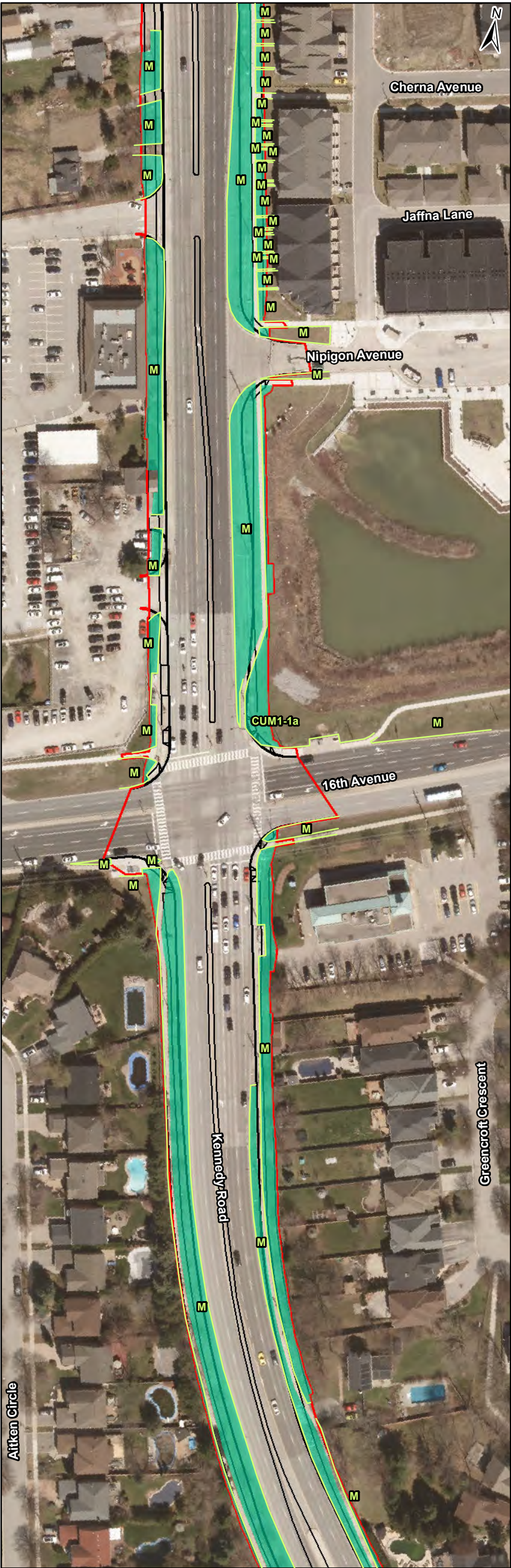
Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ministry of Natural Resources and Forestry (LIO), Regional Municipality of York 2019 orthoimagery

0 10 20 40 60 80 Meters



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Project	TA8730	Figure	7G
Date	April, 2020	Prepared By	AJ
Scale	1:1,500	Verified By	GNK



Vegetation Communities – Impact Assessment

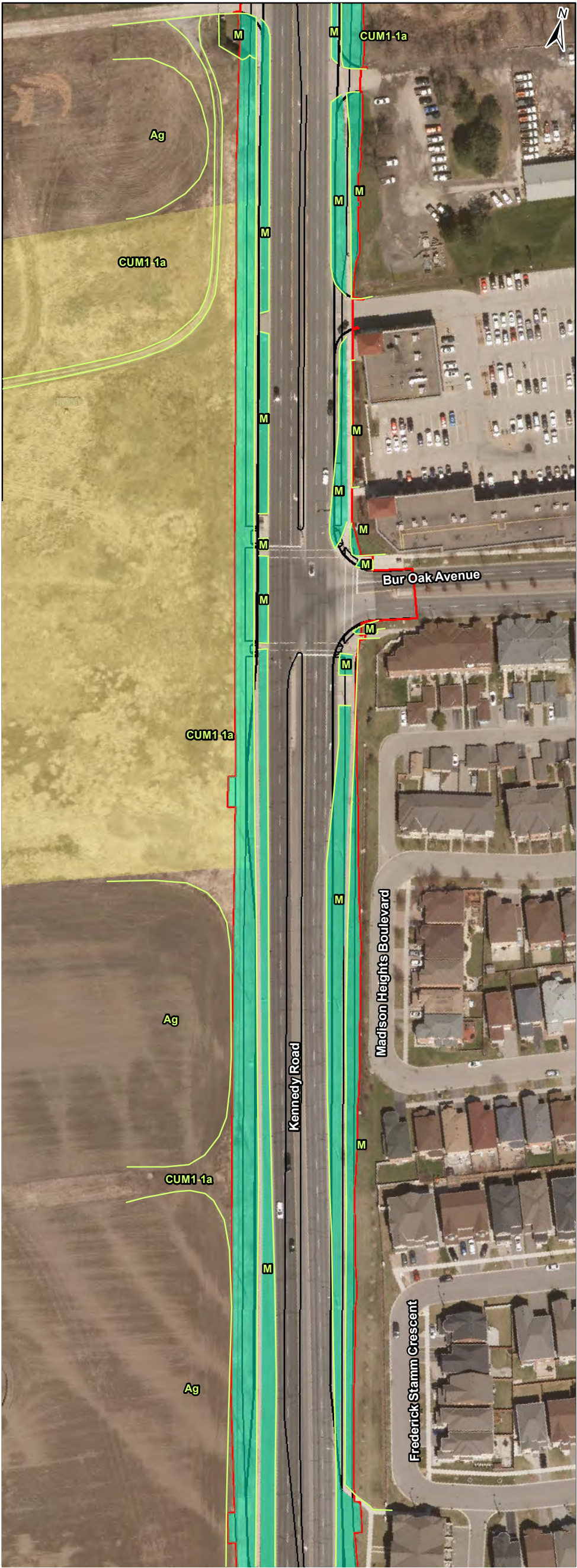
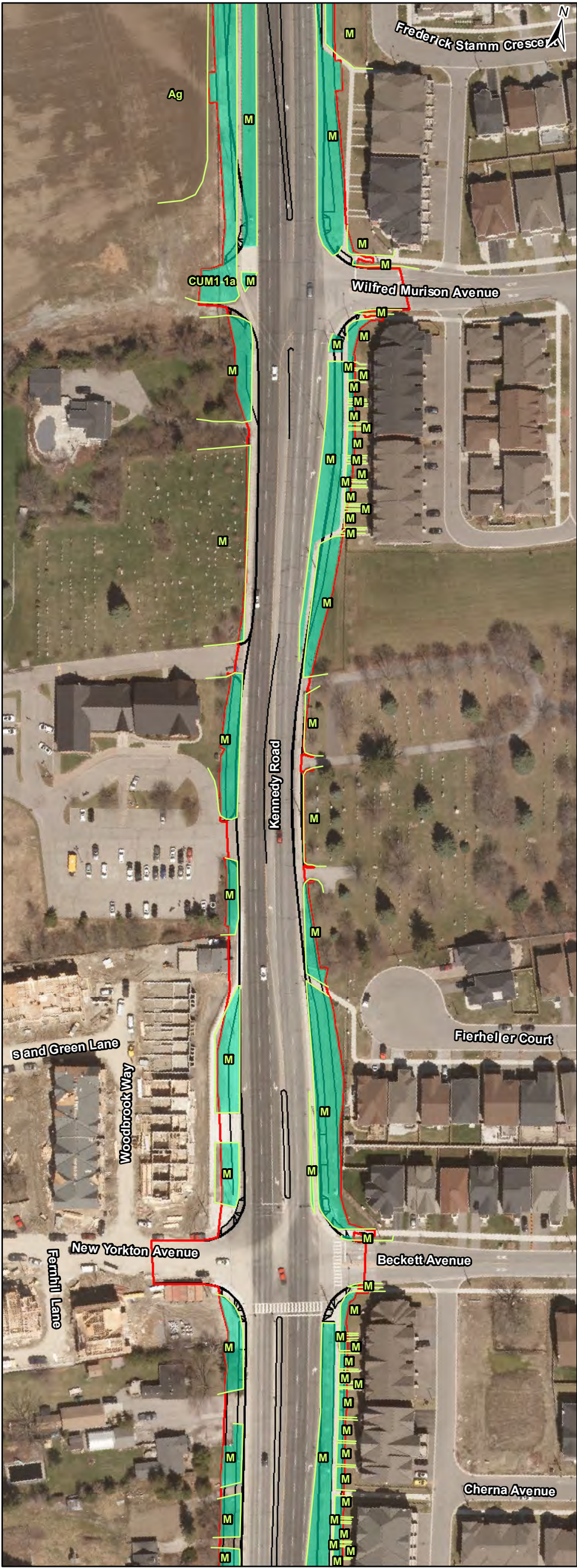
- Disturbance Limit
- Proposed Design
- Vegetation Community Boundary
- Impacted Vegetation Community Area

Vegetation Communities
CUM1-1a Dry-Moist Old Field Meadow Type
M Manicured

Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ministry of Natural Resources and Forestry (LIO), Regional Municipality of York 2019 orthoimagery



Project	TA8730	Figure	7H
Date	April, 2020	Prepared By	AJ
Scale	1:1,500	Verified By	GNK



Vegetation Communities – Impact Assessment

- Disturbance Limit
- Proposed Design
- Natural Cover Habitat: Meadow
- Vegetation Community Boundary
- Impacted Vegetation Community Area

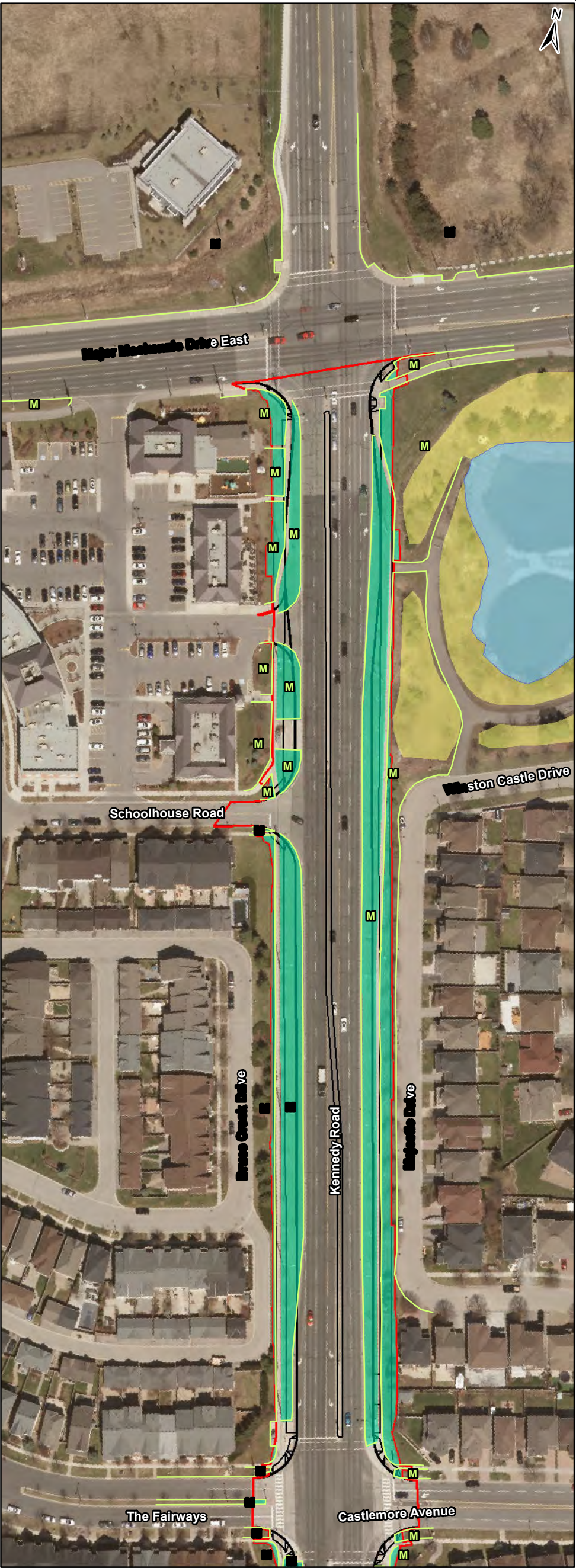
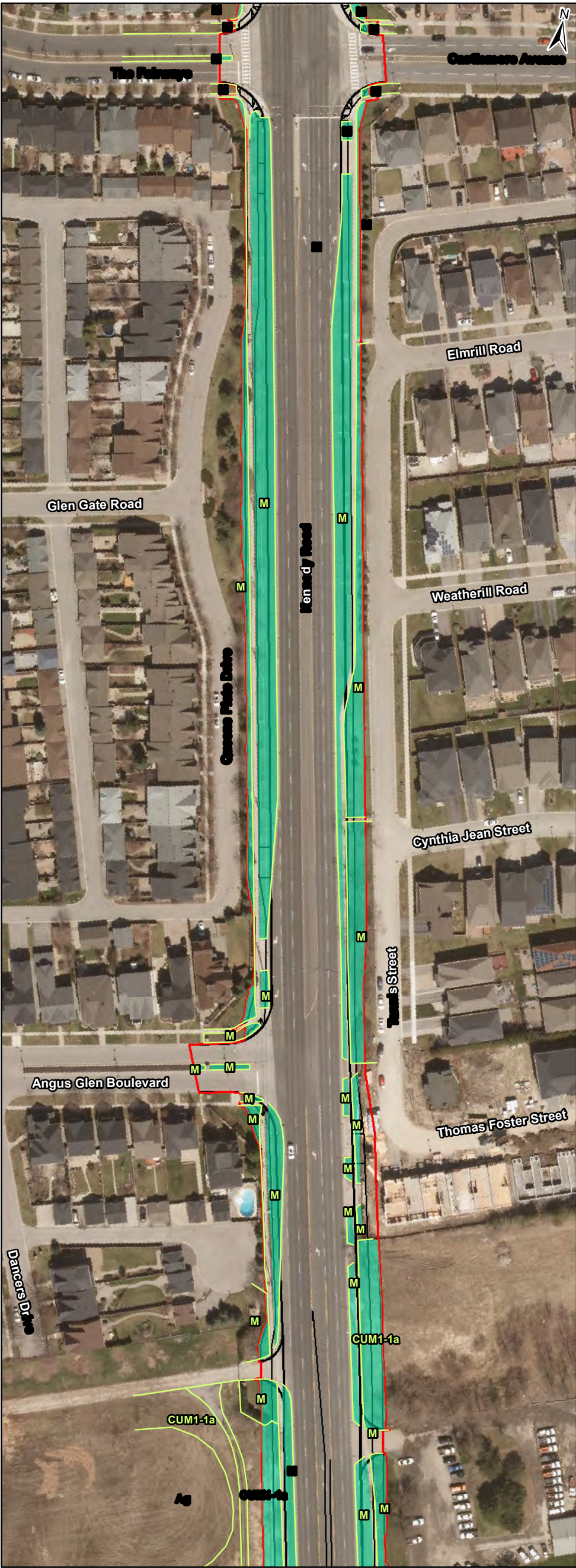
- Vegetation Communities**
- Ag** Agriculture
 - CUM1-1a** Dry-Moist Old Field Meadow Type
 - M** Manicured

Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ministry of Natural Resources and Forestry (LIO), Regional Municipality of York 2019 orthoimagery


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



Project	TA8730	Figure	71
Date	April, 2020	Prepared By	AJ
Scale	1:1,500	Verified By	GNK





Vegetation Communities – Impact Assessment


- 


Disturbance Limit
- 


Proposed Design
- 


Waterbody
- 

Natural Cover Habitat: Meadow
- 

Vegetation Community Boundary
- 

Impacted Vegetation Community Area
- 

Agriculture
- 

Dry-Moist Old Field Meadow Type
- 

Manicured

Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ministry of Natural Resources and Forestry (LIO), Regional Municipality of York 2019 orthoimagery

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Meters



environmental research associates

Project	TA8730	Figure	7J
Date	April, 2020	Prepared By	AJ
Scale	1:1,500	Verified By	GNK

4.3.1.1 Cultural Vegetation Communities

A total of 17,385 m² of cultural vegetation communities will be removed as a result of the proposed construction. The largest impact will be to Dry-Moist Old Field Meadow (CUM1-1). Overall, impacts resulting in the loss of vegetation within these cultural vegetation communities is considered to be minor. Cultural vegetation communities typically persist in areas that are regularly disturbed, and as a result, contain a high proportion of invasive and non-native plant species that are tolerant of these conditions.

It is expected that plant species displaced and/or disturbed within the cultural communities due to the proposed construction will re-colonize available lands adjacent to the new right-of-way post-construction. Disturbance activities often serve to promote the establishment and/or spread of certain plant species such as those disturbance tolerant species.

4.3.1.2 Wetland Vegetation Communities

A total of 1.55 m² of wetland vegetation communities will be removed as a result of the proposed construction south of 407 ETR. The size of this area is considered inconsequential and efforts will be made during detail design to avoid any loss of wetland communities.

4.3.1.3 Human Influenced Lands

As noted in **Table 9**, a total of 10.49 ha of human influenced vegetation (manicured lawns and hedgerows) will be removed as a result of the proposed widening of Kennedy Road. The overall significance of the impact to these lands is considered low given that the majority of the human influenced vegetation communities are comprised of manicured lands.

4.3.2 Displacement of and/or disturbance to Rare, Threatened or Endangered Vegetation and Vegetation Communities

All of the vegetation communities identified within the study area are considered to be widespread and common in Ontario and secure globally as described in **Section 2.3.3**. Several Kentucky Coffee-trees are located within the right-of-way and within the cultural meadow community (CUM1-1d). These trees are planted and are not protected under the *Endangered Species Act*.

A total of four regionally rare plant species were identified within the study area as described in **Section 2.3.3**. It is recommended that the regionally rare plant species be retained, to the extent possible, with the exception of poison ivy, which is considered a nuisance weed species, despite its regional significance. If impacts are unavoidable, it is recommended that these plant species, including individual shrub and trees that measure less than 10 cm DBH, be transplanted into suitable habitat conditions. Where possible, these plants should be transplanted into the newly created edges of those impacted communities, but outside the limit of disturbance.

4.3.3 Mitigation

4.3.3.1 Compensation

Grading limits, and hence, removal of vegetation will be confirmed during detail design. Compensation for the removal of the wetland community, if required, shall be provided at a rate determined with agencies during the detail design phase. Compensation for loss of vegetation communities will be in accordance with the *Guideline for Determining Ecosystem Compensation* (TRCA 2018).

4.3.3.2 Invasive Species Management

Efforts to control non-native and invasive plant species that have become established, as well as prevent the establishment of new non-native and invasive plant species at a minimum should include the following:

- where there are dense patches of common buckthorn, swallow-wort or garlic mustard, the appropriate removal and control of these species by a qualified specialist should be undertaken;
- minimize the exposure of bare soil, where bare soil must persist over a period of time these should be planted with a non-invasive annual cover crop for an interim period; and,
- no non-native and invasive ornamentals plants should be used for landscaping (e.g., Norway maple, purple loosestrife, Japanese knotweed, Japanese honeysuckle, etc.).

In addition, efforts should be made to prevent the spread of invasive plant species during construction both on and off site. Sanitation of construction equipment should be undertaken in accordance with the *Clean Equipment Protocol for Industry* (Halloran, Anderson and Tassie 2013) and at a minimum should include sanitation of construction vehicles and equipment prior to leaving and moving to the next site. A cleaning station should be set up, so vehicles and equipment can be inspected and cleaned regularly.

4.3.3.3 Planting Plans

A detailed planting plan will be developed during the detail design phase once areas identified for restoration have been determined in consultation with the respective agencies. It is recommended that the planting of wetland habitat, if required, be undertaken with the appropriate native and non-invasive plant species which will be presented on site-specific plans to be developed by an experienced landscape architect.

At a minimum, planting plans will show the following:

- detailed maps of the planting locations along with the respective allocations of tree, shrub, herbaceous and grass species to be planted inclusive of species and ratio of plantings or abundances; and,

- a description of the best management practices that are to be followed in the planting and tending of these sites for a minimum of five years following the initial planting stage. In particular, management will need to be undertaken for those invasive/aggressive plant species.

4.3.3.4 Construction Best Management Practices

At a minimum the following mitigation measures will be implemented during construction:

- vegetation cover will be used to protect any exposed surfaces in accordance with OPSS 804 -Construction Specification for Seed and Cover;
- topsoil from stockpiles to be in accordance with OPSS 802 - Construction Specification for Topsoil;
- old field seed mix and mulching or erosion control blanket (in accordance with NSSP-Erosion Control Blanket) will be placed in areas of soil disturbance to provide adequate slope protection and long-term slope stabilization; and,
- tree protection to be in accordance with OPSS 801 - Construction Specification for the Protection of Trees.

4.4 Wildlife and Wildlife Habitat

Modifications to Kennedy Road have the potential to result in the displacement of and disturbance to wildlife and wildlife habitat. Effects on wildlife related to these modifications may include:

- displacement of wildlife and wildlife habitat;
- barrier effects on wildlife passage;
- wildlife/vehicle conflicts;
- disturbance to wildlife from noise, light and visual intrusion;
- potential impacts to migratory birds; and,
- displacement of rare, threatened or endangered wildlife and significant wildlife habitat.

4.4.1 Displacement of Wildlife and Wildlife Habitat

Modification and widening of Kennedy Road will take place within and beyond the existing right-of-way. Much of the right-of-way and lands immediately adjacent consist of highly disturbed, low quality wildlife habitat, with higher quality habitats generally restricted to valleylands associated with watercourse crossings. These valleylands support riparian areas consisting of semi-natural vegetation communities and are expected to contribute to the wildlife assemblage identified within the lands examined.

Only minimal infringement to the edge of the above-mentioned natural heritage features will occur as a result of road modification and widening of Kennedy Road. These works

within and beyond the right-of-way are not expected to have any significant impact on wildlife and/or wildlife habitat. Displacement of species at risk habitat is not anticipated (see **Section 4.4.6**).

The proposed activities at this site should occur outside of the breeding bird window (see **Section 4.4.5**), to minimize disturbance to birds and other wildlife species utilizing habitats within the study area. An analysis of vegetation removal per vegetation (wildlife habitat) community is presented in **Section 4.2** (above).

4.4.2 Barrier Effects on Wildlife Passage

No new permanent migratory barriers to wildlife will be created as a result of the proposed road modifications. The existing barrier posed by the current Kennedy Road right-of-way will be greater due to the proposed widening. Given the disturbed nature of the lands found within the study area, the modifications are not expected to have a significant impact on wildlife passage. However, where natural areas are found abutting, and in particular, on opposite sides of Kennedy Road (e.g., valleylands at the watercourse crossings) a more significant barrier effect on wildlife movement across Kennedy Road can be anticipated.

An evaluation of wildlife crossing suitability was completed (i.e., calculation of openness ratio - OR) for both watercourse crossings. The current OR for the Rouge River bridge is approximately 3.85. The new OR (2.14) is lower due to the increased length to accommodate the widened Kennedy Road corridor, but is still well within the range for the passage of large mammals (e.g., deer) of 0.6 - 1.0 (CVC 2017). Therefore, wildlife passage under the bridge at the Rouge River will remain unchanged. Replacement of the twin culverts located at the Tributary of the Rouge River is proposed, which will maintain the potential for wildlife passage due to the replacement of the twin CSP culverts with twin pre-cast concrete culverts. The current OR is 0.04 (one culvert only) and the new OR is 0.07 (one culvert only), which meets the minimum target OR for movement of smaller wildlife species that are adapted to nocturnal and/or tunnel like conditions in their life history (typically a variety of small to mid-size mammals and amphibians).

4.4.3 Wildlife/Vehicle Conflicts

The proposed road modifications and widening will increase the width of the travelled surface resulting in an increased risk of mortality for wildlife that elects to cross the road. The existing Kennedy Road right-of-way poses a potential barrier to wildlife movement. While the increase in width of road increases exposure of wildlife to vehicle conflicts, the potential increase in wildlife mortality above existing conditions is considered minor. However, where natural areas are found abutting, and in particular, on opposite sides of Kennedy Road (e.g., valleylands at watercourse crossings) an increase in wildlife/vehicle conflicts may be expected. Construction duration and disturbance in the

vicinity of the culverts and bridge should be minimized to the extent possible to reduce the potential for increase in road mortality caused by wildlife avoidance of these structures. In addition, wildlife fencing is recommended at the Rouge River to direct wildlife under the bridge rather than across the roadway.

4.4.4 Disturbance to Wildlife from Noise, Light and Visual Intrusion

Noise, light and visual intrusion may alter wildlife activities and patterns. In human-influenced settings, such as the study area, wildlife has become acclimatized to anthropogenic conditions and only those fauna that are tolerant of human activities remain. Minor edge effect to natural areas (e.g., valleylands at the watercourse crossings) may occur as road widening will result in an increase in noise, light, and visual intrusion. Given that wildlife is acclimatized to the presence of the existing Kennedy Road right-of-way in the study area, the tolerance of the wildlife assemblage to human activities and the limited zone of influence of the proposed widening, disturbance to wildlife from noise, light and visual intrusion will have no significant adverse effects.

4.4.5 Potential Impacts to Migratory Birds

As identified above (**Section 2.3.2**), numerous bird species listed under the *Migratory Birds Convention Act* (MBCA) were identified within the study area. The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or the damaging, destroying, removing or disturbing of nests. While migratory insectivorous and non-game birds are protected year-round, migratory game birds are only protected from March 10 to September 1. The study area lands fall within Environment Canada's Nesting Zone C2 (Nesting Period: end of March – end of August). Consequently, to comply with the requirements of the MBCA, it is recommended that disturbance, clearing or disruption of vegetation where birds may be nesting should be completed outside the window of April 1 to August 31 to avoid the breeding bird season for the majority of the bird species protected under the Act. In the event that these activities must be undertaken from April 1 to August 31, a nest screening survey will be conducted by a qualified avian biologist. If an active nest is located, a mitigation plan shall be developed and provided to Environment Canada – Ontario Region for review prior to implementation.

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

Background data provided by the MNRF, Aurora District, detailed five species at risk that have been previously identified as present within the vicinity of the Kennedy Road study area (discussed in **Section 2.3.3**). The only species at risk that was confirmed during field investigations was Barn Swallow. Barn Swallow was observed foraging near the study area during the 2017 breeding bird surveys; however, the habitat for Barn Swallow is likely associated with a barn structure located 300 m west of Kennedy Road

between Wilfred Murison Avenue and Angus Glen Avenue. As a result, no impacts to Barn Swallow are anticipated.

Suitable habitat for Snapping Turtle can be found within the larger watercourses and, potentially, within the storm water management ponds found within the study area. Mitigation measures for Snapping Turtle should be implemented at the Rouge River crossing, where fencing appropriate for small mammals and herpetofauna should be installed to funnel Snapping Turtles (and other wildlife) to the bridge crossing and keep wildlife off of the road surface.

The likelihood of the project having a negative effect on species at risk is low. Because of the unlikelihood of adverse effects on species at risk, no permitting requirement under the ESA is anticipated for wildlife; however, consultation with the MECP during the detail design phase is warranted. Follow-up field surveys may be required during detail design to further assess presence/absence and potential habitat function of lands within the study area, including an assessment of the potential use by bat species at risk of trees to be removed.

4.5 Impacts to Designated Natural Areas

The Rouge River crossing is identified as part of the City of Markham Greenway System. A narrow strip of Dry-Moist Old Field Meadow Type (CUM1-1) and Mineral Cultural Woodland (CUW1) associated with the Rouge River valleyland will be removed by the Kennedy Road widening.

Potential impacts to these designated natural heritage features will be mitigated through preparation of edge management plans, restoration plans, invasive species management plans and ecological offsets in accordance with TRCA guidelines and policies. These restoration and compensation measures will be determined during detail design in consultation with the City of Markham and the TRCA.

5.0 CONCLUSION AND RECOMMENDATIONS

There are several areas that exist in a semi-natural state that will require site-specific environmental management measures including the Rouge River crossing. The following tasks shall be carried out in greater detail during future design phases including:

- Preparation of the following environmental management plans: Edge Management Plan; Compensation/Restoration Plans; Erosion and Sediment Control Plan; and, Environmental Inspection and Monitoring Plan;
- The specifications for wildlife fencing at the Rouge River (large and small mammal/herpetofauna) will be confirmed during detail design;
- Further correspondence shall take place with MECP to discuss species at risk that have been identified or have the potential to be located in the vicinity of the study area, in particular Redside Dace, and any requirements under the Ontario ESA;
- Further field investigations should be undertaken during the appropriate seasons using MNRF protocols for Barn Swallow to confirm their absence from the study area;
- Further correspondence shall take place with TRCA to determine application requirements for permits under Ontario Regulation 166/06; and,
- A self-assessment shall be carried out in accordance with DFO procedures to determine the potential for “harmful alteration of fish habitat” once bridge and culvert designs have been advanced.

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APPENDIX A.
FISH AND FISH HABITAT
PHOTOGRAPHIC RECORD

PROJECT #TA8730
July 2017

PHOTOGRAPHIC RECORD

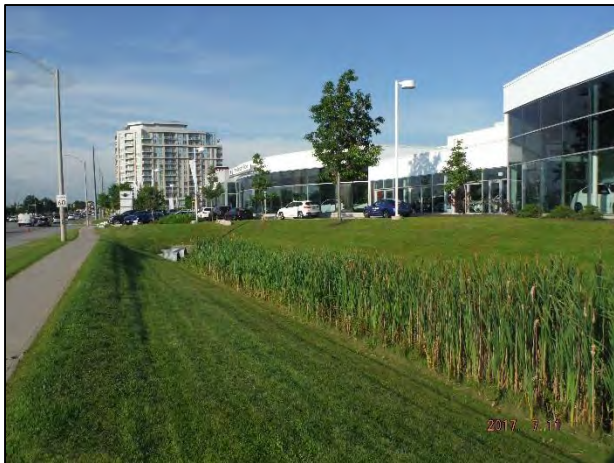
Tributary of Rouge River



Downstream end of Helen Road culvert facing downstream (north) along Kennedy Road – watercourse a roadside ditch at this location



Downstream end of Helen Road culvert facing upstream (southeast)



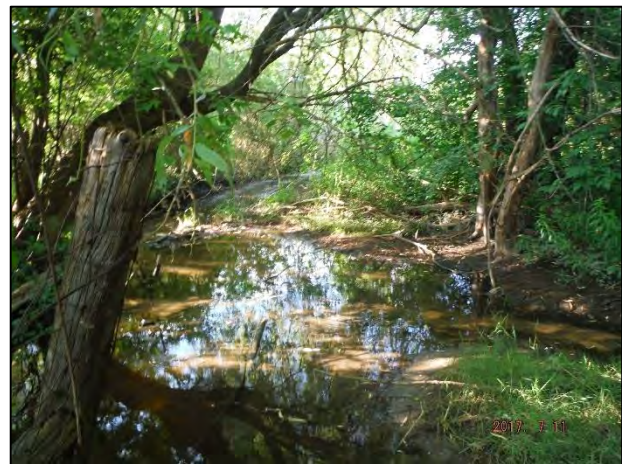
Watercourse facing downstream (north) along Kennedy Road towards upstream end of Kennedy Road culvert



Upstream ends of Kennedy Road culverts facing upstream (south)



Downstream ends of Kennedy Road culverts on west side of road



Channel downstream of Kennedy Road culverts facing downstream (west)

PROJECT #TA8730
July 2017

PHOTOGRAPHIC RECORD

Tributary of Rouge River



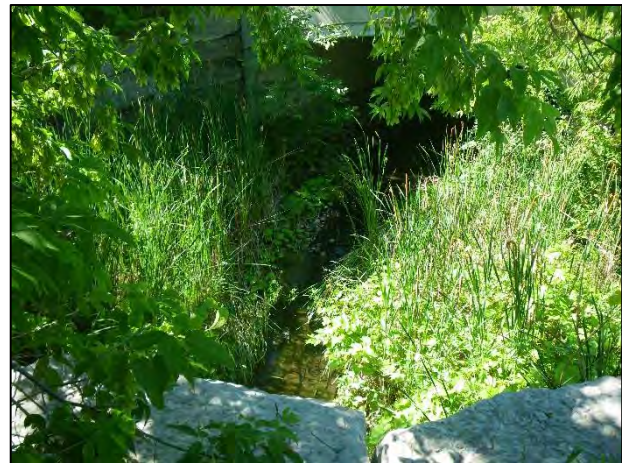
Downstream end of crossing of driveway from Kennedy Road into Ford dealership facing upstream (south)



Facing downstream (north) at watercourse downstream of culvert in previous photo running between Ford and Honda dealerships



Facing upstream (south) at channel between Ford and Honda dealerships from upstream end of driveway culvert into Honda dealership from Unionville Gate



Small open section of channel between downstream end of driveway culvert from previous photo and upstream end of Unionville Gate culvert, facing upstream (south)



Downstream end of Unionville Gate culvert facing upstream (south)



Channel downstream of Unionville Gate culvert as it enters a natural area, facing downstream (north)

PROJECT #TA8730
July 2017

PHOTOGRAPHIC RECORD

Rouge River



Channel upstream of crossing facing upstream (west)



Channel facing downstream (east) towards Kennedy Road bridge



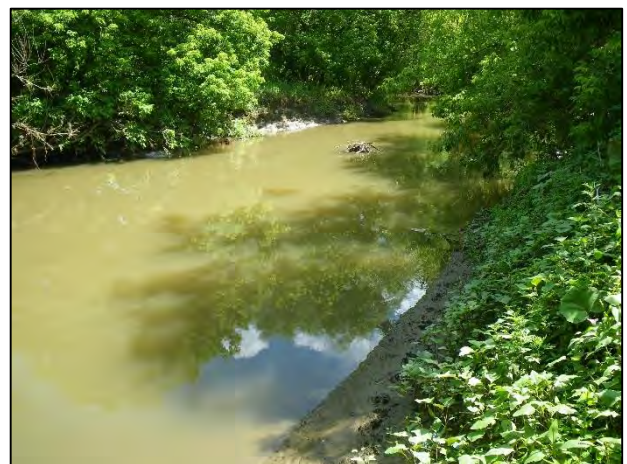
Channel under bridge, facing upstream (west)



Channel under bridge facing downstream (east)



Downstream channel



Channel downstream of Kennedy Road facing downstream (east)

APPENDIX B. VASCULAR PLANT LIST

Appendix B. Vascular Plant List

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	TRCA	York	M	H	CUM1-1a	CUM1-1b	CUM1-1c	CUW1a	CUW1b	CUW1c	CUW1d	CUW1e	CUW1f	MAS2-1	SWD3-3	SWT2-5
	EQUISETACEAE	HORSETAIL FAMILY																				
	<i>Equisetum arvense</i>	field horsetail	G5	S5			L5	X	X													
	PINACEAE	PINE FAMILY																				
	<i>Abies balsamea</i>	balsam fir	G5	S5			L4	X	X													
*	<i>Larix decidua</i>	European larch	G?	SE2			L+	X	X													
*	<i>Picea abies</i>	Norway spruce	G?	SE3			L+	X	X	X							X					
	<i>Picea glauca</i>	white spruce	G5	S5			L3	X	X	X												
*	<i>Picea pungens</i>	Colorado spruce	G5	SE1			L+		X													
*	<i>Pinus nigra</i>	Austrian pine	G?	SE2			L+		X	X												
	<i>Pinus strobus</i>	eastern white pine	G5	S5			L4	X	X													
*	<i>Pinus sylvestris</i>	scotch pine	G?	SE5			L+	X	X							X	X					
	CUPRESSACEAE	CEDAR FAMILY																				
	<i>Juniperus virginiana</i>	eastern red cedar	G5	S5			L5		X		X											
	<i>Thuja occidentalis</i>	eastern white cedar	G5	S5			L4	X	X			X					X					
	RANUNCULACEAE	BUTTERCUP FAMILY																				
	<i>Anemone canadensis</i>	Canada anemone	G5	S5			L5	X								X						
	ULMACEAE	ELM FAMILY																				
	<i>Ulmus americana</i>	white elm	G5?	S5			L5	X					X			X			X		X	X
	<i>Celtis occidentalis</i>	common hackberry	G5	S4					X													
*	<i>Ulmus pumila</i>	Siberian elm	G?	SE3			L+	X	X			X		X			X					X
	URTICACEAE	NETTLE FAMILY																				
*	<i>Urtica dioica</i> ssp. <i>dioica</i>	European stinging nettle	G5T?	SE2			L+	X				X										
	JUGLANDACEAE	WALNUT FAMILY																				
	<i>Juglans nigra</i>	black walnut	G5	S4			L5	R-1	X		X	X						X	X			
	FAGACEAE	BEECH FAMILY																				
	<i>Quercus rubra</i>	red oak	G5	S5			L4	X	X						X							
	<i>Quercus alba</i>	white oak	G5	S5			L3	R6	X													
	<i>Quercus macrocarpa</i>	bur oak	G5	S5			L4	X						X								
	<i>Quercus bicolor</i>	swamp white oak	G5	S4					X													
	CARYOPHYLLACEAE	PINK FAMILY																				
*	<i>Cerastium arvense</i> ssp. <i>arvense</i>	field chickweed	G5T?	SE4			L+		X													
	POLYGONACEAE	SMARTWEED FAMILY																				
*	<i>Rumex crispus</i>	curly-leaf dock	G?	SE5			L+	X			X		X									
	GUTTIFERAE	ST. JOHN'S-WORT FAMILY																				
*	<i>Hypericum perforatum</i>	common St. John's-wort	G?	SE5			L+	X			X		X						X			
	TILIACEAE	LINDEN FAMILY																				

Appendix B. Vascular Plant List

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	TRCA	York	M	H	CUM1-1a	CUM1-1b	CUM1-1c	CUW1a	CUW1b	CUW1c	CUW1d	CUW1e	CUW1f	MAS2-1	SWD3-3	SWT2-5
*	<i>Tilia cordata</i>	small leaf linden	G?	SE1			L+		X													
	<i>Tilia americana</i>	basswood	G5	S5			L5	X	X					X					X			
	VIOLACEAE	VIOLET FAMILY																				
	<i>Viola conspersa</i>	American dog violet	G5	S5			L5	X						X		X						
	SALICACEAE	WILLOW FAMILY																				
	<i>Populus balsamifera</i> ssp. <i>balsamifera</i>	balsam poplar	G5T?	S5			L5	X	X													
*	<i>Salix fragilis</i>	crack willow	G?	SE5			L+	X						X		X					X	
	<i>Salix</i> sp.	willow		?					X													
	<i>Salix matsudana</i>	corkscrew willow	G?	SR			L+	X													X	
	<i>Populus deltoides</i> ssp. <i>deltoides</i>	eastern cottonwood	G5T?	SU			L5	X											X		X	
	<i>Populus tremuloides</i>	trembling aspen	G5	S5			L5	X	X	X	X	X						X				
	<i>Salix eriocephala</i>	Missouri willow	G5	S5			L5	X														X
*	<i>Salix alba</i>	white willow	G5	SE4			L+	X	X			X										
	<i>Salix exigua</i>	sandbar willow	G5	S5			L5	U													X	X
	BRASSICACEAE	MUSTARD FAMILY																				
*	<i>Alliaria petiolata</i>	garlic mustard	G5	SE5			L+	X	X	X	X	X		X	X	X		X	X			
*	<i>Barbarea vulgaris</i>	yellow rocket	G?	SE5			L+	X				X				X						
*	<i>Hesperis matronalis</i>	dame's rocket	G4G5	SE5			L+	X				X		X	X	X	X					
	GROSSULARIACEAE	GOOSEBERRY FAMILY																				
	<i>Ribes aureum</i>	golden currant	G5	SR					X													
	<i>Ribes cynosbati</i>	prickly gooseberry	G5	S5			L5	X				X										
	<i>Ribes americanum</i>	wild black currant	G5	S5			L5	X					X									
	ROSACEAE	ROSE FAMILY																				
	<i>Geum canadense</i>	white avens	G5	S5			L5	X							X	X						
	<i>Crataegus punctata</i>	large-fruited thorn	G5	S5			L5	X								X			X			
	<i>Rubus occidentalis</i>	thimble-berry	G5	S5			L5	X			X	X				X		X				
	<i>Crataegus</i> sp.	hawthorn										X					X					
	<i>Rosa</i> sp.	rose							X													
	<i>Fragaria virginiana</i> ssp. <i>virginiana</i>	scarlet strawberry	G5T?	SU			L5	X					X			X	X					
	<i>Prunus</i> sp.	cherry										X										
*	<i>Prunus avium</i>	sweet cherry	G?	SE4			L+	X	X													
*	<i>Pyrus communis</i>	common pear	G5	SE4			L+	X	X													
	<i>Prunus virginiana</i> ssp. <i>virginiana</i>	choke cherry	G5T?	S5			L5	X	X		X		X			X			X			
*	<i>Malus pumila</i>	common apple	G5	SE5			L+	X			X	X					X		X			

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	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	TRCA	York	M	H	CUM1-1a	CUM1-1b	CUM1-1c	CUW1a	CUW1b	CUW1c	CUW1d	CUW1e	CUW1f	MAS2-1	SWD3-3	SWT2-5
	FABACEAE	PEA FAMILY																				
*	<i>Trifolium repens</i>	white clover	G?	SE5			L+	X	X		X											
*	<i>Trifolium pratense</i>	red clover	G?	SE5			L+	X			X											
*	<i>Melilotus alba</i>	white sweet-clover	G?	SE5			L+	X			X		X									
*	<i>Coronilla varia</i>	variable crown-vetch	G?	SE5			L+	X			X	X	X									
*	<i>Vicia cracca</i>	tufted vetch	G?	SE5			L+	X	X		X	X	X					X	X			X
*	<i>Robinia pseudo-acacia</i>	black locust	G5	SE5			L+	X	X		X		X									
	<i>Gymnocladus dioicus</i>	Kentucky coffee-tree	G5	S2	THR	THR			X													
	<i>Gleditsia triacanthos</i>	honey locust	G5	S2			L+	X	X													
*	<i>Lotus corniculatus</i>	bird's-foot trefoil	G?	SE5			L+	X	X		X	X	X						X			
	ELAEAGNACEAE	OLEASTER FAMILY																				
*	<i>Elaeagnus angustifolia</i>	Russian olive	G?	SE3			L+	X			X		X					X				
	LYTHRACEAE	LOOSESTRIFE FAMILY																				
*	<i>Lythrum salicaria</i>	purple loosestrife	G5	SE5			L+	X					X							X		
	ONAGRACEAE	EVENING-PRIMROSE FAMILY																				
	<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	yellowish enchanter's nightshade	G5T5	S5			L5	X			X					X		X				
	CORNACEAE	DOGWOOD FAMILY																				
	<i>Cornus sericea</i>	red-osier dogwood	G5	S5			L5	X	X							X			X	X	X	X
	RHAMNACEAE	BUCKTHORN FAMILY																				
*	<i>Rhamnus cathartica</i>	common buckthorn	G?	SE5			L+	X	X	X	X	X	X	X	X	X	X	X	X			X
	VITACEAE	GRAPE FAMILY																				
	<i>Vitis riparia</i>	riverbank grape	G5	S5			L5	X	X		X		X					X	X			X
	<i>Parthenocissus inserta</i>	inserted Virginia-creeper	G5	S5			L5	X	X				X	X		X			X			
	HIPPOCASTANACEAE	BUCKEYE FAMILY																				
	<i>Aesculus glabra</i> var. <i>glabra</i>	Ohio buckeye	G5T5	S1					X													
*	<i>Aesculus hippocastanum</i>	horse chestnut	G?	SE2			L+	X	X													
	ACERACEAE	MAPLE FAMILY																				
*	<i>Acer platanoides</i>	norway maple	G?	SE5			L+	X	X			X				X	X					
	<i>Acer</i> sp.	maple							X													
*	<i>Acer campestre</i>	hedge maple	G?	SE1			L+		X													
	<i>Acer</i> X <i>freemanii</i>	freeman's maple					LH	X	X				X			X					X	
	<i>Acer negundo</i>	manitoba maple	G5	S5			L+?	X	X	X	X	X	X	X	X	X	X	X	X		X	X
	<i>Acer rubrum</i>	red maple	G5	S5			L4	X	X													
*	<i>Acer ginnala</i>	amur maple	G?	SE1			L+	X	X													
	<i>Acer saccharum</i> ssp. <i>saccharum</i>	sugar maple	G5T?	S5			L5	X	X													

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	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	TRCA	York	M	H	CUM1-1a	CUM1-1b	CUM1-1c	CUW1a	CUW1b	CUW1c	CUW1d	CUW1e	CUW1f	MAS2-1	SWD3-3	SWT2-5
	<i>Acer saccharinum</i>	silver maple	G5	S5			L4	X	X			X					X					X
	ANACARDIACEAE	SUMAC FAMILY																				
	<i>Toxicodendron radicans</i> var. <i>rydbergii</i>	poison-ivy	G5T	S5			L4	R-3					X									
	<i>Rhus typhina</i>	staghorn sumac	G5	S5			L5	X	X		X		X									
	APIACEAE	PARSLEY FAMILY																				
*	<i>Pastinaca sativa</i>	wild parsnip	G?	SE5			L+	X				X				X						
*	<i>Daucus carota</i>	wild carrot	G?	SE5			L+	X	X	X	X	X	X						X			
	APOCYNACEAE	DOGBANE FAMILY																				
	<i>Apocynum cannabinum</i> var. <i>cannabinum</i>	Indian hemp	G5T	S5			L5	U											X			
	<i>Asclepias syriaca</i>	common milkweed	G5	S5			L5	X			X		X									
*	<i>Cynanchum rossicum</i>	swallow-wort	G?	SE5			L+	X	X	X	X	X	X			X	X					
	SOLANACEAE	POTATO FAMILY																				
*	<i>Solanum dulcamara</i>	bitter nightshade	G?	SE5			L+	X	X		X									X		
	CONVOLVULACEAE	MORNING-GLORY FAMILY																				
*	<i>Convolvulus arvensis</i>	field bindweed	G?	SE5			L+	X			X		X									
	BORAGINACEAE	BORAGE FAMILY																				
*	<i>Myosotis scorpioides</i>	mouse-ear scorpion-grass	G5	SE5			L+					X										
	LAMIACEAE	MINT FAMILY																				
*	<i>Mentha spicata</i>	spear mint	G?	SE4			L+	X					X									
*	<i>Glechoma hederacea</i>	creeping Charlie	G?	SE5			L+	X				X				X						
*	<i>Leonurus cardiaca</i> ssp. <i>cardiaca</i>	common motherwort	G?T?	SE5			L+	X	X													
*	<i>Nepeta cataria</i>	catnip	G?	SE5			L+	X	X			X				X						
	PLANTAGINACEAE	PLANTAIN FAMILY																				
*	<i>Plantago major</i>	common plantain	G5	SE5			L+	X			X		X									
	OLEACEAE	OLIVE FAMILY																				
	<i>Fraxinus pennsylvanica</i>	red ash	G5	S5			L5	X	X			X				X		X			X	X
	<i>Fraxinus americana</i>	white ash	G5	S5			L5	X											X			
*	<i>Syringa reticulata</i>	japanese tree lilac							X		X											
	SCROPHULARIACEAE	FIGWORT FAMILY																				
*	<i>Linaria vulgaris</i>	butter-and-eggs	G?	SE5			L+	X	X	X			X						X			
	BIGNONIACEAE	TRUMPET-CREEPER FAMILY																				
*	<i>Catalpa bignonioides</i>	common catalpa	G4G5	SE1					X													
	RUBIACEAE	MADDER FAMILY																				
	<i>Galium aparine</i>	cleavers	G5	S5			L4	U							X	X						

Appendix B. Vascular Plant List

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	TRCA	York	M	H	CUM1-1a	CUM1-1b	CUM1-1c	CUW1a	CUW1b	CUW1c	CUW1d	CUW1e	CUW1f	MAS2-1	SWD3-3	SWT2-5
	CAPRIFOLIACEAE	HONEYSUCKLE FAMILY																				
*	<i>Lonicera tatarica</i>	tartarian honeysuckle	G?	SE5			L+	X	X			X	X		X	X	X	X				
	DIPSACACEAE	TEASEL FAMILY																				
*	<i>Dipsacus fullonum</i> ssp. <i>sylvestris</i>	wild teasel	G?T?	SE5			L+	X						X								
	ASTERACEAE	ASTER FAMILY																				
	<i>Ambrosia artemisiifolia</i>	common ragweed	G5	S5			L5	X	X		X		X									
*	<i>Centaurea maculosa</i>	spotted knapweed	G?	SE5			L+	X			X											
*	<i>Achillea millefolium</i> ssp. <i>millefolium</i>	common yarrow	G5T?	SE?			L+	X					X									
	<i>Aster lateriflorus</i> var. <i>lateriflorus</i>	calico aster	G5T5	S5						X	X		X									X
	<i>Aster lanceolatus</i> ssp. <i>lanceolatus</i>	tall white aster	G5T?	S5			L5	X								X						
	<i>Aster novae-angliae</i>	New England aster	G5	S5			L5	X	X		X		X									
	<i>Aster puniceus</i> var. <i>puniceus</i>	purple-stemmed aster	G5T?	S5			L5	X								X						
	<i>Solidago canadensis</i>	canada goldenrod	G5	S5			L5	X	X	X	X	X	X						X			
*	<i>Arctium minus</i> ssp. <i>minus</i>	common burdock	G?T?	SE5			L+	X	X			X	X	X	X	X						
*	<i>Tanacetum vulgare</i>	common tansy	G?	SE5			L+	X			X											
*	<i>Sonchus arvensis</i> ssp. <i>arvensis</i>	field sow-thistle	G?T?	SE5			L+	X	X		X		X						X			
	<i>Erigeron annuus</i>	daisy fleabane	G5	S5			L5	X											X			
*	<i>Lactuca serriola</i>	prickly lettuce	G?	SE5			L+	X					X									
*	<i>Taraxacum officinale</i>	common dandelion	G5	SE5			L+	X	X	X	X	X	X	X		X		X	X			
	<i>Conyza canadensis</i>	horseweed	G5	S5			L5	X			X											
*	<i>Cirsium vulgare</i>	bull thistle	G5	SE5			L+	X			X			X								
*	<i>Cirsium arvense</i>	Canada thistle	G?	SE5			L+	X	X	X	X	X	X							X		
*	<i>Cichorium intybus</i>	chicory	G?	SE5			L+	X			X		X									
	<i>Eupatorium rugosum</i>	white snakeroot	G5	S5			L5	X								X						
	JUNCACEAE	RUSH FAMILY																				
	<i>Juncus dudleyi</i>	Dudley's rush	G5	S5			L5	X					X									
	POACEAE	GRASS FAMILY																				
*	<i>Digitaria ischaemum</i>	small crabgrass	G?	SE5			L+	X	X		X		X									
*	<i>Lolium perenne</i>	English rye grass	G?	SE4			L+	X	X				X									
*	<i>Bromus inermis</i> ssp. <i>inermis</i>	awnless brome	G4G5T?	SE5			L+	X	X	X	X		X				X					
	<i>Festuca rubra</i> ssp. <i>rubra</i>	red fescue	G5T4	S5			L+	X					X									
	<i>Poa pratensis</i> ssp. <i>pratensis</i>	Kentucky bluegrass	G5T	S5			L+	X	X	X	X	X	X			X	X		X			
	<i>Poa compressa</i>	Canada blue grass	G?	S5			L+	X	X							X						
	<i>Phragmites australis</i>	common reed	G5	S5			L+?	X					X							X		

Appendix B. Vascular Plant List

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	TRCA	York	M	H	CUM1-1a	CUM1-1b	CUM1-1c	CUW1a	CUW1b	CUW1c	CUW1d	CUW1e	CUW1f	MAS2-1	SWD3-3	SWT2-5
*	<i>Phleum pratense</i>	timothy	G?	SE5			L+	X				X										
	<i>Phalaris arundinacea</i>	reed canary grass	G5	S5			L+?	X	X		X	X	X	X		X			X	X		X
	TYPHACEAE	CATTAIL FAMILY																				
	<i>Typha X glauca</i>	glaucous cattail	HYB	S5			L+	X												X		
	<i>Typha angustifolia</i>	narrow-leaved cattail	G5	S5			L+	X	X											X		X
	LILIACEAE	LILY FAMILY																				
*	<i>Hemerocallis fulva</i>	orange day-lily	G?	SE5			L+	X			X											

APPENDIX C

ACRONYMS AND DEFINITIONS USED IN SPECIES LISTS

Appendix C. Acronyms and Definitions Used in Species Lists

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 been regulated under Ontario's <i>Endangered Species Act</i> .
Endangered (END)	A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's <i>Endangered Species Act</i> .
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 <i>Migratory Birds Convention Act</i> 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 <i>Migratory Birds Convention Act</i> are noted in the applicable species lists.	

SARA	Species at Risk Act
The Canada <i>Species at Risk Act</i> 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 <i>Endangered Species Act</i> 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 <i>Fish and Wildlife Conservation Act</i> 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 <i>Endangered Species Act</i> , the provision with the most protection will prevail (s. 2 of the <i>Fish and Wildlife Conservation Act</i>).		
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).
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.

FWCA	Fish and Wildlife Conservation Act	
The Ontario <i>Fish and Wildlife Conservation Act</i> 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 <i>Endangered Species Act</i> , the provision with the most protection will prevail (s. 2 of the <i>Fish and Wildlife Conservation Act</i>).		
Schedule No.	Short Form	Status
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. <i>Equisetum x nelsonii</i>)	
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 <i>Conservation Priorities for the Birds of Southern Ontario</i> (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.	