APPENDIX

E NATURAL ENVIRONMENT SUPPLEMENTARY MATERIALS

Natural Environment Supplementary Materials

Background Data Collection and Analysis

Below are the key sources of information that were reviewed in support of the Natural Environment Existing Conditions (**Section 3.4** of the ESR):

- AECOM. (2011). Sustainable Halton Water and Wastewater Master Plan
- Conservation Halton. Natural Heritage Data (2017). Natural heritage data
- Conservation Halton. (2010). Sixteen Mile Creek and Grindstone Creek Supplemental Monitoring. Long Term Environmental Monitoring Program
- Dillon Consulting. (2011). Halton Region Transportation Master Plan (2031) – The Road to Change
- eBird.org (2021). Searched for records of SCC within study area
- Ecoplans Limited. (2013) Detail Design of Improvements to Tremaine Road, from 300 m South of 14th Sideroad (former Main Street) to 150 m North of Steeles Avenue, Town of Milton, Natural Environment Impact Assessment.
- Fisheries and Oceans Canada. (2022). Aquatic Species at Risk Mapping. Map 16 of 34
- Geomorphix. (2021). Geomorphological Report, Sixteen Mile Creek and Tributary NW-1-E, Steeles Avenue West, Environmental Assessment, Town of Milton
- Gartner Lee Consulting. (2005). Halton Regional Forest Management Plan, and Addendum (2006)
- Halton Region. (2021). Interim Office Consolidation of the Regional Official Plan (November 10, 2021)
- Halton Region. (Undated). A Biodiversity Strategy for the Halton Regional Forests 2014-2024
- Halton Region and North-South Environmental. (2005). Halton Region Environmentally Sensitive Areas Consolidation Report
- iNaturalist.ca (2021). Searched for records of SCC within study area
- Ministry of Natural Resources and Forestry. (2022). Land Information Ontario
- Niagara Escarpment Commission. (2017). Niagara Escarpment Plan
- Ontario Ministry of Municipal Affairs and Housing. (2017). Greenbelt Plan
- Ontario Ministry of Natural Resources. (2015). Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E

- Ontario Ministry of Natural Resources. (2010). Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005
- Ontario Ministry of Natural Resources. (2000). Significant Wildlife Habitat Technical Guide
- Philips Engineering. (2004). Indian Creek/Sixteen Mile Creek, Sherwood Survey, Subwatershed Management Study
- Rand Engineering et al. (2014). Milton Heights Neighborhood, Sherwood Survey Secondary Plan Area, Town of Milton, Regional Municipality of Halton. Subwatershed Impact Study Areas 1, 2, & 4
- WSP Canada Inc. (2022). *Class Environmental Assessment Study for Steeles Avenue (Tremaine Road to Industrial Drive, Drainage and Stormwater Management Report*

These sources were reviewed to assess the general character of the area, provide context for the project-specific assessment, assess general connectivity between natural features within the study area to those in the surrounding landscape, identify potential impacts, constraints, sensitivities and mitigation requirements.

This background information was then used to update and describe the existing natural environmental conditions presented below, which in turn provided the basis for assessing the impacts of the preferred alignment and preliminary design.

Approach and Methodology

Vegetation Survey Approach

Vegetation surveys were undertaken within the study area on the following dates: July 11, 2017, November 28, 2017, June 11, 2018, and October 26, 2018.

The scope of vegetation fieldwork and analyses included the following:

- Classification, mapping and evaluation of vegetation communities within the study area using the Ecological Land Classification (ELC) for Southern Ontario (Lee et al. 1998), see Exhibit 1, **Appendix E** and **Section 3.4.6**;
- Vegetation community's description as outlined in **Section 3.4.6**;
- Vegetation community significance was evaluated using vegetation community rarity ranks listed on the NHIC website (MNRF 2022).
- A vascular plant species list was prepared based on the botanical inventory work (see Table 2, **Appendix E**) and is discussed in **Section 3.4.6**; and
- Plant species status was evaluated using the rankings within The List of the Vascular Plants of Ontario's Carolinian Zone (Oldham 2017), The Vascular Plants of Halton Region (Crins 2006), and The Distribution and Status of Vascular Plants of the Greater Toronto Area (Varga 2000), for Regional significance; the NHIC vascular plant list for provincial significance (MNRF 2021); the current Species At Risk in Ontario List (Government of Ontario 2021) for Ontario SAR; and, the Species At Risk Act (Schedules 1 and 3), for SAR in Canada (Government of Canada 2021).

Vegetation characteristics are described in **Section 3.4.6** and are summarized for each of the ten Natural Heritage Features (identified on **Exhibit 3-3**) in Table 1, **Appendix E**. Photographs of the Natural Heritage Features are also in Table 1.

Fish and Aquatic Habitat Survey Approach

Field investigations of the watercourse Natural Heritage Features (#1, #2, #3 and #8 - identified on **Exhibit 3-3**) within the study area were conducted on July 14, July 19, November 3, November 28, 2017 and April 16, 2019 by WSP ecologists. These watercourse features in the vicinity of Steeles Avenue were assessed and the existing fisheries and aquatic habitat conditions are detailed in Table 1, **Appendix E**. The aquatic habitat of the three of the watercourses that are crossed / impacted by the preferred alignment (Sixteen Mile Creek and the Tributary NW-1-E of Sixteen Mile Creek and the Unnamed Tributary of NW-1-E) were also mapped (see **Appendix E**)

and assessed directly at the crossing locations and are described further in **Section 3.4.8**.

Aquatic habitat assessments encompassed the following habitat parameters (where applicable):

- Flow condition, clarity, general gradient and velocities;
- Channel dimensions and general character;
- Morphology (e.g., riffles, pools);
- Cover opportunities (i.e., woody debris, undercut banks, boulders, aquatic vegetation);
- Substrate type;
- Bank height, character and stability/evidence of erosion;
- Riparian vegetation;
- Any observations of fish presence and/or barriers to fish movement;
- Potential specialized and important habitat areas including potential spawning habitat, good nursery cover, holding habitat (deeper refuge pools);
- Evidence of groundwater discharge or indicators; and
- Disturbances, habitat limitations and potential habitat enhancement opportunities.

Fish community surveys were also completed with the use of backpack electrofisher. These qualitative surveys involved sampling a variety of aquatic habitats (e.g., undercut banks, pools, riffles, areas of vegetation) within the watercourses being potentially impacted by the preferred alignment. Photographs of the Natural Heritage Features are found in Table 1, **Appendix E**.

Wildlife Survey Approach

Wildlife surveys were undertaken in 2017 and 2018. Surveys included avifauna, breeding amphibians, wildlife habitat assessment for SAR and Significant Wildlife Habitat (SWH), as well as collection of general wildlife and habitat information. Survey dates in 2017 were: April 11, May 17, June 8, June 22, July 9, July 11, and November 28. Survey dates in 2018 were: June 11 and October 26.

Results were recorded / presented using Wildlife Survey Units (WSU's 1-9) which correspond to the various ELC Units and other features found on Exhibit 1, **Appendix E**, as summarized below:

- WSU 1: Marsh, SWMP and Cultural Woodland edge at north end of study area (ELC Unit 16-17)
- WSU 2: 16 Mile Creek Riparian forest and Cultural Meadow (ELC Unit 1b and 2)

- WSU 3: Manicured Open Space with planted trees, east of Sixteen Mile Creek (ELC Unit 15)
- WSU 4: Rail corridor hedgerow and Cultural Meadow (ELC Unit 13-14)
- WSU 5: Marsh and Cultural Meadow west of Peru Road intersection (ELC Unit 3a, 3b, 4a)
- WSU 6: Forest and Thicket along Tributary NW-1E of Sixteen Mile Creek (ELC Unit 7 and 9
- WSU 7: Cultural Woodland, marsh and Cultural Meadow in southwest of study area (ELC Unit 4b, 5, and 10a)
- WSU 8: Large deciduous forest along southeast edge of study area (ELC Unit 11)
- WSU 9: Cultural Thicket connecting to the north of WSU 8 (ELC Unit 12).

Additional detail on these surveys is provided in following sections.

Avifauna

Avian surveys were conducted to gather breeding bird data and to evaluate the study area for avian habitat potential. Two rounds of breeding bird surveys were conducted by qualified, experienced staff throughout the study area on June 8, and July 9, 2017; upon refinement of the route alternatives and receiving additional PTE, a single round of breeding bird surveys was completed on June 11, 2018 for areas that were not previously accessed in 2017, including ELC Units 9, 11, 12, 13, 15 and 1b. The surveys included a combination of wandering transects through habitat features, and roadside observations. All visual and audible observations were recorded, as well as the level of breeding bird evidence following standard criteria established by the Ontario Breeding Bird Atlas (OBBA). Bird species observed during surveys are presented by WSU in Table 3a, **Appendix E** and are discussed in **Section 3.4.7.1**.

Breeding Amphibians

Amphibian calling (breeding) activity was surveyed using the Marsh Monitoring Program (MMP) amphibian calling survey protocol (Bird Studies Canada 2003, revised 2009). Surveys were conducted by qualified experienced staff under appropriate conditions (i.e., dusk/evening survey with suitable air temperatures, high humidity or light rain, and low/no wind). Surveys were completed three times during the spring, at least ten days apart. Suitability of timing for amphibian calling was confirmed by referencing other local sites with known amphibian populations and/or liaison with other researchers. Following guidelines of the MMP, night-time air temperatures were greater than: 5°C for the first survey; 10°C for the second survey; and 17°C for the third survey. Each calling station

was surveyed for three minutes and surveys were started one half hour after sunset and were completed before midnight.

Using the MMP, amphibian calling activity was rated using three levels: Level 1 (individual calls can be counted with no overlap), Level 2 (some calls can be counted or estimated, some overlap) or Level 3 (calls continuous and overlapping, individuals not distinguishable).

Three rounds of amphibian calling surveys were completed at five road-side stations targeting potential amphibian breeding habitat within or adjacent to the study area on the following dates in 2017: April 11, May 17, and June 22. Refer to Exhibit 1, **Appendix E** for amphibian survey station locations and results are provided in **Section 3.4.7.2**.

SAR / SCC and General Wildlife Habitat Assessment

An assessment of existing wildlife habitats was undertaken to consider potential use for SAR and SCC known to occur within the vicinity of the study area as well as other wildlife. Further discussion of the approach and findings of the SAR / SCC habitat screening are presented in **Section 3.4.9**.

The wildlife habitat assessment included searches for cavity / snag trees and building structures that may provide suitable roosting / maternity habitat for SAR bats. The SAR bat habitat / cavity tree survey was conducted by a qualified, experienced ecologist using transects spaced approximately 10 m apart or closer within the potential tree removal areas of the various route alternatives, as well as screening level coverage in adjacent areas for context purposes. One round of surveys was completed during the leaf-off period (targeting habitat for Little Brown Bat [*Myotis lucifugus*] / Northern Myotis [*Myotis septentrionalis*] habitat). One leaf-off assessment was deemed appropriate because habitat for Tri-colored Bat (*Perimyotis subflavus*) habitat is considered abundant within the local landscape and an additional leaf-on assessment could be completed during the detailed design stage, if required.

Trees were examined from multiple vantage points using binoculars to visually inspect potential cavities and dead/dying leaf clusters. When a tree with one or more suitable cavities was found, photos were taken, and the following information was recorded:

- UTM coordinates
- Tree species
- Diameter at Breast Height (DBH)
- Decay class (Watt and Caceres, 1999; Classes 1-3 are preferred)

- Height Class (canopy levels, as per MNRF 2017 datasheets; visually estimated)
- Cavity descriptions (number, height above ground, size)
- In addition, trees with suitable characteristics for potential Tri-colored Bat habitat were recorded, including:
    - Any oak tree >10cm DBH
    - Any maple tree >10cm DBH IF the tree includes dead / dying leaf clusters
    - Any maple tree >25cm DBH
    - Any tree with dead / dying leaf clusters (Maples / Oaks are preferred).

These characteristics are important in determining the suitability of potential bat roosting / maternity colony habitat (MNRF 2015, 2017). Although the surveys for this project were based on 2017 MNRF guidance, this is generally consistent with the current MECP guidance regarding SAR bats; however, the recent MECP guidance has not included assessment of Tri-colored Bat habitat in the protocol. For results of the SAR bat habitat assessment, refer to **Section 3.4.9**.

Existing habitats were also screened for potential as SWH, as defined in the SWH Criteria Schedules for Ecoregion 7E (MNRF 2015), including key wildlife movement corridors. Existing structures such as bridges and culverts were inspected to document any bird nesting or other wildlife use (e.g., using culverts as a movement corridor).

Supplemental observations of herpetofauna, mammals, and insects were recorded during all field visits (i.e., wildlife, aquatic and vegetation surveys); these included sightings of species, as well as evidence of use (e.g. browse, tracks / trails, scat, burrows, and vocalizations). Other wildlife observations are provided in combination with the breeding bird data in Table 3a, **Appendix E**. Notable wildlife findings are also summarized for each of the ten Natural Heritage Features within the study area in Table 1, **Appendix E**.

Floristic Inventory

- Coefficient of Conservatism (CC) values range from 0 to 9. CC values are assigned on a scale of 0 to 10, with 0-3 being species found in a variety of plant communities and tolerant of major disturbance, 4-6 being species typically associated with a specific plant community but tolerant of moderate disturbance, 7-8 being species associated with a plant community in an advanced successional stage that has undergone minor disturbance, and 9-10 species with a high fidelity to a narrow range of synecological parameters (Oldham et al. 1995). The only species with a CC value of 7 or higher was Jack Pine (*Pinus banksiana,* C=9). The Jack Pine was located in Unit 13, a former clay extraction area with restoration planting, and may have been planted.
- Coefficient of Wetland (CW) values range from -5 to 5. CW values are assigned on a scale of -5 to 5 with -5 being species almost exclusively found in wetlands (i.e., obligate wetland species), and 5 being species almost never found in wetlands (i.e., obligate upland species) (Oldham et al. 1995).

Vegetation Communities Descriptions

Cultural Communities

Dry – Moist Old Field Cultural Meadow (CUM1-1)

Six (6) areas of Cultural Meadow (i.e., Units 2, 3a, 3b, 5, 8, 13) are present and consist of a dense layer of herbaceous ground vegetation variously dominated by Kentucky Blue-grass (*Poa pratensis*), Awnless Brome (*Bromus inermis ssp inermis*), Orchard Grass (*Dactylis glomerata*), Teasel (*Dipsacus slyvestris*), Wild Carrot (*Daucus carota*), Garden Bird's-foot-trefoil (*Lotus corniculatus*), White Sweet Clover (*Melilotus albus*), and Canada Thistle (*Cirsium arvense*).

One (1) of these communities (i.e., Unit 13) is a large meadow that appears to be located on the site of a former aggregate extraction area for clay. The hard-packed substrate supporting only a sparse layer of herbaceous ground vegetation of species capable of persisting in dry conditions. Below a sparse layer of planted Ash trees (*Fraxinus sp.* ~ 1 to 3 m tall) is a ground layer dominated by Gray Goldenrod (*Solidago nemoralis*), multiple Aster species (*Symphyotrichum spp.*), Wild Carrot, Kentucky Blue-grass, and Quackgrass (*Elymus repens*). Some of the ground vegetation appears to have been seeded, including an unidentified creeping legume, and a variety of grasses.

Cultural Thicket (CUT1)

Two (2) areas of Cultural Thicket (i.e., Units 7 and 12) are present and are dominated by Hawthorn (*Crataegus sp*.), Green Ash (*Fraxinus pennsylvanica*), Staghorn Sumac (*Rhus typhina*), Tartarian Honeysuckle (*Lonicera tatarica*) and Wild Red Raspberry (*Rubus idaeus ssp. strigosus*). The ground layer is dominated by Tall Goldenrod (*Solidago altissima*), various grass species, Wild Strawberry (*Fragaria virginiana*), Avens (*Geum sp*.), and Garlic Mustard (*Alliaria petiolata*).

Cultural Woodland (CUW1)

Three (3) areas of Cultural Woodland (i.e., Units 10a, 10b and 16) are present within the study area, on the north side of Steeles Avenue. Units 10a and 10b are dominated by ash trees (many of which have succumbed to damage from the Emerald Ash Borer [(*Agrilus planipennis*], a non-native beetle). Live trees and shrub cover is dominated by Eastern Cottonwood, Common Buckthorn (*Rhamnus cathartica*) and Red-osier Dogwood, with a ground layer composted of tolerant grasses and forbs, many of which are non-native. The other cultural woodland (Unit 16) is dominated by Manitoba Maple (*Acer negundo*).

Cultural Hedgerow (CUH)

One Cultural Hedgerow (i.e., Unit 14) is present along north side of the rail line and along the property limit that extends north to the existing Steeles Avenue. This hedgerow is sparse in the westernmost extension, behind the residences. The hedgerow is comprised primarily of planted conifers and poplars (*Populus sp.).*

Manicured Open Space (MOS)

One area of Manicured Open Space (i.e., Unit 15) is present in the study area. It consists of mown lawn with mature planted Silver Maple (*Acer saccharinum*) trees. Please note that at detailed design, Unit 15 will be further assessed in the field to re-evaluate if the criterion for a Woodland and Significant Woodland is met.

Natural Terrestrial Communities

Fresh – Moist Lowland Deciduous Forest (FOD7)

One (1) area of Fresh-Moist Lowland Deciduous Forest (i.e., Unit 9) is present along Tributary NW-1-E of Sixteen Mile Creek. The canopy is dominated by dead Green Ash (*Fraxinus pennsylvanica*) (many of which have succumbed to damage from the Emerald Ash Borer). The die-off was likely intensified by the severe drought and high temperatures of 2016. Below the standing dead ash trees, the subcanopy is dominated by Manitoba Maple and European Buckthorn. The understory and ground layer are dominated by Tall Goldenrod, various grass species, Avens, European Coltsfoot (*Tussilago farfara*) and Common Dandelion (*Taraxacum officinale*).

Fresh – Moist Willow Lowland Deciduous Forest (FOD7-3)

Two (2) areas of Fresh-Moist Willow Lowland Deciduous Forest (Units 1a and 1b) are present along Sixteen Mile Creek. The canopy and subcanopy are dominated by Willow (*Salix sp.*), Silver Maple, European Black Alder (*Alnus glutinosa*), Bur Oak (*Quercus macrocarpa*), Manitoba Maple and Green Ash. The understory is dominated by European Black Alder, Red Osier Dogwood (*Cornus sericea*), Reed Canary Grass (*Phalaris arundinacea*) and European Buckthorn. The ground layer is dominated by Virginia Creeper and Poison Ivy (*Toxicodendron rydbergii*). The portion of Sixteen Mile Creek along the eastern edge of the study area (Unit 1b) has less historic disturbance. A few large Bur Oak and Red Oak (*Quercus rubra*) are present here.

As noted above, a Butternut (END under the ESA) sapling was found in Unit 1b as part of the WSP tree inventory survey on October 29, 2020.

Fresh – Moist Bur Oak Deciduous Forest (FOD9-3)

A small section of a larger Fresh – Moist Bur Oak Deciduous Forest (Unit 11) extends into the study area along its southern edge.

Unlike the other vegetation communities within the study area, this forest does not appear to have been historically cleared. It is present on a 1954 air photo of the area. While it was not cleared, it has been impacted by some historical disturbance, most likely livestock grazing and/or logging. The canopy is dominated by mature Bur Oak and mid-aged ash. The subcanopy is dominated by Bur Oak, ash, Climbing Poison Ivy (*Toxicodendron rydbergii ssp. negundo*) and American Hop-hornbeam (*Ostrya virginiana*). The understory is dominated by ash, European Buckthorn, multiple hickory species, and Chokecherry (*Prunus virginiana*). The ground layer is dominated by Wild Red Raspberry, Intermediate Enchanter's Nightshade (*Circaea luteiana ssp. canadensis*), ash, and various mannagrass species (*Glyceria spp*.). Pockets of wetland vegetation are present in vernal pools.

Wetland Communities

Cattail Mineral Shallow Marsh (MAS2-1)

Linear sections of Cattail Mineral Shallow Marsh (i.e., Units 4b, 4c and 6) line part of Steeles Avenue on the north and south side and serve as ditches. The unnamed Tributary of NW-1-E also runs along on of these ditches in Unit 4b. Also, the Unevaluated Wetland along Tributary NW-1-E (Unit 4a) north of Steeles Avenue is a Cattail Mineral Shallow Marsh.

The herbaceous cover in these communities is dominated by Hybrid Cattail *(Typha x glauca*) with Reed Canary Grass (*Phalaris arundinacea*), European Phragmites (*Phragmites australis ssp. australis*), Fox Sedge (*Carex vulpinoidea*) and Purple Loosestrife (*Lythrum salicaria*) as associates.

Forb Mineral Shallow Marsh (MAS2-9)

One (1) small Forb Mineral Shallow Marsh (i.e., Unit 17) dominated by Purple Loosestrife is present in the extreme northeast corner of the study area.

Background Review / Previous Studies

Avifauna

A similar suite of avifauna species were recorded in the Milton Heights Neighborhood SIS (Rand Engineering et al., 2014), which overlaps with a portion of the current Steeles Avenue MCEA study area (WSU 5 / Units 3a, 3b, 4a). Four SAR birds were recorded during the SIS investigations, all of which are listed as THR provincially and federally:

- Barn Swallow was observed with foraging / flyover individuals and no suitable nesting habitat
- Chimney Swift (*Chaetura pelagica*) was observed with foraging / flyover individuals and no suitable nesting habitat
- Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*) were recorded as a non-breeding / migrant occurrence in 2006 and were not recorded in the 2013 breeding bird surveys.

While there is potential for these SAR birds to occur as migrant / foraging individuals within the current Steeles Avenue MCEA study area, no suitable nesting habitat has been identified (e.g., existing agricultural fields within the study area were documented as soy beans in 2020 and corn in 2021), with the exception of the confirmed Barn Swallow nesting habitat as described previously.

In addition, four regionally significant ('uncommon' for Halton Region) bird species were recorded in 2011 during the SIS investigations; however, only one species was recorded within the current Steeles Avenue MCEA study area:

- Willow Flycatcher (*Empidonax traillii*) was recorded in the Unevaluated Wetland area (current WSU 5 / Units 3a, 3b, 4a); while this species was not recorded in the study area in 2017-2018, there is suitable breeding habitat and the species may occur.

Through review of eBird.org and iNaturalist databases for the study area, the following SCC records were identified:

- Barn Swallow: eBird.org, June 29, 2003; 1 individual at 2 roadside points near ELC Units 3a/4a and agricultural field west of ELC Unit 9
- Wood Thrush (*Hylocichla mustelina*): eBird.org, June 29, 2003; 1 individual at roadside point near agricultural field west of ELC Unit 9 (it is unclear which habitat this record was associated with)
- Additional avian SAR were identified in the eBird.org records within 2 km of the study area; however, these were the same species as those identified through the SAR screening assessment (refer to **Section 3.4.9**)

Amphibians and Reptiles

A similar suite of amphibian species was recorded during the Milton Heights Neighborhood SIS (Rand Engineering et al., 2014) calling surveys, including two additional amphibian species that were not recorded during the Steeles Avenue MCEA 2017-2018 surveys: American Toad and Northern Leopard Frog. Two stations from the SIS targeted marsh habitat in the Unevaluated Wetland / ELC Unit 4a and no amphibian calling was recorded at these stations, which is consistent with WSPs 2017-2018 survey findings.

One additional reptile species was recorded during the Milton Heights Neighborhood SIS (Rand Engineering et al., 2014) field surveys and iNaturalist records:

- Snapping Turtle (*Chelydra serpentina*):
    - Milton Heights Neighborhood SIS (Rand Engineering et al., 2014): One adult was observed along Tributary NW-1-D, west of the rail crossing culvert; this species is listed as Special Concern provincially and federally, and has potential to occur in other aquatic or wetland habitats in the Steeles Avenue MCEA study area.
    - iNaturalist (June 1, 2020): one road-killed juvenile individual along Steeles Avenue near the rail crossing.

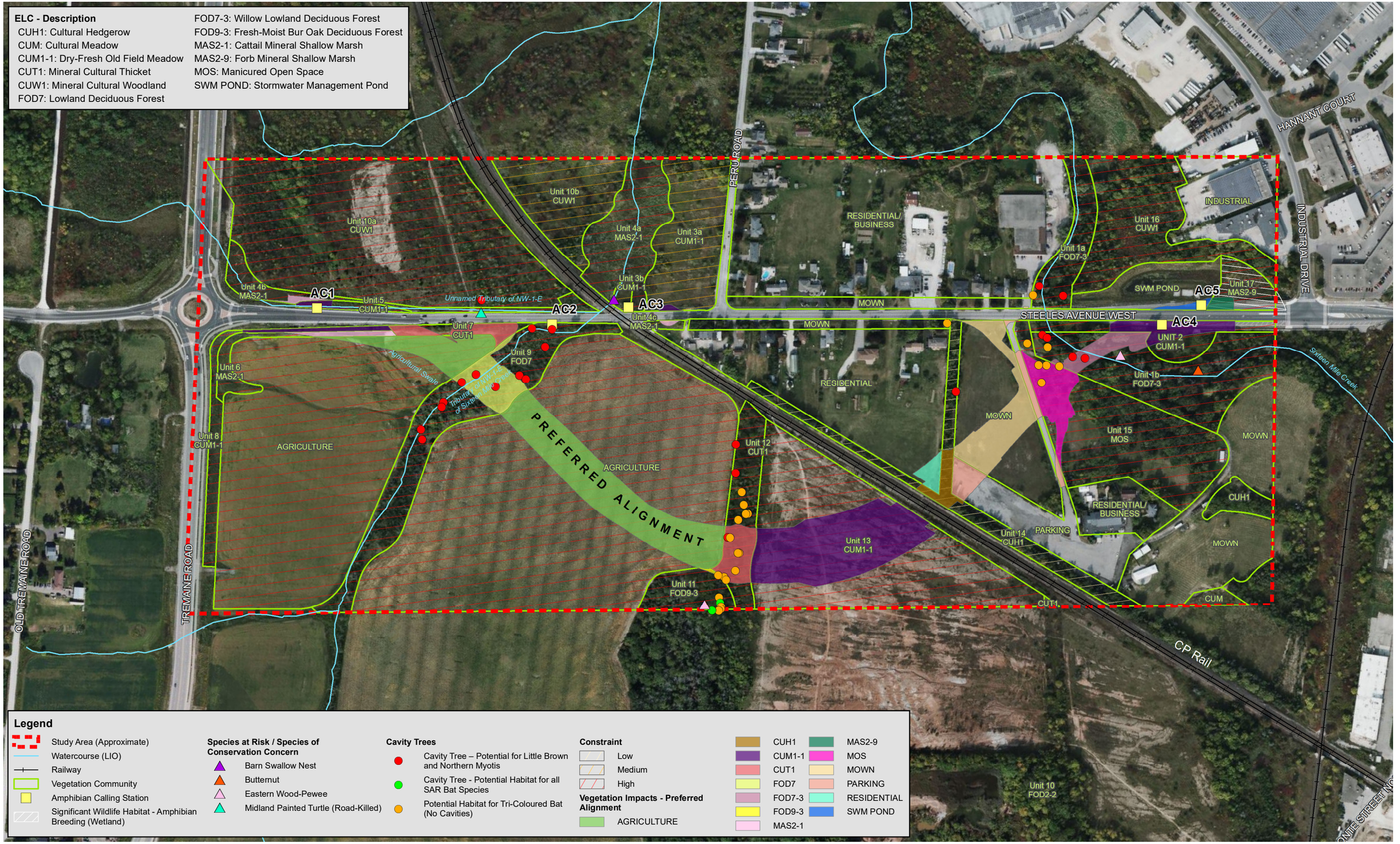
SAR Bat Habitat

A similar suite of mammal species was recorded during the Milton Heights Neighborhood SIS (Rand Engineering et al., 2014) field surveys, including three additional mammal species that were not recorded during the Steeles Avenue MCEA 2017-2018 surveys: American Beaver (*Castor canadensis*), Coyote (*Canis latrans*) and Norway Rat (*Rattus norvegicus*); these additional mammal species also have potential to occur within the Steeles Avenue MCEA study area.

TABLE OF CONTENTS FOR EXHIBITS AND TABLES

ELC - Description

CUH1: Cultural Hedgerow
CUM: Cultural Meadow
CUM1-1: Dry-Fresh Old Field Meadow
CUT1: Mineral Cultural Thicket
CUW1: Mineral Cultural Woodland
FOD7: Lowland Deciduous Forest
FOD7-3: Willow Lowland Deciduous Forest
FOD9-3: Fresh-Moist Bur Oak Deciduous Forest
MAS2-1: Cattail Mineral Shallow Marsh
MAS2-9: Forb Mineral Shallow Marsh
MOS: Manicured Open Space
SWM POND: Stormwater Management Pond



Legend

- Study Area (Approximate)
- Watercourse (LIO)
- Railway
- Vegetation Community
- Amphibian Calling Station
- Significant Wildlife Habitat - Amphibian Breeding (Wetland)

Species at Risk / Species of Conservation Concern

- Barn Swallow Nest
- Butternut
- Eastern Wood-Pewee
- Midland Painted Turtle (Road-Killed)

Cavity Trees

- Cavity Tree – Potential for Little Brown and Northern Myotis
- Cavity Tree - Potential Habitat for all SAR Bat Species
- Potential Habitat for Tri-Coloured Bat (No Cavities)

Constraint

- Low
- Medium
- High

Vegetation Impacts - Preferred Alignment

- AGRICULTURE

- CUH1
- CUM1-1
- CUT1
- FOD7
- FOD7-3
- FOD9-3
- MAS2-1
- MAS2-9
- MOS
- MOWN
- PARKING
- RESIDENTIAL
- SWM POND

HALTON REGION – Steeles Avenue Environmental Assessment

Preferred Alignment Impact Area, ELC, Constraint Areas, Wildlife Stations and SAR Bat Survey Results

0 50 100
metres
1:4,000

Date: April 2022
Project No: 17M-00979-00
Exhibit No: 1

28 Apr 2022

L:\Projects\2017\00979_00_SteelesAvenueEAHalton\MXDs\00979_00_SteelesAvenueEAHalton_ELCImpacts_B_202204.mxd

Table 1: Natural Heritage Features Assessment (see Exhibit 3-3 for feature locations)

Feature #	Feature	Feature Description / Notes	Representative Photos
1	Unnamed Tributary of NW-1-E and associated marsh and cultural woodland	**Aquatic:** Un-named Tributary of NW-1-E is a small, warmwater watercourse (likely permanent), designated as medium to high constraint (as documented in *Detail Design of Improvements to Tremaine Road, from 300 m South of 14th Sideroad (former Main Street*) to 150 m North of Steeles Avenue, Town of Milton, Natural Environment Impact Assessment, Ecoplans Limited/WSP, 2013). The tributary flows parallel to the north side of Steeles Ave. along the ditchline for approximately 400 m before it outlets to Tributary NW-1-E of Sixteen Mile Creek (Feature #3). Approximately 140 m of this tributary has been realigned and restored in conjunction with the Tremaine Road works. <u>Re-aligned Section</u> • Small defined channel along Steeles Ave, bankfull width averaging 2 m (0.4 depth). Flow depth ranged from 0.03 m (riffle areas) to 0.4 m (in pools) at time of survey. • Riffle and pool morphology, mix of gravel and rubble substrate with some sand and boulders. • Instream vegetation consists of cattail, Reed Canary Grass and patches of watercress • Watercourse flows through cattail marsh further upstream (north) of re-aligned section. <u>Ditched Section</u> • Base of flat bottom ditch along Steeles Ave. ranges from 1.2 m to 3 m in width (near confluence with NW-1-E). Flow depth ranged mainly from 0.05 m to 0.1 m at time of survey and up to 0.4 m in the pool. • Flat morphology (with one pool at laneway culvert), fine muck and clay substrates. • Instream vegetation consists of cattail (dense in sections) A variety of cool and warm water baitfish species (Blacknose Dace *Rhinichthys atratulus*, Brook Stickleback *Culaea inconstans* Creek Chub *Semotilus atromaculatus* and Fathead Minnow *Pimephales Promelas*) were captured by WSP during the July 19, 2017 fisheries inventory. Ministry of Northern Development, Mines, Natural Resources and Forestry (NDMNRF) and Ministry of Environment, Conservation and Parks (MECP) have indicated this watercourse is considered 'Contributing Habitat for Redside Dace' (*Clinostomus elongatus*) and American Eel (*Anguilla rostrata*) due to its eventual connection to Sixteen Mile Creek. Redside Dace is a protected species listed as Endangered (END) under the Endangered Species Act (ESA) in Ontario and as END under the Species at Risk Act in Canada (SARA). American Eel is a protected species listed as END under the ESA in Ontario. DFO SAR mapping (April 2022) indicates that Northern Sunfish - *Lepomis Peltastes*, Special Concern (SC) under the ESA and SARA is "found (or potentially found)" in this watercourse. MECP has indicated there are historical records of Northern Sunfish found in the watershed. NDMNRF also indicated that there are records of Bridle Shiner (*Notropis bifrenatus* – (SC) under the ESA) in the vicinity of the study area. **Vegetation:** Cattail Mineral Shallow Marsh (Unit 4b: MAS2-1) along the watercourse, adjacent Cultural Woodland (Unit 4a: CUW) dominated by Ash (*Fraxinus sp.*) to the north. No Species at Risk (SAR), provincially rare or regionally rare plant species known to be present. **Wildlife:** Generally lower quality wildlife habitat since much of this watercourse (~140 m) along Steeles Ave. has been recently re-aligned within the last few years. This feature may provide marginally suitable turtle foraging / movement habitat and potential hibernation habitat (in pools ≥0.5 m deep); potential species include Snapping Turtle (provincially Special Concern) and Midland Painted Turtle (Special Concern, COSEWIC; Not at Risk, ESA), road-killed individual recorded approximately 150 m west of railway line). Also considered moderate potential foraging /dispersal habitat for Monarch (provincially Special Concern).	 Cattail Marsh feature upstream (north) of realigned section  Re-aligned section along Steeles Ave. (looking east)  Ditched section along Steeles Ave. (looking east) Photos taken on July 14, 2017

Table 1: Natural Heritage Features Assessment (see Exhibit 3-3 for feature locations)

Feature #	Feature	Feature Description / Notes	Representative Photos
2	Swale Feature in Agricultural Field, drains to Tributary NW-1-E	**Aquatic:** Small, agricultural field swale that conveys the ditch drainage from Steeles Ave. and local surface drainage to Tributary NW-1-E. This swale would be considered Low Constraint under the Aquatic Constraints definition found in the *Milton Heights Neighborhood Subwatershed Impact Study* (Rand Engineering et al., 2014). • Swale is approximately 3 m in width and contains dense Reed Canary Grass (dominant) with some Common Reed (near ditch line) and patches of cattail. • Ploughed through in sections and along the edge for the rest. Ephemeral flow, dry at time of surveys, including on April 16, 2019. • No defined channel within swale with exception of outlet area to NW-1-E where a 'notch' in the bank has been dug historically. No direct fish habitat, however, since the swale drains to Tributary NW-1-E, it would be considered 'Contributing Habitat' for Redside Dace and American Eel. DFO SAR mapping (April 2022) indicates that Northern Sunfish (SC under the ESA) and SARA is "found (or potentially found)"in this watercourse. MECP has indicated there are historical records of Northern Sunfish found in the watershed. NDMNRF also indicated that there are records of Bridle Shiner (SC under the ESA) in the vicinity of the study area. **Vegetation:** Reed Canary Grass Mineral Meadow Marsh (MAM) dominated by Reed Canary Grass (*Phalaris arundinacea*) with European Common Reed (*Phragmites australis ssp. australis*) and Narrow-leaved Cattail (*Typha angustifolia*). No SAR, provincially rare or regionally rare plant species known to be present. **Wildlife**: Limited potential for wildlife habitat due to small size and ephemeral flow. Potential for occasional movement of small-medium sized mammals and anurans, and foraging / nesting habitat for common, disturbance-tolerant birds.	 Swale feature – looking north towards Steeles Ave. (July 14, 2017)  Swale feature – looking south (downstream) – July 14, 2017  Swale feature looking south (Nov. 3, 2017)  Swale feature on October 30, 2020. Looking north at section being impacted by the preferred alignment near Steeles Ave.

Table 1: Natural Heritage Features Assessment (see Exhibit 3-3 for feature locations)

Feature #	Feature	Feature Description / Notes	Representative Photos
3	Tributary NW-1-E of Sixteen Mile Creek, and associated Riparian Forest	Aquatic: Tributary NW-1-E of Sixteen Mile Creek is a small watercourse that has been classified as warmwater. This watercourse is identified as 'Intermittent - seasonal habitat' and designated as 'High Constraint with Rehabilitation Potential' in the *Milton Heights Neighborhood Subwatershed Impact Study* (Rand Engineering et al., 2014). • a 0.75 m diameter HDPE (plastic) pipe conveys the flow of this watercourse under Steeles Avenue. The CP Rail crossing is located approximately 7 m downstream (north) appears to be an old concrete open footing culvert (2 m high x 2 m width). • defined channel that has been modified in the past • downstream of Steeles Avenue (north) and the CP Rail crossing, the creek flows through an unevaluated wetland (see Feature 4). Here the watercourse has a bankfull width ranging from 2.5 to 3 m, flat morphology and mix of gravel and sand substrate. Average flow depth at the time of survey was 0.5 m. Instream vegetation consist of cattail and Reed Canary Grass. • upstream (south) of Steeles Avenue, the watercourse flows from the south (along the edge of a forest feature) to Steeles Avenue where it bends 90O to the east and flows along the ditchline for approximately 75 m before bending north again through the crossing. Here the watercourse has a bankfull channel width ranging from 3.5 m to 4 m, flat dominant morphology and mix of fine substates (silt, muck and clay dominant with some gravel). Flow depth ranges from 0.2 m to 0.3 m. Instream vegetation includes dense cattail in ditchline along Steeles Ave., Reed Canary Grass and patches of watercress. A Rainbow Trout *Oncorhynchus mykiss* fingerling (a coldwater species) and a variety of warm and cool water bait fish species (Blacknose Dace *Rhinichthys atratulus*, Brook Stickleback *Culaea inconstans* Creek Chub *Semotilus atromaculatus* and Fathead Minnow *Pimephales Promelas*) were captured by WSP at the Steeles Avenue crossing during the July 19, 2017 fisheries inventory. NDMNRF and MECP have indicated this watercourse is considered 'Contributing Habitat' for Redside Dace and American Eel due to its connection to Sixteen Mile Creek. DFO SAR mapping (April 2022) indicates that Northern Sunfish (SC under the ESA and SARA) is "found (or potentially found)"in this watercourse. MECP has indicated there are historical records of Northern Sunfish found in the watershed. NDMNRF also indicated that there are records of Bridle Shiner (SC under the ESA) in the vicinity of the study area. **Vegetation:** Fresh-Moist Lowland Forest (Unit 9: FOD7) is found south of Steeles Ave. - dominated by dead Green Ash in the canopy, with a subcanopy dominated by Manitoba Maple and European Buckthorn. No SAR, provincially rare or regionally rare plant species known to be present. Rough Bedstraw (*Galium asprellum*) and Purple leaved Willow Herb (*Epilobium coloratum*), both Regionally Uncommon per Oldham (2017) and Crins (2006) were found in Unit 9. The unevaluated wetland found on north side of Steeles Ave. is described in Feature #4. **Wildlife:** Barn Swallow (provincially Threatened) nesting was confirmed in the rail crossing culvert. The riparian forest provides foraging / nesting habitat for common, disturbance tolerant bird species. This feature may provide marginally suitable turtle foraging / movement habitat and potential hibernation habitat (in pools ≥0.5 m deep - mainly downstream of Steeles Ave.). White-tailed Deer tracks were observed throughout this forest, from east-west and along the watercourse (north-south). Moderate potential for Little Brown Bat / Northern Myotis (provincially listed as Endangered) roosting habitat with a total of 12 cavity trees recorded in the FOD7 unit; however, most of the potential roosting habitat consists of small cavity openings or loose bark on dead Ash trees (live trees are preferred for longevity of roosting habitat).	 Riparian forest upstream (south) of Steeles Ave. July 4, 2017  Barn Swallow nest within CNR culvert – July 14, 2017  Tributary NW-1-E looking downstream (north) of CNR culvert – July 4, 2017  Tributary NW-1-E looking upstream (south) through crossing area Nov. 3, 2017  Rainbow Trout fingerling – captured July 19, 2017

Table 1: Natural Heritage Features Assessment (see Exhibit 3-3 for feature locations)

Feature #	Feature	Feature Description / Notes	Representative Photos
4	Unevaluated Wetland associated with Tributary NW-1-E of Sixteen Mile Creek (Feature #3)	**Aquatic:** See aquatic notes for Feature #3. **Vegetation:** Cattail Mineral Shallow Marsh (Unit 4a: MAS2-1). No Species at Risk, provincially rare or regionally rare plant species known to be present. Swamp Milkweed (*Asclepias incarnata*), a Regionally Uncommon per Oldham (2017) is present. **Wildlife:** This feature may provide marginally suitable turtle foraging / movement habitat and potential hibernation habitat (in pools and deeper areas ≥0.5 m deep along the tributary running through the wetland); potential species include Snapping Turtle (provincially Special Concern) and Midland Painted Turtle (Not currently at Risk), a road-killed individual was recorded approximately 150 m west of railway line. Snapping Turtle was confirmed along Trib. NW-1-D, west of the rail crossing culvert during previous studies (SIS, 2013), and is likely associated with the habitat in Feature 4. Suitable breeding habitat for common marsh and forest edge associated bird species. Monarch was confirmed in this feature (provincially Special Concern; likely foraging / dispersal habitat).	  Photos looking North of Steeles Ave. July 4, 2017
5	Cultural Thicket	**Vegetation:** Mineral Cultural Thicket (Unit 12: CUT1) dominated by Hawthorn, Staghorn Sumac, European Buckthorn and Wild Red Raspberry. Scarce (<10%) Bur Oak, Manitoba Maple and Ash in the canopy. Thicket is located on a berm associated with former aggregate extraction to the east. No SAR, provincially rare species known to be present. Virginia Creeper (*Parthenocissus quinquefolia*) a Regionally Rare species per Oldham (2017) and Purple leaved Willow Herb (*Epilobium coloratum*), a Regionally Uncommon species per Crins (2006) are present. **Wildlife:** Moderate potential roosting habitat for Little Brown Bat, Northern Myotis and Tri-coloured Bat (provincially listed as Endangered) with 3 cavity trees and at least 9 suitable Oak trees, including one mature Bur Oak with a DBH of ~100cm. Breeding evidence for Northern Mockingbird (regionally uncommon) was recorded (one singing male associated with suitable nesting habitat in this feature). Potential movement corridor for White-tailed Deer and small-medium sized mammals, providing connection to the larger forest area to the south (Feature #5a).	  Photos taken on November 28, 2017

Table 1: Natural Heritage Features Assessment (see Exhibit 3-3 for feature locations)

Feature #	Feature	Feature Description / Notes	Representative Photos
5a	Deciduous Forest Extension of Feature 5 (largely outside of study area)	**Vegetation:** Fresh-Moist Bur Oak Deciduous Forest (Unit 11: FOD9-3) located south (and adjacent) to the Thicket (Feature 5). Abundant mature Bur Oak co-dominant with mid-aged Ash, suggestive of disturbance such as historic livestock grazing or logging. Abundant Climbing Poison Ivy on trees. Some regeneration of late successional species: Bitternut Hickory, Shagbark Hickory, and White Pine. No SAR or provincially rare known to be present. Short Scale Sedge (*Carex leptopoda*), a Regionally Rare species per Oldham (2017) and Shagbark Hickory (*Carya ovata*), a Regionally Uncommon species per Oldham (2017) are present. **Wildlife:** Moderate-high potential roosting habitat for Little Brown Myotis, Northern Myotis and Tri-coloured Bat (provincially listed as Endangered) with at least 4 cavity trees and 9 suitable Oak trees in the northern section of the forest feature. Breeding evidence for Eastern Wood-pewee (provincially Special Concern) was recorded (one singing male associated with suitable nesting habitat in this feature) and there is potential breeding habitat for Wood Thrush (SC). Some evidence of vernal pooling was observed, indicating moderate potential habitat for breeding anurans.	  Photos taken on November 28, 2017
6	Meadow Regenerating Area, likely former aggregate extraction area for brick works.	**Vegetation:** Dry-Fresh Old Field Cultural Meadow (Unit 13: CUM1) in a former aggregate extraction area. Sparse (<10%) tree cover of planted Ash 1-3m tall. Low ground cover (25-60%) of drought and disturbance tolerant plants. Exposed and eroded sections of clay soil present. No SAR or provincially rare plant are present. Regionally Rare species per Oldham (2017) including Knotted Rush (*Juncus nodosus*) and Pendulous Bulrush (*Scirpus pendulus*) are known to be present. Two Regionally Uncommon species per Oldham (2017), are also present: Eastern Red Cedar (*Uniperus virginiana*) and Swamp Milkweed. **Wildlife:** Breeding evidence (singing males in suitable nesting habitat) was recorded for Savannah Sparrow (Area Sensitive) and Vesper Sparrow (Area Sensitive, regionally uncommon). Barn Swallow (provincially Threatened) and Northern Rough-winged Swallow (regionally uncommon) were observed foraging in the fields. This area was evaluated as potential breeding habitat for two grassland SAR birds, Bobolink (THR) and Eastern Meadowlark (THR); these species were not recorded during the breeding bird surveys, and the habitat is considered low suitability due the level of disturbance and bare ground. This feature is also considered potential breeding habitat for Common Nighthawk (SC).	  Photos taken on November 28, 2017

Table 1: Natural Heritage Features Assessment (see Exhibit 3-3 for feature locations)

Feature #	Feature	Feature Description / Notes	Representative Photos
7	Cultural Hedgerow Deciduous and Coniferous Planted Trees along a Property Boundary	**Vegetation:** Cultural Hedgerow (Unit 14: CUH) of planted conifers and poplars. No SAR, provincially rare or regionally rare or uncommon plant species known to be present. **Wildlife**: Minimal potential for SAR bats (provincially Endangered) roosting habitat with 2 low suitability cavity trees and 1 planted Manitoba Maple tree. Potential for occasional movement of small-medium sized mammals, and foraging/nesting habitat for common, disturbance-tolerant birds.	 Photo taken July 4, 2017
8	Sixteen Mile Creek, and Riparian Forest	**Aquatic: Sixteen** Mile Creek and its wooded riparian corridor is the most prominent natural feature within the study area, and is a sensitive coldwater stream. The stream is designated High Constraint in the Milton Heights Neighborhood Subwatershed Impact Study (Rand Engineering et al., 2014). • Bridge structure at Steeles Ave. crossing (~14 m span x 2.75 m height) • Defined channel, bankfull width ranges from 6 m to 15 m upstream (north) of bridge and between 8.1 and 13. 6 m downstream. • Morphology is riffle dominant (with some pooling) immediately upstream (pool ~ 11 m long x 2.5 wide) and downstream of the Steeles Ave. bridge and the morphology is run and flat dominant through the structure. • Substrates are rubble dominant with gravel, sand and some boulders. Little instream vegetation. • There is also a small swale feature located on the north side of Sixteen Mile Creek directly within the new bridge crossing area. The swale is grass lined, ranges in width from 2 – 3 m (no defined channel) and is found entirely within the flood plain and area of the new proposed structure. The following cold, cool and warmwater fish species were captured by WSP on July 19, 2017 (upstream of structure): • Rainbow Trout (*Oncorhynchus mykiss*) • Blacknose Dace • Common Shiner (*Luxilus cornutus*) • Creek Chub • Fantail Darter (*Etheostoma flabellare*) • Horneyhead Chub (*Nocomis biguttatus*) • Iowa Darter (*Etheostoma exile*) • Johnny or Tesselated Darter (*Etheostoma nigrum*) • Rainbow Darter (*Etheostoma caeruleum*) • Slimy Sculpin (*Cottus cognatus*) Other cold water species known to occur in the vicinity of the bridge includes Brown Trout (Salmo trutta) and Mottled Sculpin (*Cottus bairdii*).	 Sixteen Mile Creek looking downstream (south) of Steeles Ave. July 19, 2017  Sixteen Mile Creek looking upstream (south) of Steeles Ave. July 19, 2017

Table 1: Natural Heritage Features Assessment (see Exhibit 3-3 for feature locations)

Feature #	Feature	Feature Description / Notes	Representative Photos
		Conservation Halton (CH) have indicted that there is confirmed spawning habitat for Rainbow Trout and Brown Trout in the immediate vicinity of the bridge and further up and downstream. NDMNRF have indicated this watercourse is considered 'Contributing Habitat' for Redside Dace in the vicinity of the crossing (confirmed by MECP). American Eel (END under the ESA) were also recently (2019) found in Sixteen Mile Creek further upstream near Kelso Dam. MECP considers the reach in the vicinity of the crossing as 'Occupied Habitat' for this species. DFO SAR mapping (April 2022) indicates that Northern Sunfish (SC under the ESA and SARA) is "found (or potentially found)"in this watercourse. MECP has indicated there are historical records of Northern Sunfish found in the watershed. NDMNRF also indicated that there are records of Bridle Shiner (SC under the ESA) in the vicinity of the study area. **Vegetation:** Willow Lowland Forest (Unit 1a and 1b: FOD7-3) along Sixteen Mile Creek. Canopy dominated by Willow, Silver Maple, Black Alder and Bur Oak. To the south of the creek (on south side of the road) is a manicured area of mown lawn with planted mature Soft Maple (~50cm dbh). A Butternut (Juglans cinerea) sapling was found in Unit 1b (UTM coordinates 17T 588830.22 E, 4818522.82 N). Also, Virginia Creeper, a Regionally Rare species per Oldham (2017) and one Regionally Uncommon species per Oldham (2017), Eastern Red Cedar, is also present. **Wildlife:** Moderate potential for SAR bats with at least 4 cavity trees along the riparian corridor and 5 planted Soft Maple trees in the manicured area (additional similar habitat present beyond the proposed alignments). The watercourse feature has moderate potential for turtle foraging / movement habitat and potential hibernation habitat (larger pools ≥0.5 m deep; however, not ideal for hibernation due to lack of soft mud substrates). Since most of the treed vegetation in this feature consists of planted Soft Maple on mown/manicured lawn, there is minimal potential for SAR avifauna; however, Eastern Wood-pewee (SC) was confirmed during the breeding bird surveys in the riparian forest. Moderate potential for Monarch (provincially Special Concern) foraging / dispersal habitat along the riparian zone. One locally significant bird species, American Redstart (TRCA, L3), was recorded along the riparian zone. High abundance (L3 calling) of one breeding anuran, Spring Peeper, was recorded along the rail corridor southeast of Steeles Ave. and Industrial Dr. intersection (beyond the study area).	 Steeles Ave bridge structyre (south side) July 19, 2017  Manicured area with Soft Maple  Steeles Ave. crossing area on November 28, 2017, looking downstream  Swale Feature on north bank within crossing area, November 28, 2017

Table 1: Natural Heritage Features Assessment (see Exhibit 3-3 for feature locations)

Feature #	Feature	Feature Description / Notes	Representative Photos
9	Storm Water Management Pond (SWMP) and Marsh	**Aquatic:** no fish observed in the new SWMP. Pond outlets to riparian zone of Sixteen Mile Creek on south side of Steeles Avenue via a 0.3 m plastic pipe (rock check dam was observed at the outlet). **Vegetation:** A new SWMP was being constructed on the north side of Steeles Ave. (east of the Sixteen Mile Creek crossing) during 2017 at the time of the surveys. An October 30, 2020 visit shows good colonization of cattail (see Photo). A small area of Forb Mineral Shallow Marsh (Unit 17: MAS2-9) dominated by Purple Loosestrife is still present along the north-east edge of the SWMP. No Species at Risk, provincially rare or regionally rare plant species known to be present. **Wildlife:** Moderate potential for turtle foraging and hibernation habitat (pool depths >1 m); potential species include Midland Painted Turtle (Not currently at Risk) and Snapping Turtle (provincially Special Concern) within the remaining naturalized wetland and recently constructed SWM ponds; however, no turtles were recorded during a basking survey (July 9, 2017). Suitable breeding habitat for common marsh and forest edge associated birds. Evidence of breeding anurans was recorded from the Forb Mineral Shallow Marsh (Unit 17) noted above (high abundance - Gray Treefrog and Green Frog; low abundance - Spring Peeper); this Shallow Marsh meets the criteria for confirmed Significant Wildlife Habitat – Amphibian Breeding Habitat (Wetland).	 New SWMP on north side of Steeles Ave. September 15, 2017  SWMP on north side of Steeles Ave. on October 30, 2020 Forb Mineral Shallow Marsh. September, 2017  Form Mineral Shallow Marsh. July 9, 2017

Table 1: Natural Heritage Features Assessment (see Exhibit 3-3 for feature locations)

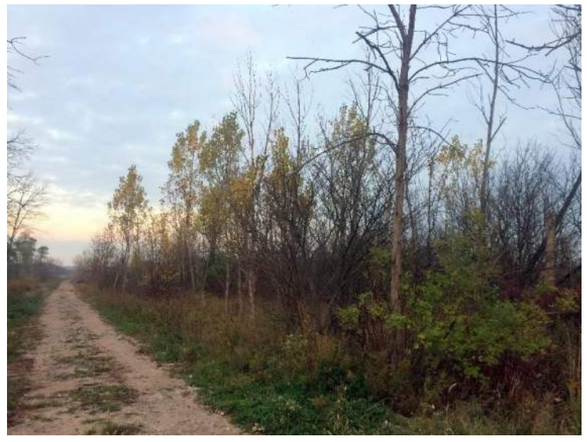
Feature #	Feature	Feature Description / Notes	Representative Photos
10	Cultural Woodland	**Vegetation:** Mineral Cultural Woodland (Unit 10a:CUW1). Regenerating vegetation on former agricultural land. Tree cover dominated by dead Ash trees that have succumbed to damage inflicted by Emerald Ash Borer, a non-native beetle. Live trees and shrub cover is dominated by Eastern Cottonwood, Common Buckthorn and Red-osier Dogwood. The ground layer consists of disturbance tolerant grasses and forbs, many of which are non-native. No Species at Risk, provincially rare, or regionally rare plant species known to be present. **Wildlife:** Limited potential for higher quality wildlife habitats as this a recently regenerated area with no wetland or watercourse features. Wildlife field surveys for this area were limited to coverage along the south edge; however, this feature likely provides breeding / foraging habitat for a similar suite of common, disturbance-tolerant bird and wildlife species as those recorded in other forest / shrub edge habitats in the study area. Minimal potential for Little Brown Bat / Northern Myotis (provincially listed as Endangered) roosting habitat with one cavity tree recorded along the south edge of the Cultural Woodland unit (and likely additional similar quality trees within the feature); however, most of the potential bat roosting habitat consists of small cavity openings or loose bark on dead Ash trees (live trees are preferred for longevity of roosting habitat).	 Photo taken July 11, 2017  Photo taken July 11, 2017  Photo Taken October 27, 2018

Table 2 *Vascular Plant Species List*

Common Name	Scientific Name	cc[1]	cw[1]	Grank[2]	Srank[3]	COSEWIC[4]	MNR[5]	SARA Status[6]	Halton NAI (Crins et al. 2006)[7]	Halton Region (Varga et al. 2000)[7]	Ecodistrict 7E-4 (Oldham, 2017)[7]	native status	Unit 1: FOD7-3	Unit 2: CUM1-1	Unit 3: CUM1-1	Unit 4: MAS2-1	Unit 5: CUM1-1	Unit 6: MAS2-1	Unit 7: CUT1	Unit 8: CUM1-1	Unit 9: FOD7	Unit 10: CUW1	Unit 11: FOD9-3	Unit 12: CUT1	Unit 13: CUM1-1	Unit 14: CUH	Unit 15: MOS	Unit 16: CUW1	Additional Species outside of ELC polygons	OVERALL
Box Elder	*Acer negundo*	0	-2	G5	S5					X	IC	N	X	X					X		X	X		X				X		X
Norway Maple	*Acer platanoides*	*	5	GNR	SNA					X	IC	I	X																	X
Red Maple	*Acer rubrum*	4	0	G5	S5					X	C	N					X													X
Silver Maple	*Acer saccharinum*	5	-3	G5	S5					X	X	N	X						X		X							X		X
Sugar Maple	*Acer saccharum var. saccharum*	4	3	G5T5	S5					X	C	N											X							X
Maple Species	*Acer sp.*											N																	X	X
Freeman's Maple	*Acer X freemanii*			GNA	SNR					X	hyb	N				X														X
Common Yarrow	*Achillea millefolium ssp millefolium*	*	3	G5T5?	SNA					X	IX	I			X										X					X
Giant Bentgrass	*Agrostis gigantea*	*	0	G4G5	SNA					X	IC	I			X		X		X											X
Garlic Mustard	*Alliaria petiolata*	*	0	GNR	SNA					X	IC	I	X								X				X					X
European Alder	*Alnus glutinosa*	*	-2	GNR	SNA					X	IC	I	X																	X
Annual Ragweed	*Ambrosia artemisiifolia*	0	3	G5	S5					X	C	N		X			X			X					X					X
Serviceberry Species	*Amelanchier sp.*											N								X		X								X
Canada Anemone	*Anemone canadensis*	3	-3	G5	S5					X	C	N	X																	X
Tall Thimbleweed	*Anemone virginiana var virginiana*	4	5	G5T5	S5					X		N			X															X
Lesser Burdock	*Arctium minus*	*	5	GNR	SNA					X	IC	I		X																X
Greater Burdock	*Arctium lappa*		0	GNR	SNA					X	IC	I									X				X					X
Jack-in-the-pulpit	*Arisaema triphyllum ssp triphyllum*	5	-2	G5T5	S5					X	C	N																		X
Common Wormwood	*Artemisia vulgaris*	*	5	GU	SNA						IR	I		X																X
Swamp Milkweed	*Asclepias incarnata ssp incarnata*	6	-5	G5T5	S5					X	U	N				X									X					X
Common Milkweed	*Asclepias syriaca*	0	5	G5	S5					X	C	N		X	X		X								X					X
Asparagus	*Asparagus officinalis*	*	3	G5?	SNA					X	IC	I			X															X
Yellow Rocket	*Barbarea vulgaris*	*	0	GNR	SNA					X	IC	I	X								X		X	X						X
Devil's Beggar's Ticks	*Bidens frondosa*	3	-3	G5	S5					X	C	N									X									X
Awnless Brome	*Bromus inermis ssp inermis*	*	5	GNR	SNA					X	IC	I			X		X				X	X		X					X	X
Golden-fruited Sedge	*Carex aurea*	4	-4	G5	S5					X	C	N													X					X
Short-scale Sedge	*Carex deweyana*	6	4	G5	S5					X	R	N											X							X
Graceful Sedge	*Carex gracillima*	4	3	G5	S5					X	C	N											X		X					X
Rosy Sedge	*Carex rosea*			G5	S5					X	C	N									X		X							X
Sedge Species	*Carex sp.*											N			X								X		X					X
Stalk-grain Sedge	*Carex stipata*	3	-5	G5	S5					X	C	N			X						X									X
Fox Sedge	*Carex vulpinoidea*	3	-5	G5	S5					X	C	N			X	X														X
Bitternut Hickory	*Carya cordiformis*	6	0	G5	S5					X	C	N											X							X
Shagbark Hickory	*Carya ovata*	6	3	G5	S5					XU	U	N											X							X
Spotted Knapweed	*Centaurea stoebe*	*	5	GNR	SNA					X	IR	I													X					X
White Goosefoot	*Chenopodium album var album*			G5TNR	SNA					X	IC	I										X								X
Chicory	*Cichorium intybus*	*	5	GNR	SNA					X	IC	I		X	X		X		X	X		X			X			X		X
Enchanter's Nightshade	*Circaea lutetiana ssp canadensis*	3	3	G5T5	S5					X	C	N									X		X							X
Creeping Thistle (Canada Thistle)	*Cirsium arvense*	*	3	GNR	SNA					X	IC	I		X	X		X			X	X			X	X					X
Bull Thistle	*Cirsium vulgare*	*	4	GNR	SNA					X	IC	I	X				X													X
Virginia Virgin-bower	*Clematis virginiana*	3	0	G5	S5					X	C	N	X																	x
Field Bindweed	*Convolvulus arvensis*	*	5	GNR	SNA					X	IC	I					X													X
Gray Dogwood	*Cornus racemosa*	2	-2	G5?	S5					X	IC	N	X		X						X		X						X	X
Red-osier Dogwood	*Cornus sericea*	2	-3	G5	S5					X	C	N	X								X	X					X			X
Dogwood Species	*Cornus sp.*											N											X							X
Hawthorn Species	*Crataegus sp.*											N			X				X	X	X		X	X	X					X
Orchard Grass	*Dactylis glomerata*	*	3	GNR	SNA					X	IC	I	X				X				X	X	X						X	X
Queen Anne's Lace	*Daucus carota*	*	5	GNR	SNA					X	IC	I		X	X		X		X	X	X	X		X	X	X		X		X
Fuller's Teasel	*Dipsacus fullonum*	*	5	GNR	SNA					X	IC	I		X	X		X		X	X	X			X						X
Barnyard Grass Species	*Echinochloa sp.*																					X								X
Wild Mock-cucumber	*Echinocystis lobata*	3	-2	G5	S5					X	C	N									X									X
Common Viper's-	*Echium vulgare*	*	5	GNR	SNA					X	IC	I					X				X				X					X
Creeping Wild Rye	*Elymus repens*	*	3	GNR	SNA					X	IC	I		X							X				X					X
Purple-leaf Willow-herb	*Epilobium coloratum*	3	-5	G5	S5				U	XU	C	N									X			X						X
Willow-herb Species	*Epilobium sp*											I											X							X
Field Horsetail	*Equisetum arvense*	0	0	G5	S5					X	C	N	X		X	X	X													X
White-top Fleabane	*Erigeron annuus*	0	1	G5	S5					X	C	N									X			X		X				X
Canada Horseweed	*Erigeron canadensis*	0	1	G5	S5					X	U	N										X								X
Philadelphia Fleabane	*Erigeron philadelphicus var. philadelphicus*	1	-3	G5T5	S5					X	C	N	X								X									X
Running Strawberry-bush	*Euonymus obovatus*	6	5	G5	S5					X	C	N											X							X
Common Boneset	*Eupatorium perfoliatum*	2	-4	G5	S5					X	C	N				X														X
Flat-top Fragrant Goldenrod	*Euthamia graminifolia*	2	-2	G5	S5					X	C	N													X					X

Common Name	Scientific Name	cc[1]	cw[1]	Grank[2]	Srank[3]	COSEWIC[4]	MNR[5]	SARA Status[6]	Halton NAI (Crins et al. 2006)[7]	Halton Region (Varga et al. 2000)[7]	Ecodistrict 7E-4 (Oldham, 2017)[7]	native status	Unit 1: FOD7-3	Unit 2: CUM1-1	Unit 3: CUM1-1	Unit 4: MAS2-1	Unit 5: CUM1-1	Unit 6: MAS2-1	Unit 7: CUT1	Unit 8: CUM1-1	Unit 9: FOD7	Unit 10: CUW1	Unit 11: FOD9-3	Unit 12: CUT1	Unit 13: CUM1-1	Unit 14: CUH	Unit 15: MOS	Unit 16: CUW1	Addltional Species outside of ELC polygons	OVERALL
Spotted Joe-pye Weed	*Eutrochium maculatum var. maculatum*	3	-5	G5T5	SNR					X	C	N	X																	X
Woodland Strawberry	*Fragaria vesca ssp americana*	4	4	G5T5	S5					XU	C	N											X							X
Virginia Strawberry	*Fragaria virginiana ssp virginiana*	2	1	G5T5	SU					X	C	N			X							X	X	X	X					X
Green Ash	*Fraxinus pennsylvanica*	3	-3	G5	S4					X	C	N	X		X	X			X		X	X	X	X	X	X		X		X
Rough Bedstraw	*Galium asprellum*	6	-5	G5	S5					XU	U	N									X		X							X
Herb-robert	*Geranium robertianum*	*	5	G5	SNA					X	C	I											X							X
Yellow Avens	*Geum aleppicum*	2	-1	G5	S5					XU	X	N											X	X						X
White Avens	*Geum canadense*	3	0	G5	S5					X	C	N									X		X							X
Rough Avens	*Geum laciniatum*	4	-3	G5	S4					X	C	N									X		X							X
Avens Species	*Geum sp.*											N											X	X						X
Clover-root	*Geum urbanum*	*	5	G5	SNA					X	IX	I	X								X									X
Manna Grass Species	*Glyceria sp.*											N											X							X
Fowl Manna Grass	*Glyceria striata*	3	-5	G5	S5					X	C	N									X		X							X
Orange Daylily	*Hemerocallis fulva*	*	5	GNA	SNA					X	IC	I			X											X				X
Dame's Rocket	*Hesperis matronalis*	*	5	G4G5	SNA					X	IC	I									X		X							X
Virginia Waterleaf	*Hydrophyllum virginianum*	6	-2	G5	S5					X	C	N											X							X
St. John's-wort	*Hypericum perforatum*	*	5	GNR	SNA					X	IC	I	X											X		X				X
Spotted Jewelweed	*Impatiens capensis*	4	-3	G5	S5					X	C	N	X								X		X							X
Elecampane Flower	*Inula helenium*	*	5	GNR	SNA					X	IC	I			X															X
Yellow Iris	*Iris pseudacorus*	*	-5	GNR	SNA					X	IU	I	X																	X
Butternut	*Juglans cinerea*	6	2	G4	S2?	END	END	END		X	U	N	X																	X
Black Walnut	*Juglans nigra*	5	3	G5	S4					X	C	N												X	X				X	X
Dudley's Rush	*Juncus dudleyi*	1	0	G5	S5					X	C	N				X									X					X
Knotted Rush	*Juncus nodosus*	5	-5	G5	S5				U	XU	R	N													X					x
Eastern Red Cedar	*Juniperus virginiana*	4	3	G5	S5				U	R5	U	N	X		X										X					X
Common Nipplewort	*Lapsana communis*	*	5	GNR	SNA					X	IU	I											X							X
Common Motherwort	*Leonurus cardiaca ssp. cardiaca*	*	5	GNRTNR	SNA					X	IC	I									X									X
Field Pepper-grass	*Lepidium campestre*	*	5	GNR	SNA					X	IC	I					X			X				X						X
Oxeye Daisy	*Leucanthemum vulgare*	*	5	GNR	SNA					X	IC	I	X	X	X		X				X			X	X					X
European Privet	*Ligustrum vulgare*	*	1	GNR	SNA					X	IU	I	X										X							X
Butter-and-eggs	*Linaria vulgaris*	*	5	GNR	SNA					X	IC	I	X																	X
Tartarian Honeysuckle	*Lonicera tatarica*	*	3	GNR	SNA					X	IC	I	X		X				X	X	X	X	X			X				X
Garden Bird's-foot-trefoil	*Lotus corniculatus*	*		GNR	SNA					X	IC	I		X	X		X			X		X				X		X		X
European Bugleweed	*Lycopus europaeus*	*	-5	GNR	SNA					X	IU	I	X																	X
Purple Loosestrife	*Lythrum salicaria*	*	-5	G5	SNA					X	IC	I		X			X	X			X	X							X	X
Common Apple	*Malus pumila*	*	5	G5	SNA					X	IC	I													X					X
Black Medic	*Medicago lupulina*	*	1	GNR	SNA					X	IC	I			X		X			X										X
White Sweet Clover	*Melilotus albus*	*	3	GNR	SNA					X	IC	I					X			X		X						X		X
Yellow Sweet Clover	*Melilotus officinalis*	*	5	GNR	SNA						IR	I					X			X										X
Peppermint	*Mentha x piperita*	*	-5	GNR	SNA					X	hyb	I				X														X
Watercress Species	*Nasturtium sp.*		0									I				X					X									X
Catnip	*Nepeta cataria*	*	1	GNR	SNA					X	IC	I		X																X
Evening-primrose sp.	*Oenothera sp.*											N					X													X
Eastern Hop-hornbeam	*Ostrya virginiana*	4	4	G5	S5					X	C	N											X							X
Upright Yellow Wood Sorrel	*Oxalis stricta*	0	3	G5	S5					X	C	N	X										X							X
Virginia Creeper	*Parthenocissus quinquefolia*	6	1	G5	S4?				F	XU	R	N	X	X					X		X		X	X						X
Reed Canary Grass	*Phalaris arundinacea*	0	-4	G5	S5					X	C	N	X		X	X					X								X	X
Meadow Timothy	*Phleum pratense*	*	3	GNR	SNA					X	IC	I			X															X
European Reed Grass	*Phragmites australis ssp. australis*	*	-4	GNR	SNR					X	IC	N						X								X			X	X
Norway Spruce	*Picea abies*	*	5	G5	SNA					XSR	IX	I														X			X	
White Spruce	*Picea glauca*	6	3	G5	S5				U	XU	U	N																	X	
Colorado Spruce	*Picea pungens*			G5	SNA							I	X																X	x
Meadow Hawkweed	*Pilosella caespitosa*	*	5	GNR	SNA					X	IC	I													X					x
Jack Pine	*Pinus banksiana*	9	3	G5	S5					XSR	IX	N													X					x
Mugo Pine	*Pinus mugo*			GNR	SNA							I	X																	X
Austrian Pine	*Pinus nigra*	*	-5	GNR	SNA							I																	X	
Eastern White Pine	*Pinus strobus*	4	3	G5	S5					X		N							X				X							x
Scotch Pine	*Pinus sylvestris*	*	5	GNR	SNA					X	C	I													X	X			X	X
Black-seed Plantain	*Plantago rugelii*	1	0	G5	S5					X	C	N									X									X
Canada Bluegrass	*Poa compressa*	0	2	GNR	SNA					X	IC	N					X						X	X	X					X
Fowl Bluegrass	*Poa palustris*	5	-4	G5	S5					X	C	N	X								X									X
Kentucky Bluegrass	*Poa pratensis ssp. pratensis*	*	1	G5T5	S5					X	IC	N		X	X		X				X	X			X	X		X		X
Eastern Cottonwood	*Populus deltoides ssp. deltoides*			G5T5	SU						C	N										X				X				X
Carolina Poplar	*Populus x canadensis*			GNA	SNA					X	hyb	I	X																X	X
Sulphur Cinquefoil	*Potentilla recta*	*	5	GNR	SNA					X	IC	I	X											X						x
Self-heal	*Prunella vulgaris ssp. lanceolata*	5	5	G5T5	S5					X	C	N											X		X					X
Choke Cherry	*Prunus virginiana var. virginiana*	2	1	G5T5	S5					X		N	X		X				X		X		X							X

Common Name	Scientific Name	cc[1]	cw[1]	Grank[2]	Srank[3]	COSEWIC[4]	MNR[5]	SARA Status[6]	Halton NAI (Crins et al. 2006)[7]	Halton Region (Varga et al. 2000)[7]	Ecodistrict 7E-4 (Oldham, 2017)[7]	native status	Unit 1: FOD7-3	Unit 2: CUM1-1	Unit 3: CUM1-1	Unit 4: MAS2-1	Unit 5: CUM1-1	Unit 6: MAS2-1	Unit 7: CUT1	Unit 8: CUM1-1	Unit 9: FOD7	Unit 10: CUW1	Unit 11: FOD9-3	Unit 12: CUT1	Unit 13: CUM1-1	Unit 14: CUH	Unit 15: MOS	Unit 16: CUW1	Addltional Species outside of ELC polygons	OVERALL
Common Pear	*Pyrus communis*	*	5	G5	SNA					X	IR	I												X	X					X
Bur Oak	*Quercus macrocarpa*	5	1	G5	S5					X	C	N	X										X	X						X
Northern Red Oak	*Quercus rubra*	6	3	G5	S5					X	C	N	X																	X
Tall Buttercup	*Ranunculus acris*	*	-2	G5	SNA					X	IC	I			X	X					X		X							X
Cursed Crowfoot	*Ranunculus sceleratus var. sceleratus*	2	-5	G5T5	SU					X		N									X									X
Buckthorn	*Rhamnus cathartica*	*	3	GNR	SNA					X	IC	I	X		X					X	X	X	X		X	X		X		X
Staghorn Sumac	*Rhus typhina*	1	5	G5	S5					X	C	N		X						X		X		X		X		X		X
Prickly Gooseberry	*Ribes cynosbati*	4	5	G5	S5					X	C	N											X							X
Northern Red Currant	*Ribes rubrum*	*	5	G4G5	SNA					X	IC	I									X									X
Black Locust	*Robinia pseudoacacia*	*	4	G5	SNA					X	IC	I																X		
Rose Species	*Rosa sp.*											N							X		X									X
Wild Red Raspberry	*Rubus idaeus ssp. strigosus*	0	-2	G5T5	S5					X	C	N												X						X
Black Raspberry	*Rubus occidentalis*	2	5	G5	S5					X	C	N	X								X		X							X
Curly Dock	*Rumex crispus*	*	-1	GNR	SNA					X	IC	I		X						X		X		X				X		X
Dock Species	*Rumex sp.*											I									X									X
Pussy Willow	*Salix discolor*	3	-3	G5	S5					X	C	N										X								X
Willow Species	*Salix sp.*											I	X									X								X
Soft-stemmed Bulrush	*Schoenoplectus tabernaemontani*	5	-5	G5	S5					X	C	N				X														X
Woolgrass Bulrush	*Scirpus atrovirens*	3	-5	G5?	S5					X	C	N			X	X									X					X
Pendulous Bulrush	*Scirpus pendulus*	3	-5	G5	S5				U	XU	R	N													X					X
Crown-vetch	*Securigera varia*	*	5	GNR	SNA					X	IC	I					X			X					X					X
Foxtail Species	*Setaria sp.*											I					X				X	X								X
Maiden's Tears	*Silene vulgaris*	*	5	GNR	SNA					X	IR	I					X														X
Bittersweet Nightshade	*Solanum dulcamara*	*	0	GNR	SNA					X	IC	I									X										X
Tall Goldenrod	*Solidago altissima*	1	3	G5	S5					X	C	N	X		X		X		X		X	X	X	X		X		X		X
Canada Goldenrod	*Solidago canadensis*	1	3	G5	SNR					X	C	N					X				X		X	X						X
Field Goldenrod	*Solidago nemoralis var. nemoralis*			G5T5	S5						C	N			X										X					X
Field Sowthistle	*Sonchus arvensis ssp arvensis*	*		GNRTNR	SNA					X	IC	I		X	X	X	X		X	X										X
European Mountain-ash	*Sorbus aucuparia*	*	5	G5	SNA					X	IC	I	X													X				X
Panicled Aster	*Symphyotrichum lanceolatum ssp. lanceolatum*			G5T5	S5					XU	C	N		X	X	X					X			X	X					X
Calico Aster	*Symphyotrichum lateriflorum var. lateriflorum*	3	-2	G5T5	SNR						C	N	X																	x
New England Aster	*Symphyotrichum novae-angliae*	2	-3	G5	S5					X	C	N	X		X		X				X			X		X		X		X
Swamp Aster	*Symphyotrichum puniceum var. puniceum*	6	-5	G5T5	S5						C	N										X								X
Common Dandelion	*Taraxacum officinale*	*	3	G5	SNA					X	IC	I		X			X		X		X	X		X						X
Field Penny-cress	*Thlaspi arvense*	*	5	GNR	SNA					X	IR	I								X										X
Northern White Cedar	*Thuja occidentalis*	4	-3	G5	S5					X	C	N														X				X
American Basswood	*Tilia americana*	4	3	G5	S5					X	C	N								X				X	X					X
Eastern Poison Ivy	*Toxicodendron radicans ssp. negundo*	5	-1	G5T5	S5					X	C	N	X	X							X			X						X
Meadow Goat's-beard	*Tragopogon dubius*	*	5	GNR	SNA					X	IR	I					X													X
Red Clover	*Trifolium pratense*	*	2	GNR	SNA					X	IC	I					X			X		X								X
Colt's Foot	*Tussilago farfara*	*	3	GNR	SNA					X	IC	I	X			X	X				X									X
Narrow-leaved Cattail	*Typha angustifolia*	3	-5	G5	SNA					X	IC	I										X				X				x
Blue Cattail	*Typha x glauca*	3	-5	GNA	SNA					X	hyb	N			X	X		X							X					X
American Elm	*Ulmus americana*	3	-2	G5?	S5					X	C	N				X					X	X	X							X
Slender Stinging Nettle	*Urtica dioica ssp. gracilis*	2	-1	G5T5	S5					X	C	N				X									X					X
Common Mullein	*Verbascum thapsus*	*	5	GNR	SNA					X	IC	I					X													X
White Vervain	*Verbena urticifolia*	4	-1	G5	S5					X	C	N									X									X
Thyme-leaved Speedwell	*Veronica serpyllifolia ssp. serpyllifolia*	*		G5TNR	SNA					X	IC	I											X							X
Nannyberry	*Viburnum lentago*	4	-1	G5	S5					X	C	N			X															X
Guelder-rose Viburnum	*Viburnum opulus var. opulus*	*	0	GNRTNR	SNA					X	IC	I	X											X						X
Tufted Vetch	*Vicia cracca*	*	5	GNR	SNA					X	IC	I	X		X	X	X					X						X		X
Riverbank Grape	*Vitis riparia*	0	-2	G5	S5					X	C	N	X	X	X		X		X		X	X	X	X	X	X		X		X

PLANT LIST LEGEND

Scientific Name, Common Name, and Family
Based on Vascan and NHIC (February 28, 2020)

Vascan: http://data.canadensys.net/vascan/search
NHIC: https://www.sdc.gov.on.ca/sites/MNRF-PublicDocs/EN/ProvincialServices/ONTARIO_SPECIES_LISTS.zip

[1] Coefficient of Conservatism, Coefficient of Wetness, Weediness, and Physiology/Habit
Oldham, M. J., W. D. Bakowsky and D. A. Sutherland. 1995. Floristic Quality Assessment System for Southern Ontario. Natural Heritage Information Centre, Ministry of Natural Resources. Peterborough, Ontario.
CC and CW values reflect updates by NHIC, current as of *February 28, 2020*).

CC: Coefficient of Conservatism. Rank of 0 to 10 based on plants degree of fidelity to a range of synecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters.
CW: Coefficient of Wetness. Value between 5 and –5. A value of –5 is assigned to Obligate Wetland (OBL) and 5 to Obligate Upland (UPL), with intermediate values assigned to the remaining categories.
Weediness: Assigned to all non-native species and range from -1 (low impact of the species on natural areas) to -3 (high impact of the species on natural areas).
Habit: Physiology/Habit. The growth form of the species (e.g. forb, shrub, tree).

[2] OWES Wetland Plant List
Ontario Ministry of Natural Resources. 2013. Ontario Wetland Evaluation System Southern Manual. 3rd Edition, Version 3.3; Ontario Ministry of Natural Resources. 2013. Ontario Wetland Evaluation System Northern Manual. 1st Edition, Version 1.3

Species presence or absence from the Ontario Wetland Evaluation System (OWES) Wetland Plant List.
Codes are defined as follows:
X: Present on the list

[3] G-Rank (Global)
Global Status from Nature Serve (via NHIC, February 28, 2020)
Nature Serve: http://explorer.natureserve.org/
NHIC: http://www.sse.gov.on.ca/sites/MNR-PublicDocs/EN/ProvincialServices/Ontario_Vascular_Plants.xlsx

Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

Global (G) Conservation Status Ranks
G1: Critically Imperiled - At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
G2: Imperiled - at high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
G3: Vulnerable - At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
G4: Apparently Secure - At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
G5: Secure - At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.
G#G#: Range Rank – A numeric range rank (e.g., G2G3, G1G3) is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type. Ranges cannot skip more than two ranks (e.g., GU should be used rather than G1G4).

GX: Presumed Extinct - Not located despite intensive searches and virtually no likelihood of rediscovery.

GH: Possibly Extinct - Known from only historical occurrences but still some hope of rediscovery. Examples of evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species has been searched for unsuccessfully, but not thoroughly enough to presume that it is extinct or eliminated throughout its range.

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

GNR: Unranked – Global rank not yet assessed

GNA: Not Applicable – A conservation status rank is not applicable because the species is not a suitable target for conservation activities. A global conservation status rank may be not applicable for several reasons, related to its relevance as a conservation target. For species, typically the species is a hybrid without conservation value, or of domestic origin. For ecosystems, the type is typically non-native (e.g, many ruderal vegetation types), agricultural (e.g. pasture, orchard) or developed (e.g. lawn, garden, golf course).

?: Inexact Numeric Rank – Denotes inexact numeric rank; this should not be used with any of the Variant Global Conservation Status Ranks or GX or GH.

T#: Infraspecific Taxon (trinomial) - The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above. For example, the global rank of a critically imperiled subspecies of an otherwise widespread and common species would be G5T1. A T subrank cannot imply the subspecies or variety is more abundant than the species, for example, a G1T2 subrank should not occur. A vertebrate animal population (e.g., listed under the U.S. Endangered Species Act or assigned candidate status) may be tracked as an infraspecific taxon and given a T rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status.

Q: Questionable taxonomy that may reduce conservation priority – Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower priority (numerically higher) conservation status rank. The “Q” modifier is only used at a global level and not at a national or subnational level.

C: Captive or Cultivated Only – Taxon or ecosystem at present is presumed or possibly extinct or eliminated in the wild across their entire native range but is extant in cultivation, in captivity, as a naturalized population (or populations) outside their native range, or as a reintroduced population or ecosystem restoration, not yet established. The “C” modifier is only used at a global level and not at a national or subnational level. Possible ranks are GXC or GHC. This is equivalent to “Extinct” in the Wild (EW) in IUCN’s Red List terminology (IUCN 2001).

[4] S-Ranks (Provincial)

Provincial Status from the NHIC (February 28, 2020)

NHIC: http://www.sse.gov.on.ca/sites/MNR-PublicDocs/EN/ProvincialServices/Ontario_Vascular_Plants.xlsx

Provincial (or Subnational) ranks are used by the 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.

Provincial/Sub-national (S) Conservation Status Ranks

S1: Critically Imperiled – At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

S2: Imperiled – At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

S3: Vulnerable – At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

S4: Apparently Secure – At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or Secure – At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.

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).

SX: Presumed Extirpated – Species or ecosystem is believed to be extirpated from the jurisdiction (province). Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered. [equivalent to "Regionally Extinct" in IUCN Red List terminology]

SH: Possibly Extirpated (Historical) – Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the jurisdiction, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.

SNR: Unranked – Nation of state/province conservation status 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 (e.g., long distance aerial and aquatic migrants, hybrids without conservation value, and non-native species.

?: Inexact or Uncertain - Denotes inexact or uncertain numeric rank.

T#: Infraspecific Taxon (trinomial) - The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above. For example, the subnational rank of a critically imperiled subspecies of an otherwise widespread and common species would be S5T1. A T subrank cannot imply the subspecies or variety is more abundant than the species, for example, a S1T2 subrank should not occur. A vertebrate animal population may be tracked as an infraspecific taxon and given a T rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status.

[5] COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

The federal review process is implemented by COSEWIC (Status as of February 28, 2020)

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is an independent advisory panel to the Minister of Environment and Climate Change Canada that meets twice a year to assess the status of wildlife species at risk of extinction.
https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html

COSEWIC Conservation Status Ranks

EXT: Extinct – A species that no longer exists.

EXP: Extirpated – A species no longer existing in the wild in Canada, but occurring elsewhere.

END: Endangered – A species facing imminent extirpation or extinction.

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

SC: Special Concern (formerly vulnerable) – A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

NAR: Not At Risk – A species that has been evaluated and found to be not at risk of extinction given the current circumstances.

DD: Data Deficient – Available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

[6] SARA (Species at Risk Act) Status and Schedule

Federal status from the Government of Canada's Species at Risk Public Registry (Status as of February 28, 2020)
http://www.registrelep-sararegistry.gc.ca/

The Act establishes Schedule 1, as the official list of species at risk in Canada. It classifies those species as being either Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed species are implemented. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern.

SARA Conservation Status Ranks

EXT: Extinct – A species that no longer exists.

EXP: Extirpated – A species that no longer exists in the wild in Canada, but exists elsewhere in the wild.

END: Endangered – A species that is facing imminent extirpation or extinction.

THR: Threatened – A species likely to become endangered if limiting factors are not reversed.
SC: Special Concern – A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

[7] SARO (Species at Risk in Ontario)
Provincial status from MNRF (Status as of February 28, 2020)
https://www.ontario.ca/environment-and-energy/species-risk-ontario-list

The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO). COSSARO is an independent advisory panel to the Ontario Ministry of Natural Resources and Forestry that assesses the status of species at risk of extinction.

MNRF Conservation Status Ranks
EXP: Extirpated – Extirpated – Lives somewhere in the world, and at one time lived in the wild in Ontario, but no longer lives in the wild in Ontario.
END: Endangered – Lives in the wild in Ontario but is facing imminent extinction or extirpation.
THR: Threatened – Lives in the wild in Ontario, is not endangered, but is likely to become endangered if steps are not taken to address factors threatening it.
SC: Special Concern – Lives in the wild in Ontario, is not endangered or threatened, but may become threatened or endangered due to a combination of biological characteristics and identified threats.

[8] Regional Status

Halton Region
Crins, W.J., McIlveen, W.D., Goodban, A.G., and P.G. O'Hara. 2006. The Vascular Plants of Halton Region, Ontario. In: Halton Natural Areas Inventory. Volume 2: Species Checklists.

Codes are defined as follows:
R: Rare
U: Uncommon
F: Requires further review
EX: Extirpated

Halton, Peel, Toronto, York, Durham, GTA, 6E7, 7E4
Varga, S., et. al. 2000. The Distribution and Status of the Vascular Plants of the Greater Toronto Area. Ontario Ministry of Natural Resources, Aurora, ON. 103 pp.
"Plant rarity is based on the number of locations for a native plant species" and also takes into account native species restricted to specialized rare habitats. For the Greater Toronto Area column, "A species is considered rare in the Greater Toronto Area if it is rare or uncommon in a least four of... Halton, Peel, Toronto, York, and Durham".

Codes are defined as follows:
X: Present
U: Uncommon native species
R: Rare native species
R#: Number of stations for a rare native species
E: Extirpated native species
+ or I: Introduced species
X+: Introduced in municipality
SR: Sight record
LR: Literature record

Carolinian Zone / Ecoregion 7E
Oldham, Michael J. 2017. List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Carolinian Canada and Ontario Ministry of Natural Resources and Forestry. Peterborough, ON. 132 pp.

Rankings within each jurisdiction within the Carolinian Zone are based on "previous lists, personal communications, and the author's knowledge of the Carolinian Zone flora. An overall status in the Carolinian Zone is provided based on status in each of the 11 areas and general knowledge of the Carolinian Zone flora."

Codes are defined as follows (**CZ Status Column Only)**

H: Historic. Native in all Carolinian Zone areas and no known records for at least 30 years in all areas where native and ranked (i.e. not X). Occasionally used for a native species known to be extirpated from its only known Carolinian Zone location(s).

R: Rare. Native to the Carolinian Zone and (a) rare (as defined in source lists; sometimes including "very uncommon") or historic (no records in ≥30 years) in more than half of the Carolinian Zone areas (≥6) in which it is native and ranked (i.e. not X); or (b) if rare or historic in <6 areas it must be uncommon or common in no more than one area.

U: Uncommon. Native in the Carolinian Zone and (a) listed as common in no more than one Carolinian Zone area; and (b) not rare or historic in more than half of the Carolinian Zone areas (≥6) in which it is native and ranked (i.e. not X).

C: Common. Native in the Carolinian Zone and (a) common in at least two Carolinian Zone areas; and (b) not rare or historic in more than half of the Carolinian Zone areas (≥6) in which it is native and ranked (i.e. not X).

X: No status. Present and native in the Carolinian Zone but no status assigned because of lack of information, often due to confusion with similar species

I: Introduced. A non-native (exotic) species that is established (or was formerly established) outside of cultivation in the Carolinian Zone.

CZ: Restricted in Ontario as a native species to the Carolinian Zone.

cz: Nearly restricted in Ontario as a native species to the Carolinian Zone. (Approximately 90%+ records)

Note: In a few cases, based on professional opinion, Carolinian Zone status ranks departed from the above criteria, particularly if the species is not ranked (i.e. X) in at least four Carolinian Zone areas.

Ecodistrict 7E4 (comprising the City of Toronto, and southern portions of York, Peel, and Halton Regional Municipalities)

Oldham, Michael J. 2017. List of the Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Carolinian Canada and Ontario Ministry of Natural Resources and Forestry. Peterborough, ON. 132 pp.

Rankings are based on "previous lists, personal communications, and the author's knowledge of the Carolinian Zone flora."

Codes are defined as follows:

H: Historic. Native and no known records for at least 30 years.

R: Rare

U: Uncommon

C: Common

X: Present. Native but no status assigned because of lack of information, often due to confusion with similar species.

I: Introduced. A non-native (exotic) species that is established (or was formerly established) outside of cultivation.

[9] Native Status

Based on Vascan and NHIC (February 28, 2020)

Vascan: http://data.canadensys.net/vascan/search

NHIC: https://www.sdc.gov.on.ca/sites/MNRF-PublicDocs/EN/ProvincialServices/ONTARIO_SPECIES_LISTS.zip

Codes are defined as follows:

N: Native

I: Introduced

Table 3a: Breeding Bird and General Wildlife Observations

Common Name	Scientific Name	GRANK[1]	SRANK[2]	ESA[3]	COSEWIC[4]	SARA Status[5]	Schedule[5]	Halton Region (2006)[6]	Habitat Use[9]	Area Sensitive Birds - Ecoregion 7E[9]	Protected Under MBCA[10]	WSU 1 (Unit 16-17 and SWMP) 2017		WSU 2 (Unit 2 & portion of 1b adjacent to ROW) 2017		WSU 3 (Unit 15 & portion of 1b beyond ROW edge) 2017-2018		WSU 4 (Unit 13-14 and Rail Corridor) 2017-2018		WSU 5 (Unit 3a, 3b, 4a) 2017		WSU 6 (Unit 7, 9) 2017-2018		WSU 7 (Unit 4b, 5, 10a) 2017		WSU 8 (Unit 11) 2018		WSU 9 (Unit 12) 2018		Overall Study Area (2017-2018)		Comments / Incidental Observations
												Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	
BIRDS																														
American Crow	*Corvus brachyrhynchos*	G5	S5B						E			1	POSS			2	POSS	2	PROB					1	POSS	1	POSS			7	PROB	
American Goldfinch	*Spinus tristis*	G5	S5B						E		Y	2	PROB	4	PROB	8	PROB	4	PROB	2	PROB	2	PROB	4	PROB			1	POSS	27	PROB	2 SM recorded incidental to ELC veg surveys (July 11, 2017) WSU#1; 1 SM recorded incidental to ELC veg surveys (July 11, 2017) WSU#6
American Redstart	*Setophaga ruticilla*	G5	S5B						I		Y	1	POSS	1	PROB	2	PROB													4	PROB	
American Robin	*Turdus migratorius*	G5	S5B						E		Y	2	PROB	4	PROB	5	PROB	5	PROB	2	PROB	2	POSS	4	POSS			1	POSS	25	PROB	
American Woodcock	*Scolopax minor*	G5	S4B						E		Y	1	POSS											4	POSS					5	POSS	Incidental observations during amphibian surveys (April 11, 2017), known early breeder
Baltimore Oriole	*Icterus galbula*	G5	S4B						E		Y							2	POSS	1	POSS			2	POSS					5	POSS	
Barn Swallow	*Hirundo rustica*	G5	S4B	THR	THR	THR	1				Y							4	OBS											4	CONF	2 nests observed in culvert at Tributary NW-1-E of Sixteen Mile Creek crossing; foraging individuals in cultural meadow fields
Black-capped Chickadee	*Poecile atricapillus*	G5	S5						I/E		Y	1	POSS			4	PROB	4	PROB	2	POSS			4	POSS			1	POSS	16	PROB	
Blue Jay	*Cyanocitta cristata*	G5	S5						I/E											1	POSS									1	POSS	
Brown-headed Cowbird	*Molothrus ater*	G5	S4B						E					1	POSS			1	POSS			2	PROB	3	PROB					7	PROB	
Brown Thrasher	*Toxostoma rufum*	G5	S4B						E		Y																	1	POSS	1	POSS	
Cedar Waxwing	*Bombycilla cedrorum*	G5	S5B						E		Y	2	PROB	2	POSS	2	POSS	3	POSS	1	POSS	2	POSS	2	POSS					14	PROB	
Chipping Sparrow	*Spizella passerina*	G5	S5B						E		Y					1	PROB	1	PROB	2	PROB									4	PROB	
Common Grackle	*Quiscalus quiscula*	G5	S5B						E			1	POSS	1	POSS	4	PROB			1	POSS									7	POSS	
Common Yellowthroat	*Geothlypis trichas*	G5	S5B						I/E		Y	1	PROB					1	POSS	1	PROB	1	POSS	1	PROB					5	PROB	
Downy Woodpecker	*Picoides pubescens*	G5	S5						I/E		Y	2	POSS			1	POSS	1	POSS			1	POSS							5	POSS	
Eastern Kingbird	*Tyrannus tyrannus*	G5	S4B						E		Y							1	POSS	1	POSS	1	POSS	1	POSS					4	POSS	
Eastern Wood-pewee	*Contopus virens*	G5	S4B	SC	SC	SC	1		I/E		Y					1	POSS									1	POSS			2	POSS	
European Starling	*Sturnus vulgaris*	G5	SNA					I	E			4	POSS	2	POSS	4	POSS	10	PROB			2	POSS	6	POSS	25	POSS	3	POSS	56	PROB	
Field Sparrow	*Spizella pusilla*	G5	S4B						E		Y							2	PROB					2	PROB					4	PROB	
Gray Catbird	*Dumetella carolinensis*	G5	S4B						I/E		Y	1	POSS	1	PROB	1	PROB	1	POSS			1	POSS					1	POSS	6	PROB	1 VO/OB recorded incidental to ELC veg surveys (July 11, 2017) WSU#1
Great Blue Heron	*Ardea herodias*	G5	S4						S/B, M/F		Y											1	OBS							1	OBS	Flyover
Hairy Woodpecker	*Picoides villosus*	G5	S5						I		Y					1	POSS													1	POSS	
House Sparrow	*Passer domesticus*	G5	SNA					I	E							2	POSS	3	CONF	2	POSS									7	CONF	
House Wren	*Troglodytes aedon*	G5	S5B						E		Y											1	POSS					1	POSS	2	POSS	
Indigo Bunting	*Passerina cyanea*	G5	S4B						E		Y									1	POSS	1	POSS			1	POSS	1	POSS	4	POSS	1 SM recorded incidental to ELC veg surveys (July 11, 2017) WSU#5
Killdeer	*Charadrius vociferus*	G5	S5B,S5N								Y					1	POSS	3	CONF											4	CONF	
Mourning Dove	*Zenaida macroura*	G5	S5						E		Y					2	POSS	1	PROB	1	POSS	1	POSS					1	POSS	6	PROB	
Northern Cardinal	*Cardinalis cardinalis*	G5	S5						I/E		Y			1	PROB	2	POSS	2	PROB							1	CONF	1	POSS	7	CONF	
Northern Flicker	*Colaptes auratus*	G5	S4B						I/E		Y					1	POSS			1	POSS			1	POSS					3	POSS	
Northern Mockingbird	*Mimus polyglottos*	G5	S4					U	E		Y							1	POSS											1	POSS	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	G5	S4B					U	M/F		Y							1	POSS											1	POSS	
Red-eyed Vireo	*Vireo olivaceus*	G5	S5B						I/E		Y			1	POSS	1	POSS													2	POSS	
Red-tailed Hawk	*Buteo jamaicensis*	G5	S5						E									1	POSS											1	POSS	
Red-winged Blackbird	*Agelaius phoeniceus*	G5	S4						E			4	PROB	2	PROB	2	POSS			6	PROB			10	PROB					24	PROB	5 OB recorded incidental to ELC veg surveys (July 11, 2017) WSU#5
Savannah Sparrow	*Passerculus sandwichensis*	G5	S4B							X	Y							2	PROB											2	PROB	
Song Sparrow	*Melospiza melodia*	G5	S5B						E		Y	2	POSS	2	PROB	5	POSS	3	PROB	1	POSS	2	PROB	5	PROB					20	PROB	1 SM recorded incidental to ELC veg surveys (July 11, 2017) WSU#6
Spotted Sandpiper	*Actitis macularius*	G5	S5								Y													1	POSS					1	POSS	
Swamp Sparrow	*Melospiza georgiana*	G5	S5B						E		Y													1	PROB					1	PROB	
Turkey Vulture	*Cathartes aura*	G5	S5B															1	OBS					1	OBS					2	OBS	Flyover
Vesper Sparrow	*Pooecetes gramineus*	G5	S4B					U		X	Y							2	POSS											2	POSS	
Warbling Vireo	*Vireo gilvus*	G5	S5B						E		Y	1	POSS	1	PROB	1	PROB	1	POSS	1	POSS			1	PROB					6	PROB	
Yellow-bellied Sapsucker	*Sphyrapicus varius*	G5	S5B					U	I/E	X	Y															1	OBS			1	OBS	Feeding evidence only
Yellow Warbler	*Setophaga petechia*	G5	S5B						E		Y			2	POSS	4	CONF	1	POSS	1	POSS	1	POSS	3	PROB					12	CONF	
Total No. of Species	**44**			**2**	**2**	**2**	**2**			**3**	**35**	**15**		**14**		**23**		**28**		**18**		**15**		**20**		**6**		**10**		**44**		

Table 3a: Breeding Bird and General Wildlife Observations

Common Name	Scientific Name	GRANK[1]	SRANK[2]	ESA[3]	COSEWIC[4]	SARA Status[5]	Schedule[5]	Halton Region (2006)[6]	Habitat Use[9]	Area Sensitive Birds - Ecoregion 7E[9]	Protected Under MBCA[10]	WSU 1 (Unit 16-17 and SWMP) 2017		WSU 2 (Unit 2 & portion of 1b adjacent to ROW) 2017		WSU 3 (Unit 15 & portion of 1b beyond ROW edge) 2017-2018		WSU 4 (Unit 13-14 and Rail Corridor) 2017-2018		WSU 5 (Unit 3a, 3b, 4a) 2017		WSU 6 (Unit 7, 9) 2017-2018		WSU 7 (Unit 4b, 5, 10a) 2017		WSU 8 (Unit 11) 2018		WSU 9 (Unit 12) 2018		Overall Study Area (2017-2018)		Comments / Incidental Observations
												Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	Abundance	Breeding Status	
INSECTS																																
Cabbage White	*Pieris rapae*	G5	SNA											4	OBS					2	OBS	1	OBS					1	OBS	8	OBS	4 OB recorded incidental to ELC veg surveys (July 11, 2017) WSU#2; 2 OB recorded incidental to ELC veg surveys (July 11, 2017) WSU#3; 1 OB recorded incidental to ELC veg surveys (July 11, 2017) WSU#6
Common Ringlet	*Coenonympha tullia*	G5	S5					C														1	OBS							1	OBS	
Eastern Forktail	*Ischnura verticalis*	G5	S5											1	OBS															1	OBS	1 OB recorded incidental to ELC veg surveys (July 11, 2017) WSU#2
Gypsy Moth	*Lymantria dispar dispar*	G5	SNA																							1	OBS			1	OBS	Caterpillar observed
Red-spotted Purple	*Limenitis arthemis astyanax*	G5T5	S5					C																		1	OBS			1	OBS	
Sulphur Sp.	*Colias sp.*	G5	S5																	2	OBS									2	OBS	2 OB recorded incidental to ELC veg surveys (July 11, 2017) WSU#3
Twelve-spotted Skimmer	*Libellula pulchella*	G5	S5															1	OBS											1	OBS	
Widow Skimmer	*Libellula luctuosa*	G5	S5															1	OBS											1	OBS	
Monarch	*Danaus plexippus*	G5	S2N,S4B	SC	END	SC	1													1	OBS									1	OBS	1 OB recorded incidental to ELC veg surveys (July 11, 2017) WSU#5
Total No. of Species	**9**			**1**	**1**	**1**	**1**							**2**				**2**		**3**		**2**				**2**		**1**		**9**		
MAMMALS																																
Eastern Chipmunk	*Tamias striatus*	G5	S5					C																						-	OBS	Wooded areas
Eastern Cottontail	*Sylvilagus floridanus*	G5	S5					C																						-	OBS	Woodland edge / open areas
Grey Squirrel	*Sciurus carolinensis*	G5	S5																											-	OBS	1 OB recorded incidental to ELC veg surveys (July 11, 2017) WSU#6
Raccoon	*Procyon lotor*	G5	S5					C																						-	TRK	Tracks along banks of 16 Mile Creek
Red Squirrel	*Tamiasciurus hudsonicus*	G5	S5					C																						-	OBS	Wooded areas
White-tailed Deer	*Odocoileus virginianus*	G5	S5					C																						-	TRK	Tracks along banks of 16 Mile Creek, 1 adult observed in WSU 10
Total No. of Species	**6**											NA		NA		NA		NA		NA		NA		NA		NA		NA		**6**		
HERPETOFAUNA																																
Eastern Gartersnake	*Thamnophis sirtalis sirtalis*	G5T5	S5					A																1	OBS					1	OBS	Observed wihtin ROW, northeast of Tremaine Rd
Midland Painted Turtle	*Chrysemys picta marginata*	G5T5	S4	NAR	SC	SC	1	C																						1	RK	Road-killed (shell) found along ROW southwest of rail crossing
Gray Treefrog	*Hyla versicolor*	G5	S5					A				L3	VOC																	L3	VOC	Recorded in swamp at AC5
Green Frog	*Lithobates clamitans*	G5	S5					A				L3	VOC											1	VOC					4	VOC	Recorded in swamp at AC5, and within marsh northeast of Tremaine Rd. round-about
Spring Peeper	*Pseudacris crucifer*	G5	S5					A				6	VOC	L3	VOC															L3	VOC	Recorded during amphibian calling surveys at AC5 (Level 2 calling) and AC6 (Level 3 calling, which was likely associated with a small marsh feature or pooling along the rail corridor; labeled on Figure)
Total No. of Species	**5**				1							**3**		**1**										**2**						**5**		

WILDLIFE LIST LEGEND

[1]G-Rank (global)
Global ranks are assigned by a consensus of the network of Conservation Data Centres (CDCs), scientific experts, and the Nature Conservancy to designate a rarity rank based on the range-wide status of a species, subspecies, or variety.

G1 Extremely rare - usually 5 or fewer occurrences in the overall range or very few remaining individuals; or because of some factor(s) making it especially vulnerable to Extinction.
G2 Very rare - usually between 5 and 20 occurrences in the overall range or with many individuals in fewer occurrences; or because of some factor(s) making it vulnerable to Extinction.
G3 Rare to uncommon - usually between 20 and 100 occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
G4 Common - usually more than 100 occurrences; usually not susceptible to immediate threats.
G5 Very common - demonstrably secure under present conditions.

[2]S-Rank (provincial)
Provincial (or Subnational) ranks are used by the 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.

S1 Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 Secure - Common, widespread, and abundant in the nation or state/province.
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).
SAN Non-breeding accidental.
SE Exotic - not believed to be a native component of Ontario's fauna.
SZN Non-breeding migrants/vagrants.
SZB Breeding migrants/vagrants.

[3]SARO (Species at Risk in Ontario) Status
Provincial status from MECP (Status as of May 2022)
https://www.ontario.ca/page/species-risk-ontario

The provincial review process is implemented by the Committee on the Status of Species at Risk in Ontario (COSSARO). COSSARO is an independent advisory panel to the Ontario Ministry of Environment, Conservation and Parks (MECP) that assesses the status of species at risk of extinction.

MECP Conservation Status Ranks
EXT Extinct - A species that no longer exists anywhere in the world.

EXP Extirpated - A species that lives somewhere in the world, lived at one time in the wild in Ontario, but no longer lives in the wild in Ontario.
END Endangered - A species that is facing imminent Extinction or extirpation.
THR Threatened - A species that is likely to become Endangered if steps are not taken to address factors threatening to lead to its Extinction or extirpation.
SC Special Concern – A species that may become Threatened or Endangered because of a combination of biological characteristics and identified threats.

[4]COSEWIC (Committee on the Status of Endangered Wildlife in Canada)
The federal review process is implemented by COSEWIC (Status as of May 2022)

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is an independent advisory panel to the Minister of Environment and Climate Change Canada that meets twice a year to assess the status of wildlife species at risk of extinction.
https://www.cosewic.ca/index.php/en-ca/

COSEWIC Conservation Status Ranks
EXT Extinct - A species that no longer exists.
EXP Extirpated - A species no longer existing in the wild in Canada, but occurring elsewhere.
END Endangered - A species facing imminent extirpation or Extinction.
THR Threatened - A species likely to become Endangered if limiting factors are not reversed.
SC Special Concern (formerly vulnerable) - A species that may become a Threatened or an Endangered species because of a combination of biological characteristics and identified threats.
NAR Not At Risk - A species that has been evaluated and found to be not at risk of Extinction given the current circumstances.
DD Data Deficient (formerly Indeterminate) - Available information is insufficient to resolve a species' eligibility for assessment or to permit an assessment of the species' risk of Extinction.

[5]SARA (Species at Risk Act) Status and Schedule
Federal status from the Government of Canada's Species at Risk Public Registry (Status as of May 2022)
https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html

The Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.

EXT Extinct - A wildlife species that no longer exists.
EXP Extirpated **-** A wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
END Endangered - A wildlife species that is facing imminent extirpation or Extinction.
THR Threatened - A wildlife species that is likely to become Endangered if nothing is done to reverse the factors leading to its extirpation or Extinction.
SC Special Concern - A wildlife species that may become a Threatened or an Endangered species because of a combination of biological characteristics and identified threats.

Schedule 1: is the official list of species that are classified as Extirpated, Endangered, Threatened and Special Concern.
Schedule 2: species listed in Schedule 2 are species that had been designated as Endangered or Threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3: species listed in Schedule 3 are species that had been designated as Special Concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

The Act establishes Schedule 1 as the official list of wildlife species at risk. However, please note that while Schedule 1 lists species that are Extirpated, Endangered, Threatened and Special Concern, the prohibitions do not apply to species of Special Concern.

Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Wildlife Species at Risk.

[6] Regional Status

Halton Region
From : Halton Natural Areas Inventory (Dwyer 2006)

Dwyer, J. K.. (Ed.) 2006. Halton Natural Areas Inventory. 2006: Volume 2 Species Checklists.

A = Abundant >125 Stations
C = Common 36-125 Stations
U = Uncommon 15-35 Stations
R= Rare < 15 Stations
E = Extirpated no longer present in Halton Region
I = Introduced an introduced species not native to Ontario
Uncertain = Uncertain if species is present in Halton Region
LS = Locally Significant
M = Migration

[8] Habitat Use
I=interior species, I/E=interior edge species, E=edge species (Freemark and Collins, 1989); M/F=Marsh/Fen, S/B=Treed Swamp/Bog. Interior bird species require habitat which is often found 100m from the forest edge while Interior/Edge species are found within both interior and edge habitat. Often Interior and Interior/Edge are more sensitive to urban encroachment as they require these large, relatively undisturbed forest habitats to support viable populations. The increasing urbanization of rural areas often results in increased parasitism and predation as well as disturbance from human recreational activities (e.g. illegal bike trails, dumping and pets.) (Freemark, K. and Collins, B. 1989. *Landscape ecology of birds breeding in temperate forest fragments*. – In: Hagan III, J. M. and Johnston, D. W. (eds), Ecology and conservation of neotropical migrant landbirds. Smithsonian Inst. Press, pp. 443–454)

[9] Area Sensitive Species
Area Sensitivity is defined as species requiring large areas of suitable habitat in order to sustain population numbers

From: Ministry of Natural Resources and Forestry. 2015. Significant Wildlife Habitat Criteria Schedules For Ecoregion 7E. January, 2015. Regional Operations Division, Southern Region Resources Section. 41pp.

[10] Protected under MBCA
Species protected under the federal Migratory Birds Convention Act, 1994.

From: Environment and Climate Change Canada. 2021. Birds Protected in Canada: https://www.canada.ca/en/environment-climate-change/services/migratory-birds-legal-protection/list.html

Ontario Breeding Bird Atlas - Breeding Evidence Codes

OBSERVED (OBS)

X Species observed in its breeding season (no breeding evidence).

POSSIBLE (POSS)

H Species observed in its breeding season in suitable nesting habitat.

S Singing male(s) present, or breeding calls heard, in suitable nesting habitat in breeding season.

PROBABLE (PROB)

P Pair observed in suitable nesting habitat in nesting season.

T Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two days, a week or more apart, at the same place.

D Courtship or display, including interaction between a male and a female or two males, including courtship feeding or copulation.

V Visiting probable nest site

A Agitated behaviour or anxiety calls of an adult.

B Brood Patch on adult female or cloacal protuberance on adult male.

N Nest-building or excavation of nest hole.

CONFIRMED (CONF)

DD Distraction display or injury feigning.

NU Used nest or egg shells found (occupied or laid within the period of the survey).

FY Recently fledged young (nidicolous species) or downy young (nidifugous species), including incapable of sustained flight.

AE Adult leaving or entering nest sites in circumstances indicating occupied nest.

FS Adult carrying fecal sac.

CF Adult carrying food for young.

NE Nest containing eggs.

NY Nest with young seen or heard.

Table 3b.1: Potential Maternity Roost Trees for Little Brown Bat / Northern Myotis (Cavity Tree)

Snag Description								UTM		Comments	Trees Retained or Removed
Tree Number	Species	DBH (cm)	Tree Height Class	Cavities / Loose Bark	Decay Class 1-3 (Yes / No)	Other Snag within 10m (Yes / No)	Max. Cavity / Loose Bark Height (m)	Easting	Northing		
1	Ash	42	2	Split in trunk, cavity 8m up	Yes		8	588315	4817942	Cavity has nest material (likely used by bird)	
2	Ash	28	3	Loose bark (small amount), 7m up	Yes		NA	588330	4817960		
3	Ash	26	2	Knothole (small 5x5cm), 7m up	Yes		7	588341	4817941		
4	Ash	30	2	Knothole 2m up	Yes		2	588349	4817897		
5	Ash	28	3	Loose bark, 6m up	Yes		NA	588357	4817900		
6	Ash	31	2	Loose bark, 6m up	Yes		NA	588342	4817867		
7	Ash	35	2	Knothole, 10m up	Yes		10	588317	4817858		
8	Ash	30	2	Loose bark (large amount), 8m up	Yes		NA	588314	4817839		
9	Ash	31	4	Loose bark, 3-6m up	No		NA	588319	4817808	Tree has fallen over / leaning against another tree	
10	Ash	28	2	Loose bark, 8m up	Yes		NA	588322	4817803		
11	Ash	36	2	Loose bark, 6m up	Yes		NA	588338	4817762		
12	Ash	44	2	Loose bark, 4-5m up	Yes		NA	588328	4817768		
13	Populus sp.	45	1	4 Woodpecker holes, 7-8m up	No		8	588253	4817916		

Snag Description								UTM		Comments	Trees Retained or Removed
Tree Number	Species	DBH (cm)	Tree Height Class	Cavities / Loose Bark	Decay Class 1-3 (Yes / No)	Other Snag within 10m (Yes / No)	Max. Cavity / Loose Bark Height (m)	Easting	Northing		
14	Unknown Deciduous	38	4	Woodpecker hole, 3m up	No		3	588567	4818046		
15	Basswood	39, 38	2	2 Knotholes, 2 and 4m up	Yes		4	588593	4818025		
16	Populus sp.	30	2	Loose bark 2-5m up	No		NA	588676	4818285		
17	Populus sp.	40	1	Loose bark, 6 - 8m up	No		NA	588686	4818405		
18	Populus sp.	50	3	woodpecker hole, 9m up	No		9	588692	4818407		
19	Populus sp.	42	2	2 Woodpecker holes, 10-11m up	No		11	588728	4818417		
20	Populus sp.	50	1	Loose bark, 12m up	Yes		NA	588738	4818427		
21	Willow	110	2	Crack, 7m up	Yes		7	588639	4818437		
22	Sugar Maple	80	1	Knothole, 12m up	Yes		12	588665	4818452	Also potential Tri-coloured Bat habitat	
T6	Bur Oak	100	1	Cavities / Long Split, 2-8m up	Yes		8	588646	4817972	Also potential Tri-coloured Bat habitat	
T14	Sugar Maple	38	3	Knothole 5m up	Yes		5	588701	4817918	Also potential Tri-coloured Bat habitat	
T18	Sugar Maple	56	2	2 Knotholes (1 large 10x10cm), 6-7m up	Yes		7	588702	4817905	Also potential Tri-coloured Bat habitat	

Table 3b.2: Potential Maternity Roost Trees for Tri-coloured Bat

Snag Description								UTM		Comments	Trees Retained or Removed
Tree Number	Species	Tree Status (Live / Dead)	DBH (cm)	Dead / Dying Leaf Clusters (Yes / No)	Cavities (Yes / No)	Other Snag within 10m (Yes / No)	Location (Open / Forest Edge / Interior)	Easting	Northing		
T1	Bur Oak	Live	45	No	No		Edge	588615	4818017		
T2	Bur Oak	Live	34	No	No		Edge	588628	4818010		
T3	Bur Oak	Live	36	No	No		Edge	588639	4818007		
T4	Bur Oak	Live	33	No	No		Edge	588638	4818005		
T5	Bur Oak	Live	40	Yes	No		Edge	588638	4817994		
T6	Bur Oak	Live	100	No	Yes		Edge	588648	4817974	Also potential Little Brown/Northern Myotis habitat	
T7	Bur Oak	Live	25	No	No		Edge	588669	4817971		
T8	Bur Oak	Live	23	No	No		Edge	588668	4817970		
T9	Bur Oak	Live	32	No	No		Edge	588682	4817955		
T10	Bur Oak	Live	45	No	No		Edge	588680	4817940	Edge of larger forest area	
T11	Bur Oak	Live	49	No	No		Edge	588674	4817936	Edge of larger forest area	
T12	Bur Oak	Live	62	No	No		Edge	588684	4817940		
T13	Bur Oak	Live	62	No	No		Edge	588695	4817921	Pink spray paint on tree	
T14	Sugar Maple	Live	38	No	Yes		Edge	588701	4817918	Also potential Little Brown/Northern Myotis habitat	
T15	Bur Oak	Live	48	Yes	No	Yes	Edge	588705	4817916	Dead leaf cluster, 14m up	

Snag Description								UTM		Comments	Trees Retained or Removed
Tree Number	Species	Tree Status (Live / Dead)	DBH (cm)	Dead / Dying Leaf Clusters (Yes / No)	Cavities (Yes / No)	Other Snag within 10m (Yes / No)	Location (Open / Forest Edge / Interior)	Easting	Northing		
T16	Bur Oak	Live	38	No	No	Yes	Edge	588707	4817914		
T17	Bur Oak	Live	44	No	No	Yes	Edge	588707	4817911		
T18	Sugar Maple	Live	56	No	No		Edge	588702	4817905	2 Knotholes, 6-7m up	
T19	Manitoba Maple	Live	40	No	No		Open	588607	4818326	Lawn Tree	
T20	Red Oak	Live	58	No	No		Open	588683	4818385	Planted tree in lawn	
T21	Soft Maple Sp.	Live	41	No	No		Edge	588701	4818401	Edge of riparian zone	
T22	Soft Maple Sp.	Live	44	Yes	No		Open	588727	4818398	Dead leaf cluster, 8m up; Planted tree in lawn	
T23	Soft Maple Sp.	Live	61	Yes	No		Open	588717	4818387	Stick/leaf cluster 7m up; Planted tree in lawn	
T24	Soft Maple Sp.	Live	33	No	No		Open	588711	4818380	Planted tree in lawn	
T25	Soft Maple Sp.	Live	48	No	No		Open		4818370	Planted tree in lawn	
T26	Soft Maple Sp.	Live	33	No	No		Edge	588643	4818425	Edge of riparian zone	

Table 3 LEGEN

Tree Height Rank	
Relative Height	*Rank*
+5+ m	7
+3-4m	6
+1-2m	5
=	4
-1-2m	3
-3-4m	2
-5+m	1

DBH Rank	
DBH	*Rank*
>70cm	6
61-70cm	5
50-60cm	4
40-49cm	3
30-39cm	2
<30cm	1

Snag Density Rank	
Proximity to other Snags	*Rank*
clustered	1
not clustered	0

Cavity Height Rank	
Cavity Height	*Rank*
>10m	1
<10m	0

Decay Class Rank	
Decay Class	*Rank*
1	1
2	1
3	1
>3	0

Weighted Rank Outcomes	
Value	*Snag Suitability*
13-15	Very Good
10-13	Good
8-10	Moderate
<8	Poor

Table 4: SAR Screening Assessment

Species At Risk Designations
ENDANGERED
THREATENED
SPECIAL CONCERN
EXTIRPATED

Species	ESA Status[1] and Regional Occurrence	ESA Protection[2]	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence in Study Area	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
Amphibians								
Jefferson Salamander (Ambystoma jeffersonianum)	END	Species Protection and Habitat Regulation	NDMNRF Website (Halton Region, 2021)	Inhabit deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs (MNRF Guelph - Waterloo List, 2014)	**None** - No suitable vernal pool breeding habitat present; records for this region are outside the study area (Kelso Conservation Area and other Escarpment forests). Minimal potential in Feature #5a south of the proposed alignment (deciduous forest with potential for vernal pools; this feature is isolated by surrounding agricultural fields and residential development).	General Wildlife and Habitat Assessment (June-July 2017)	Not recorded	**None** - no suitable habitat within study area.
Birds								
Acadian Flycatcher (Empidonax virescens)	END	Species and General Habitat Protection	OBBA (2001-2005)	Generally requires large areas of mature, undisturbed forest; avoids the forest edge; often found in well wooded swamps and ravines (MNRF Guelph - Waterloo List, 2014)	**None** - Wooded habitats in the study area are relatively small and immature to semi-mature. This species requires large tracts of mature forest. No known records in study area.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area
Bank Swallow (Riparia riparia)	THR	Species and General Habitat Protection	OBBA (2001-2005)	It nests in a wide variety of naturally and anthropogenically created vertical banks, which often erode and change over time including aggregate pits and the shores of large lakes and rivers (MNRF Guelph - Waterloo List, 2014)	**Moderate** - Likely to occur as foraging visitant over cultural meadow and agricultural fields throughout the study area; low potential for breeding habitat in various construction areas with steep-sloped soil piles	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**Minimal** - Unlikely to impact foraging habitat availability (abundant in local landscape); impacts on potential breeding habitat can be avoided through implementation of recommended mitigation measures (maintain slope of less than 70° for soil piles/excavation sites)
Barn Swallow (Hirundo rustica)	THR	Species and General Habitat Protection	NDMNRF Correspondence (Aug. 28, 2017)	prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc. (MNRF Guelph - Waterloo List, 2014)	**High** - Known to occur as foraging visitant over cultural meadow and agricultural fields throughout the study area; potential for breeding habitat in culverts / overpasses in study area	Breeding Bird Surveys (June-July 2017, June 2018)	2 nests observed in culvert at 16 Mile Creek Tributary crossing; foarging individuals in cultural meadow fields	**Minimal** - If works are required at the nesting location, impacts to nesting habitat will be mitigated through installation of replacement nest cups and activity timing windows. Unlikely to impact foraging habitat availability (abundant in local landscape).
Bobolink (Dolichonyx oryzivorus)	THR	Species and General Habitat Protection	NDMNRF Correspondence (Aug. 28, 2017)	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands (MNRF Guelph - Waterloo List, 2014)	**Minimal** - Records of occurrence within vicinity of study area (MNRF Correspondence); however, potential habitat in the cultural meadow area south of rail corridor was assessed and found to be low suitability due to the abundance of bare / unvegetated ground; other cultural meadow areas are not suitable (corn fields, manacured lawns).	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**Minimal** - In-season surveys to assess potential breeding habitat may be required to determine impacts. The suitability of the potential habitat area south of rail corridor appears to be low, due to abundance of bare ground
Canada Warbler (Cardellina canadensis)	SC	N/A	Conservation Halton Website - SAR (2021)	Generally prefers wet coniferous, deciduous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest (MNRF Guelph - Waterloo List, 2014)	**None** - very limited potential habitat is present in the study area (i.e. relatively small forests lacking dense shrub layer), no records within vicinity of study area.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area
Cerulean Warbler (Setophaga cerulea)	THR	Species and General Habitat Protection	MNRF Website (Halton Region, 2021)	Generally found in mature deciduous forests with an open understory; also nests in older, second-growth deciduous forests (MNRF Guelph - Waterloo List, 2014)	**None** - Wooded habitats in the study area are relatively small and immature to semi-mature. This species requires large tracts of mature forest. No known records in study area.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area
Chimney Swift (Chaetura pelagica)	THR	Species and General Habitat Protection	OBBA (2001-2005)	Historically found in deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys (MNRF Guelph - Waterloo List, 2014)	**Moderate** - Likely to occur as foraging visitant over cultural meadow and riparian corridor within study area; no suitable nesting habitat (un-capped chimneys) identified within study area.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**Minimal** - Unlikely to impact foraging habitat availability or foraging individuals; no known breeding records within study area.

Table 4: SAR Screening Assessment

Species	ESA Status[1] and Regional Occurrence	ESA Protection[2]	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence in Study Area	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
Common Nighthawk (Chordeiles minor)	SC	N/A	Conservation Halton Website - SAR (2021)	Generally prefer open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops) (MNRF Guelph - Waterloo List, 2014)	**Moderate** - suitable habitat (i.e. open, vegetation-free habitat) is present south of the rail corridor (Unit 13 CUM1-1)	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded (note: targeted crepuscular bird surveys were not completed)	**Minimal** - In-season/targeted surveys to assess potential breeding habitat may be required to determine impacts. The suitability of the potential habitat area south of rail corridor appears to be good, due to abundance of bare ground, however, impacts can be mitigated with construction timing windows and MBCA due diligence nest searches
Eastern Meadowlark (Sturnella magna)	THR	Species and General Habitat Protection	NDMNRF Correspondence (Aug. 28, 2017)	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps (MNRF Guelph - Waterloo List, 2014)	**Minimal** - Records of occurrence within vicinity of study area (MNRF Correspondence); however, potential habitat in the cultural meadow area south of rail corridor was assessed and found to be low suitability due to the abundance of bare / unvegetated ground; other cultural meadow areas are not suitable (corn fields, manacured lawns).	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**Minimal** - In-season surveys to assess potential breeding habitat may be required to determine impacts. The suitability of the potential habitat area south of rail corridor appears to be low, due to abundance of bare ground
Eastern Wood-pewee (Contopus virens)	SC	N/A	OBBA (2001-2005)	Associated with deciduous and mixed forests. Within mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges (MNRF Guelph - Waterloo List, 2014)	**High -** Likely to in moderate sized woodland habitats, including the deciduous forest in central portion of study area	Breeding Bird Surveys (June-July 2017, June 2018)	Possible breeding evidence recorded in WSU 3 (ELC Unit 1b) and WSU 8 (ELC Unit 11)	**Minimal** - In-season surveys to assess potential breeding habitat may be required to determine impacts. The proposed works may impact a relatively small portion of the wooded area and breeding populations are unlikely to be impacted.
Golden-winged Warbler (Vermivora chrysoptera)	SC	N/A	OBBA (2001-2005)	Generally prefer areas of early successional vegetation, found primarily on field edges, hydro or utility right-of-ways, or recently logged areas (MNRF Guelph - Waterloo List, 2014)	**None -** Potential to occur as migrant visitant (adjacent escarpment corridor); however, no suitable breeding habitats (large areas of early successional vegetation, hydro / utility ROW) or breeding records are present within study area.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Henslow's Sparrow (Ammodramus henslowii)	END	Species and General Habitat Protection	NDMNRF Website (Halton Region, 2021)	Generally found in old fields, pastures and wet meadows. They prefer areas with dense, tall grasses, and thatch, or decaying plant material (MNRF Guelph - Waterloo List, 2014)	**N**one - although areas of cultural meadow are present, the potential features in the study area are recently fallow agriculture fields or manicured lawns that lack dense tall grass and thatch; this species is extremely rare in southern Ontario.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Least Bittern (Ixobrychus exilis)	THR	Species and General Habitat Protection	NDMNRF Website (Halton Region, 2021)	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants (MNRF Guelph - Waterloo List, 2014)	**None** - No suitable habitat and no known records in study area; marsh habitat within study area is limited to small culturally influenced areas (~ 1 ha in size)	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Loggerhead Shrike (Lanius ludovicianus)	END	Species and General Habitat Protection	NDMNRF Website (Halton Region, 2020)	Generally prefer a combination of pasture or other grassland with scattered low trees and shrubs. They build their nests in small trees or shrubs (MNRF Guelph - Wellington List, 2015).	**None** - Limited suitable habitat within study area and current geographic distribution of this species is outside the Region (OBBA 2007)	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Louisiana Waterthrush (Parkesia motacilla)	SC	N/A	NDMNRF Website (Halton Region, 2021)	Generally inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps (MNRF Guelph - Waterloo List, 2014)	**None** - Suitable habitat (steeply sloped, forested ravines) is not present within study area; no known records within study area.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Olive-sided Flycatcher (Contopus cooperi)	SC	N/A	Conservation Halton Website - SAR (2021)	Generally prefers natural forest edges and openings adjacent to rivers or wetlands. Commonly nest in conifers such as White and Black Spruce, Jack Pine and Balsam Fir. (MNRF Guelph - Wellington List, 2015)	**None** - although marginal potential habitat (i.e. forest edges and openings adjacent to rivers or wetlands) is present, this species is very rare in the region and only known to occur in larger forested areas (i.e. Halton Region Forest to the west)	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Peregrine Falcon anatum/tundrius (Falco peregrinus anatum/tundrius)	SC	N/A	NDMNRF Website (Halton Region, 2017)	Generally nest on tall, steep cliff ledges adjacent to large waterbodies; some birds adapt to urban environments and nest on ledges of tall buildings, even in densely populated downtown areas (MNRF Guelph - Waterloo List, 2014)	**None -** Potential to occur as migrant / foraging visitant (from adjacent escarpment area); suitable breeding habitat (tall buildings or rock ledges) is not present within study area	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area

Table 4: SAR Screening Assessment

Species	ESA Status[1] and Regional Occurrence	ESA Protection[2]	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence in Study Area	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
Prothonotary Warbler (Protonotaria citrea)	END	Species and General Habitat Protection	NDMNRF Website (Halton Region, 2017)	Generally found in the dead trees of flooded woodlands or deciduous swamp forests; Carolinian Zone (MNRF Guelph - Hamilton List, 2013)	**None -** Suitable breeding habitat (large, mature deciduous swamp forests) is not present within study area; no known records within study area.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Red-headed Woodpecker (Melanerpes erythrocephalus)	SC	N/A	Conservation Halton Website - SAR (2021)	Generally prefer open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks (MNRF Guelph - Waterloo List, 2014)	**Minimal** - although potential habitat (i.e. forest edges, riparian forests, roadsides, urban parks) is present, this species is locally uncommon and unlikely to occur based on the lack of records in the vicinity of the study area.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Short-eared Owl (Asio flammeus)	SC	N/A	Conservation Halton Website - SAR (2021)	Generally prefers a wide variety of open habitats, including grasslands, peat bogs, marshes, sand-sage concentrations, old pastures and agricultural fields (MNRF Guelph - Waterloo List, 2014)	**Minimal** - although potential habitat (i.e. open areas, agricultural fields) is present, this species is locally rare and unlikely to occur based on the lack of records in the vicinity of the study area. Also potential for winter foraging habitat over cultural meadow areas.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Eastern Whip-poor-will (Caprimulgus vociferus)	THR	Species and General Habitat Protection	Conservation Halton Website - SAR (2021)	Generally prefer semi-open deciduous forests or patchy forests with clearings; areas with little ground cover are also preferred; In winter they occupy primarily mixed woods near open areas (MNRF Guelph - Waterloo List, 2014)	**None** - no semi-open / patchy forests of suitable size in study area and this species is locally rare with no records in the vicinity of the study area.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Wood Thrush (Hylocichla mustelina)	SC	N/A	NDMNRF Correspondence (Aug. 28, 2017)	Nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Prefers large forest mosaics, but may also nest in small forest fragments (MNRF Guelph - Waterloo List, 2014)	**Moderate -** Some potential to occur in moderate sized woodland habitats, including the deciduous forest in central portion of study area	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**Minimal** - In-season surveys to assess potential breeding habitat may be required to determine impacts. The proposed works may impact a relatively small portion of the wooded area and breeding populations are unlikely to be impacted.
Yellow-breasted Chat (Icteria virens)	END	Species and General Habitat Protection	Conservation Halton Website - SAR (2021)	Generally prefer dense thickets around wood edges, riparian areas, and in overgrown clearings (MNRF Guelph - Waterloo List, 2014)	**None** - although potential habitat (i.e. dense thickets around wood edges, riparian areas) is present, this species is locally rare with no records in the vicinity of the study area.	Breeding Bird Surveys (June-July 2017, June 2018)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Fish								
American eel (Anguilla rostrata)	END	Species and General Habitat Protection	Conservation Halton Website - SAR (2021)	All fresh water, estuaries and coastal marine waters that are accessible to the Atlantic Ocean; 12 Mile Creek Watershed and Lake Ontario (MNRF Guelph - Hamilton List 2013)	**High** - MECP considers Sixteen Mle as 'Occupied Habitat' for this species. Other watercourses within the study area are considered 'contribtuting habitat'	General Fish and Aquatic Habitat Assessment (2017-2019)	Not recorded	**Minimal** - potential temproary bioengineering works may be required on the banks of Sixteen mile Creek at the crossing site, but no impacts anticipated with use of stringent mitigation mearures.
Bridle Shiner (Notropis bifrenatus)	SC	N/A	NDMNRF Correspondence (Aug. 28, 2017)	Prefers clear, unpolluted streams, rivers and lakes with an abundance of aquatic vegetation, warm water, and sand, silt or organic substrates (MNRF Species Profile Online)	**Low to moderate** - NDMNRF has indicated that there are records of Bridle Shiner in the vicinity of the study area	General Fish and Aquatic Habitat Assessments (2017-2019)	Not recorded	**Minimal** - Potential habitat in Tributary NW-1-E, but only downstream (north) of Steele Ave.. Culvert works are well upstream of Steeles Ave. and any indirect impacts can be addressed with mitigation measures.
Lake Sturgeon (Great Lakes-Upper St. Lawrence) (Acipenser fulvescens)	THR	Species and General Habitat Protection	NDMNRF Website (Halton Region, 2021)	Freshwater lakes and rivers with soft bottoms of mud, sand or gravel at depths of five to 20 m. Spawning usually occurs in shallow, fast flowing water below dams, waterfalls or rapids with gravel and boulders (MNRF Species Profile Online 2014).	**None** - no records of this species in the area or indication from NDMNRF and MECP.	General Fish and Aquatic Habitat Assessments (2017-2019)	Not recorded	**None** - no suitable habitat within study area and no known records within study area
Northern Sunfish (Lepomis pelastes)	SC	N/A	NDMNRF Website (Halton Region, 2021)	Shallow vegetated areas of quiet, slow flowing rivers and streams, as well as warm lakes and ponds, with sandy banks or rocky bottoms. Northern Sunfish prefer to be near aquatic vegetation where they can avoid strong currents.	**Low** - this species is shown on DFO SAR SAR mapping as being "found or potentially found" in the study area watercourses however MECP has noted that reocrds fo this species are historical.	General Fish and Aquatic Habitat Assessment (2017-2019)	Not recorded	**Minimal** - Potential habitat in Tributary NW-1-E, but only downstream (north) of Steele Ave.. Culvert works are well upstream of Steeles Ave. and any indirect impacts can be addressed with mitigation measures.

Table 4: SAR Screening Assessment

Species	ESA Status[1] and Regional Occurrence	ESA Protection[2]	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence in Study Area	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
Redside Dace (Clinostomus elongatus)	END	Species Protection and Habitat Regulation	NDMNRF Website (Halton Region, 2021)	Generally found in pools and slow-moving areas of small headwater streams with a moderate to high gradient (MNRF Guelph - Hamilton List, 2013).	**Low** - watercourses within the study area are considered 'contribtuting habitat' only according to NDMNRF and MECP.	General Fish and Aquatic Habitat Assessments (2017-2019)	Not recorded	**Minimal** - Any indirect construction impacts can be addressed with mitigation measures
Silver Shiner (Notropis photogenis)	THR	Species and General Habitat Protection	NDMNRF Website (Halton Region, 2021)	Generally prefer moderate to large, deep, relatively clear streams with swift currents, and moderate to high gradients (MNRF Guelph - Waterloo List, 2014)	**Low** - the habitat withint the study area is lacking some of the preferred habitat of this species (e.g., watercourses 30 to 100 m in width with deep areas). Also a lack of records of this species in the area from NDMNRF and MECP.	General Fish and Aquatic Habitat Assessments (2017-2019)	Not recorded	**Minimal -** study area does not contain preferred habitat and no known records within study area.
Insects								
Yellow-banded Bumblebee (Bombus terricola)	SC	N/A	INaturalist (2021)	This species is a forage and habitat generalist, able to use a variety of nectaring plants and environmental conditions. It can be found in mixed woodlands, particularly for nesting and overwintering, as well as a variety of open habitat such as native grasslands, farmlands and urban areas. Nest sites are often underground in abandoned rodent burrows or decomposing logs (SARO List Website 2019).	**Moderate -** a forage and habitat generalist and suitable habitat is present within the study area (open habitat such as farmland and urban areas). 2021 iNaturalist record of a Yellow-banded Bumblebee 1.7 km west of the study area.	General Wildlife and Habitat Assessment (2017-2018)	Not recorded	**Minimal** - species is a habitat generalist with abundant suitable habitat in the regional landscape; therefore, proposed removals are unlikely to impact habitat availability.
Monarch (Danaus plexippus)	SC	N/A	NDMNRF Correspondence (Aug. 28, 2017)	Exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces (MNRF Guelph - Waterloo List, 2014)	**High** - likely to occur as foraging / migrant visitant in cultural meadow or riparian corridors	General Wildlife and Habitat Assessment (2017-2018)	One individual observed foraging / moving through WSU 5 (ELC Unit 3a / 4a).	**Minimal** - no areas with high concentrations of Milkweed vegetation were identifed; abundant suitable foraging / dispersal habitat will remain available post-construction; areas of temporary disturbance will be restored and / or naturally regenerate.
Rusty-patched Bumble Bee (Bombus affinis)	END	Species and General Habitat Protection	NDMNRF Website (Halton Region, 2021)	Generally inhabits a range of diverse habitats including mixed farmland, sand dunes, marshes, urban and wooded areas. It usually nests underground in abandoned rodent burrows (MNRF Guelph - Waterloo List, 2014)	**Minimal** - Known to occur in a variety of habitats; no known records in study area	General Wildlife and Habitat Assessment (2017-2018)	Not recorded	**None** - unlikely to occur within study area and abundant potential habitat will remain available throughout the study area following construction
West Virginia White (Pieris virginiensis)	SC	N/A	Conservation Halton Website - SAR (2021)	Generally prefer moist, deciduous woodlands. The larvae feed only on the leaves of the two-leaved toothwort (Cardamine diphylla), which is a small, spring-blooming plant of the forest floor (MNRF Guelph - Waterloo List, 2014)	**Minimal** - Limited suitable habitat is present (i.e moist woodland) and two-leaved toothwort was not recorded. In addition, West Virginia White prefers unfragmented forest blocks.	General Wildlife and Habitat Assessment (2017-2018)	Not recorded	**Minimal** - very little of the forest is proposed for removal. No known records within the study area (however, can be confused with other white butterfly species) and no observations during surveys. Habitat is marginal (i.e. fragmented, two-leaved toothwort not recorded but potentially nearby within flight distance of adults).
Mammals								
Small-footed Bat (Myotis leibii)	END	Species and General Habitat Protection	NDMNRF Correspondence (Aug. 28, 2017)	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses and under tree bark (MNRF Guelph - Waterloo List, 2014)	**Minimal** - Low potential to occur as foraging visitant. Trees with loose tree bark may be found within forested areas in the study area (known to occasionally use this type of habitat); however, the primary habitat (loose/exposed rock outcrops) is not present and there are no known records in study area.	General Wildlife and Habitat Assessment (2017)	Not recorded (acoustic monitoring / exit surveys not completed)	**Minimal** - Unlikely to impact foraging habitat availability or foraging individuals, and marginal quality roosting habitat will remain available throughout the study area following construction
Little Brown Bat (Little Brown Myotis) (Myotis lucifugus)	END	Species and General Habitat Protection	NDMNRF Correspondence (Aug. 28, 2017)	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh) (MNRF Guelph - Waterloo List, 2014)	**Moderate** - Likely to occur as foraging visitant over cultural meadow and riparian areas, moderate potential for maternity roost habitat in cavity trees within the riparian forest	General Wildlife and Habitat Assessment (2017)	Not recorded (acoustic monitoring / exit surveys not completed)	**Moderate** - potential impacts to maternity roost habitat in cavity trees within the riparian forest may require further investigation (acoustic monitoring surveys); potential impacts can be mitigated through timing windows for tree removals
Northern Long-eared Bat (Northern Myotis) (Myotis septentrionalis)	END	Species and General Habitat Protection	NDMNRF Correspondence (Aug. 28, 2017)	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Often associated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.)(MNRF Guelph - Waterloo List, 2014)	**Moderate** - Likely to occur as foraging visitant over cultural meadow and Rouge River, moderate potential for maternity roost habitat in cavity trees within the riparian forest	General Wildlife and Habitat Assessment (2017)	Not recorded (acoustic monitoring / exit surveys not completed)	**Moderate** - potential impacts to maternity roost habitat in cavity trees within the riparian forest may require further investigation (acoustic monitoring surveys); potential impacts can be mitigated through timing windows for tree removals

Table 4: SAR Screening Assessment

Species	ESA Status[1] and Regional Occurrence	ESA Protection[2]	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence in Study Area	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
Tri-colored Bat (Perimyotis subflavus)	**END**	Species and General Habitat Protection	NDMNRF Correspondence (Aug. 28, 2017)	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Manmade structures or tree cavities. Foraging over still water, rivers, or in forest gaps (COSEWIC 2013f)	**Minimal** - Low potential to occur as foraging visitant. Although potential roosting habitat is present within Sugar Maple and other wooded portions of the study area, this species is uncommon in Southern Ontario and unlikely to occur in the Region; no known records in study area.	General Wildlife and Habitat Assessment (2017)	Not recorded (acoustic monitoring / exit surveys not completed)	**Minimal** - Species is unlikely to occur within the study area, and the proposed works are unlikely to impact foraging habitat availability or foraging individuals
Woodland Vole (Microtus pinetorum)	SC	N/A	Halton Region SAR List (NDMNRF, 2021)	Generally associated with deciduous forests in areas of soft, friable, often sandy soil beneath deep humus, where it can burrow easily (MNRF Guelph - Hamilton List, 2013)	**None -** Suitable habitat (deciduous forest with sandy soils) is not present within study area. No known records in study area.	General Wildlife and Habitat Assessment (2017)	Not recorded	**None** - no suitable habitat within study area
Plants								
American Columbo (Frasera caroliniensis)	END	Species and General Habitat Protection	Halton Region SAR List (NDMNRF, 2021)	Most commonly associated with open deciduous forested slopes, thickets and clearings; grows in a variety of relatively stable habitats as well as on a wide variety of soils (MNRF Guelph - Hamilton List, 2013).	**Moderate** - Suitable habitat is present in the study area (i.e. forests, thickets, clearings)	ELC and Vegetation Assessment (July 2017)	Not recorded	**Minimal** - Unlikely to occur in the study area. No known records within the study area and not encountered during field surveys.
Butternut (Juglans Cinerea)	END	Species and General Habitat Protection	Conservation Halton Website - SAR (2021)	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldomly, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows (MNRF Guelph - Waterloo List, 2014).	**Moderate** - Suitable habitat is present in the study area (i.e. along streams, and in forests and hedgerows).	ELC and Vegetation Assessment (July 2017), Tree Inventory (October 2020)	One sapling recorded along Sixteen Mile Creek (Unit 1b)	**Potetially High -** The preferrred alignment could be within 50 m. To be further assessed at detailed design.
Broad Beech Fern (Phegopteris hexagonoptera)	SC	N/A	Halton Region SAR List (NDMNRF, 2021)	Generally inhabits shady areas of beech and maple forests where the soil is moist or wet (MNRF Guelph - Hamitlon List, 2013).	**None** - no suitable habitat within the study area (i.e. beech and maple forest)	ELC and Vegetation Assessment (July 2017)	Not recorded	**None** - No known records within the study area and not encountered during field surveys.
American Chestnut (Castanea dentata)	END	Species and General Habitat Protection	Halton Region SAR List (NDMNRF, 2021)	Found in deciduous forest communities; this tree prefers arid forests with acid and sandy soils (MNRF Guelph - Waterloo List, 2014).	**None** - no suitable habitat within the study area (i.e. arid sandy deciduous forest)	ELC and Vegetation Assessment (July 2017)	Not recorded	**None** - No known records within the study area and not encountered during field surveys.
Hart's-tongue Fern (Asplenium scolopendrium)	SC	N/A	Halton Region SAR List (NDMNRF, 2021)	Grows on calcareous rocks in deep shade on slopes in deciduous forest. Most Ontario occurrences are in maple-beech forest. Established plants can grow in exposed, rocky crevices and on outcrops, but moist, mossy areas seem to be essential for spore germination and early plant development (MNRF Species Profile Online 2014).	**None** - no suitable habitat within the study area (i.e. rocky outcrops in maple-beech forest)	ELC and Vegetation Assessment (July 2017)	Not recorded	**None** - No known records within the study area and not encountered during field surveys.
Dense Blazing Star (Liatris spicata)	THR	Species and General Habitat Protection	Halton Region SAR List (NDMNRF, 2021)	In Ontario, Dense Blazing Star grows in moist prairies, grassland savannahs, wet areas between sand dunes, and abandoned fields. This plant does not do well in the shade and is usually found in areas that are kept open and sunny by fire, floods, drought, or grazing (MNRF Species Profile Online 2014).	**Minimal** - habitat within the study area is limited to abandoned fields	ELC and Vegetation Assessment (July 2017)	Not recorded	**Minimal** - Unlikely to occur in the study area. No known records within the study area and not encountered during field surveys. This is a showy species that is unlikely to escape detection.
Eastern Flowering Dogwood (Cornus florida)	END	Species Protection and Habitat Regulation	Halton Region SAR List (NDMNRF, 2021)	Generally grows in deciduous and mixed forests, in the drier areas of its habitat, although it is occasionally found in slightly moist environments; Also grows around edges and hedgerows (MNRF Guelph - Waterloo List, 2014).	**Moderate** - Suitable habitat is present in the study area (i.e. forests, edges, hedgerows)	ELC and Vegetation Assessment (July 2017)	Not recorded	**Minimal** - Unlikely to occur in the study area. No known records within the study area and not encountered during field surveys. This is a showy species that is unlikely to escape detection.

Table 4: SAR Screening Assessment

Species	ESA Status[1] and Regional Occurrence	ESA Protection[2]	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence in Study Area	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
Hoary Mountain-mint (Pycnanthemum incanum)	END	Species and General Habitat Protection	Halton Region SAR List (NDMNRF, 2021)	Oak savannahs and prairies (MNRF Guelph - Hamilton List, 2013)	**None** - no suitable habitat within the study area (i.e. oak savannah, prairie)	ELC and Vegetation Assessment (July 2017)	Not recorded	**None** - No known records within the study area and not encountered during field surveys.
Red Mulberry (Morus rubra)	END	Species and General Habitat Protection	Halton Region SAR List (NDMNRF, 2021)	Generally grows in moist forest habitats. In Ontario, these include slopes and ravines of the Niagara Escarpment, and sand spits and bottom lands; can grow in open areas such as hydro corridors (MNRF Guelph - Hamilton List, 2013).	**Moderate** - Suitable habitat is present in the study area (i.e. forest)	ELC and Vegetation Assessment (July 2017)	Not recorded	**Minimal** - Unlikely to occur in the study area. No known records within the study area and not encountered during field surveys.
American Ginseng (Panax quinquefolius)	END	Species and General Habitat Protection	Previous staff surveys in Halton	Grows in rich, moist, undisturbed and relatively mature deciduous woods in areas of neutral soil (such as over limestone or marble bedrock)(MNRF Guelph - Waterloo List, 2014).	**Minimal** - Marginal suitable habitat is present in the study area (i.e. forest), however, forest is not rich, and does not contain typical associate tree species and bedrock conditions typical for locations within Halton.	ELC and Vegetation Assessment (July 2017)	Not recorded	**Minimal** - Unlikely to occur in the study area. No known records within the study area and not encountered during field surveys.
Reptiles								
Blanding's Turtle (Emydoidea blandingii)	THR	Species and General Habitat Protection	Conservation Halton Website - SAR (2021)	Generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams (MNRF Guelph - Waterloo List, 2014)	**None** - Unlikely to use habitat within the study area as there are no slow-flowing rivers or wetland habitats of sufficient size and quality. No known records in study area.	General Wildlife and Habitat Assessment (2017)	Not recorded	**None -** No known records or suitable habitat within study area and potential movement path along riparian zone will remain available post-construction.
Five-lined Skink (Carolinian) (Eumeces fasciatus)	END	Species Protection and Habitat Regulation	Conservation Halton Website - SAR (2021)	Generally occur near dunes, fields, and deciduous forests. This species in generally associated with relatively open environments. (MNRF Guelph - Haldimand List 2015).	**None -** Suitable habitat (dunes, field forests near lake shoreline) is not present within study area. No known records in study area.	General Wildlife and Habitat Assessment (2017)	Not recorded	**None** - no suitable habitat within study area
Northern Map Turtle (Graptemys geographica)	SC	N/A	Conservation Halton Website - SAR (2021)	Generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day (MNRF Guelph - Waterloo List, 2014)	**None -** Suitable habitat (large, slow flowing rivers or lakes) is not present within study area. No known records in study area.	General Wildlife and Habitat Assessment (2017)	Not recorded	**None** - no suitable habitat within study area
Eastern Ribbonsnake (aka. Northern Ribbonsnake) (Thamnophis sauritus septentrionalis)	SC	N/A	Conservation Halton Website - SAR (2021)	Generally occur along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting (MNRF Guelph - Waterloo List, 2014)	**Minimal** - suitable habiat is present within the study area (i.e. streams bordered by dense vegetation), however, no known observations and species is unlikely to go undetected in a heavily populated area	General Wildlife and Habitat Assessment (2017)	Not recorded	**None -** unlikely to be present, no known records within the study area and no observations during surveys
Snapping Turtle (Chelydra serpentina)	SC	N/A	Conservation Halton Website - SAR (2021); iNaturalist.org (2020); Milton Heights Neighborhood SIS (2014)	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits (MNRF Guelph - Waterloo List, 2014)	**High** - potential to occur within a variety of wetland habitats and deeper sections of the 16 Mile Creek tributary; known to occur within study area (iNaturalist and other background records)	General Wildlife and Habitat Assessment (2017-2018)	Not recorded	**Minimal** - With recommended mitigation measures (e.g. temporary exclusion fencing), no impacts are anticipated as proposed removal areas along riparian corridors are relatively small and no removals are proposed in the Unevaluated Wetland. Potential movement path along riparian zone will remain available post-construction.
Spiny Softshell (Apalone spinifera)	THR	Species and General Habitat Protection	Conservation Halton Website - SAR (2021)	Generally prefer marshy creeks, swift-flowing rivers, lakes, impoundments, bays, marshy lagoons, ditches and ponds near rivers (MNRF Guelph - Hamilton List, 2013)	**None -** Suitable habitat (large, slow flowing rivers or lakes) is not present within study area. No known records in study area.	General Wildlife and Habitat Assessment (2017)	Not recorded	**None** - no suitable habitat within study area

Table 4: SAR Screening Assessment

Species	ESA Status[1] and Regional Occurrence	ESA Protection[2]	Source of Record (Date)	Key Habitats Used by Species in Ontario	Reasonable Likelihood of Presence in Study Area	Surveys Undertaken	Results of Field Surveys	Likelihood and Magnitude of Impacts to Species or Habitat
Stinkpot (Eastern Musk Turtle) (Sternotherus odoratus)	SC	N/A	Conservation Halton Website - SAR (2021)	Found in ponds, lakes, marshes and rivers that are generally slow-moving, have abundant emergent vegetation, and muddy bottoms. Nesting is in soil, decaying vegetation and rotting wood close to the water and exposed to direct sunlight (MNRF Species Profile Online 2014).	**None -** Suitable habitat (large, slow flowing rivers or lakes) is not present within study area. No known records in study area.	General Wildlife and Habitat Assessment (2017)	Not recorded	**None** - no suitable habitat within study area
Wood Turtle (Glyptemys insculpta)	END	Species Protection and Habitat Regulation	Conservation Halton Website - SAR (2021)	Generally inhabit fresh-water rivers and streams with sandy or gravely-sandy bottoms and prefers clear meandering watercourses with a moderate current. They nest on sand or gravel-sand beaches and banks. Although they prefer riparian areas with diverse, patchy cover, females also lay in gravel holes, at the edges of roads and railways, in utility right-of-ways, in farming fields, pastures and former fields – any sunny and easily dug spot (MNRF Guelph - Waterloo List, 2014)	**None** - Although records are not publically available, no records in the vicinity of the study area were communicated by MNRF.	General Wildlife and Habitat Assessment (2017)	Not recorded	**None** - no suitable habitat within study area

Table 5: Sixteen Mile Creek Fishery

FISH SPECIES	**Station 123** - immediately downstream of Bronte St.. - Sampling in 1993 and 1998	**Station 235** Upstream of Steeles Avenue and the CP Rail tracks - sampling in 1998	**Station 105** ~650m downstream of Bronte Street -sampling from 2005 to 2015	**Station 222** ~900m downstream of Bronte Street -sampling in 1998 and 2016	**Station 60** north of Steeles Ave. -sampling in 1975	**Station 29** ~50 m upstream of Bronte Street (south of Steeles Ave. -sampling in 1975
Blacknose Dace *(Rhinichthys atratulus)*	X	X	X	X		X
Bluntnose Minnow (*Pimephales notatus*)	X					
Brook Stickleback (*Culaea inconstans*)				X		X
Brook Trout (*Salvelinus fontinalis*)					X	
Brown Trout (Salmo trutta trutta)	X		X	X	X	
Central Mudminnow (*Umbra limi*)			X			X
Common Carp (*Cyprinus carpio*)				X		
Common Shiner (*Luxilus cornutus*)	X				X	X
Creek Chub (*Semotilus atromaculatus*)	X	X	X		X	X
Fathead Minnow *(Pimephales promelas)*		X				
Fantail Darter (*Etheostoma flabellare*)	X		X	X	X	X
Golden Shiner (*Notemigonus crysoleucas*)					X	
Johnny Darter (*Etheostoma nigrum*)	X		X	X	X	
Largemouth Bass *(Micropterus salmoides)*			X			
Longnose Dace *(Rhinichthys cataractae)*			X	X		X
Mottled Sculpin (Cottus bairdii)			X			
Northern Hog Sucker (*Hypentelium nigricans*)	X					X
Pumpkinseed (*Lepomis gibbosus*)				X	X	X
Rainbow Darter *(Etheostoma caeruleum)*	X		X	X		X
Rainbow Trout *(Oncorhynchus mykiss)*	X		X	X	X	
Rock Bass *(Ambloplites rupestris)*	X		X			X
River Chub (*Nocomis micropogon)*					X	
White Sucker (*Catastomus commersoni*)	X		X	X	X	X

All Fisheries Species and Location Information provided by Conservation Halton

Upstream/North of Steeles Ave Bridge - Sixteen Mile Creek

Aquatic Habitat Assessment

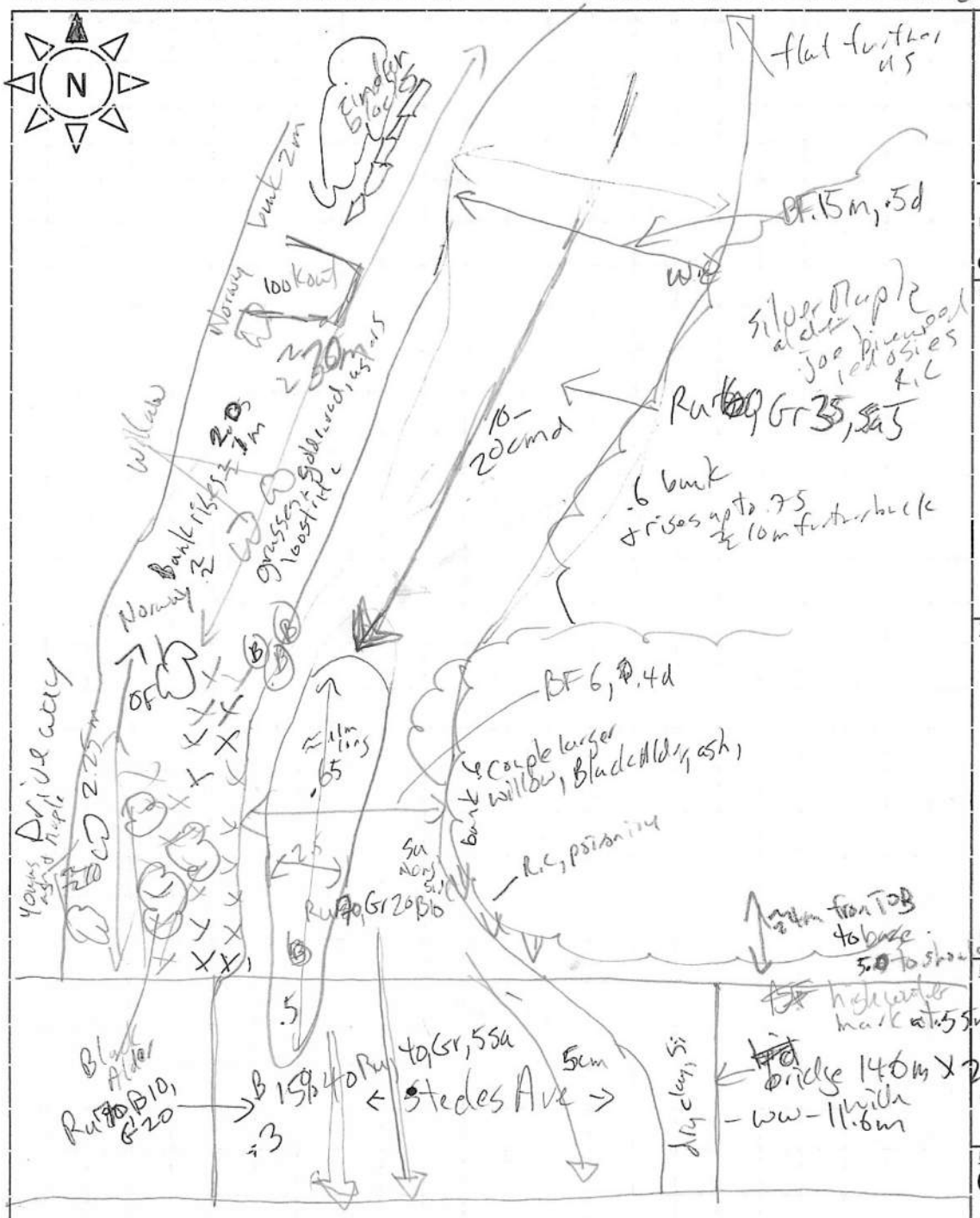
Page: 1 of 2

WSP | MMM GROUP

Project Name / #: Steeles Ave Reconstruction **Date:** July 18/17 **Time:** 1400 **Photos:**

Watercourse Name: 16 Mile Creek **Location:** Bridge at Steeles Ave **Length:** ≈50m **Observers:** A.D, CL

Zone: 17T **Easting:** 588798~~7~~ **Northing:** 4818427~~73~~ **Water Temp:** 21° **Air Temp:** 26° **% Overhead Cover:**



Profile: Horizontal Scale: Vertical Scale:

Physical Characteristics:
- 10d — Depth (cm)
- 6w — Width (m)
- — Riffle
- — Flat
- — Run/Glide
- — Pool

Substrate:
- — Island/Bar
- — Fine Substrate
- Sa, Si, M — Sand, Silt, Muck
- #### — Gravel Substrate
- — Cobble
- Sh — Shale
- (B) — Boulder
- **** — Debris

Vegetation:
- CT — Cattail
- RC — Reed Canary
- SV — Submergent Vegetation
- FV — Floating Vegetation
- EV — Emergent Vegetation
- Gr — Grasses
- (R) — Riparian Tree
- — Forested Area

Banks:
- /////// — Eroded Bank
- xxxxxxx — Riprap/other Stabilization
- — — — — Undercut Bank
- TH — Thatch

Barriers:
- — Instream Log/Tree
- ^^^^^^ — Dam/Weir/Obstruction
- — Barrier to fish movement
- S — Seasonal Barrier
- -X- - -X- — Fenceline
- — Culvert

Habitat Indicators:
- Fe — Iron Staining
- — Seep/Spring
- (W) — Watercress

Downstream / South of Steeles Ave Bridge - Sixteen Mile Creek

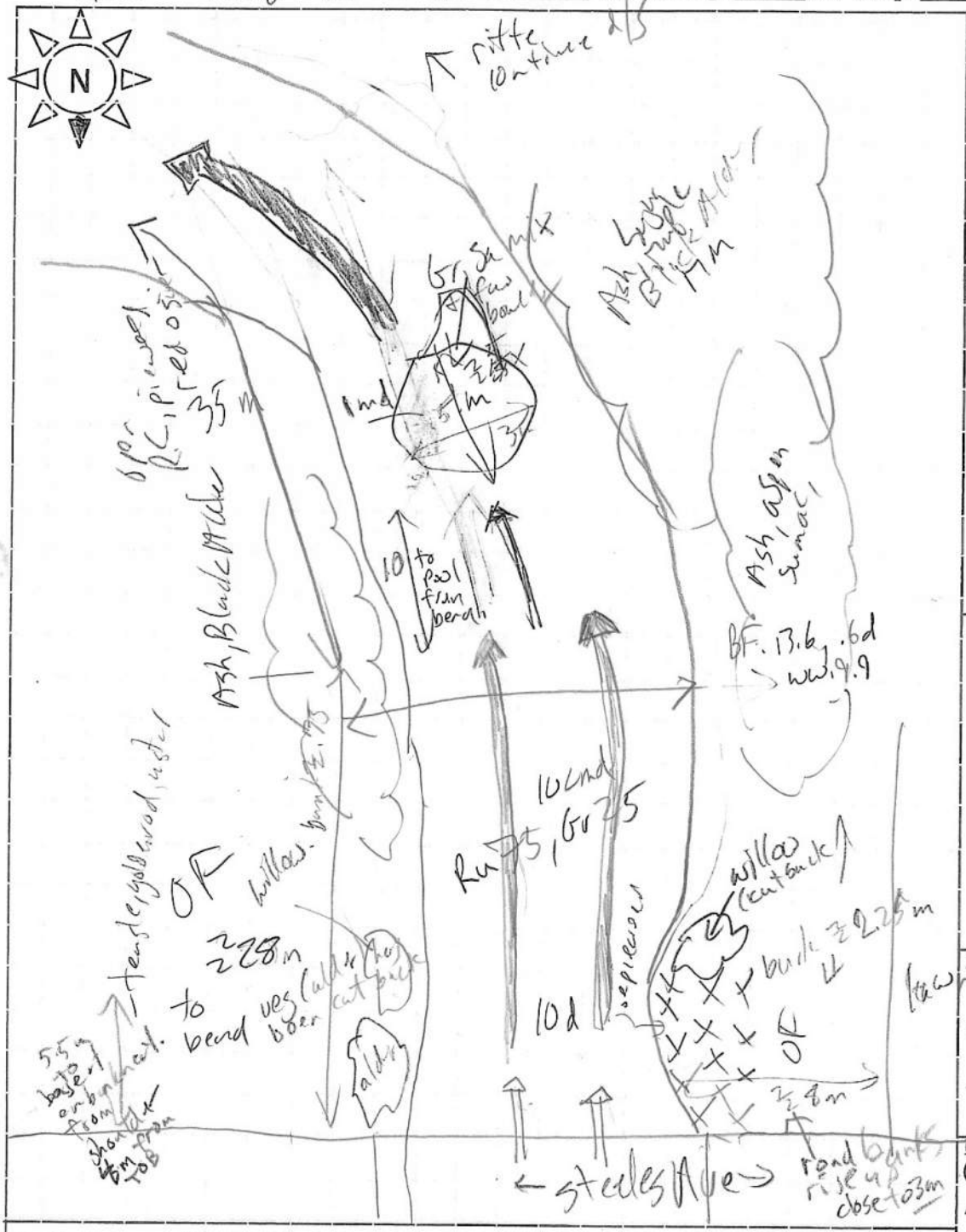
Aquatic Habitat Assessment

Page: 2 of 2 | WSP | MMM GROUP

Project Name / #: Steeles Ave Reconstruction **Date:** July 19 **Time:** 1500 **Photos:**

Watercourse Name: 16 Mile Creek at Steeles **Location:** Bridge at Steeles Ave (downstream) **Length:** 250m **Observers:** A.D, C.L

Zone: 17T **Easting:** 587929.87 **Northing:** 4818427.93 **Water Temp:** 21°C **Air Temp:** 26°C **% Overhead Cover:** 5%



Profile: Horizontal Scale: Vertical Scale:

Physical Characteristics:
- 10d — Depth (cm)
- 6w — Width (m)
- — Riffle
- — Flat
- — Run/Glide
- — Pool

Substrate:
- — Island/Bar
- — Fine Substrate
- Sa, Si, M — Sand, Silt, Muck
- #### — Gravel Substrate
- — Cobble
- Sh — Shale
- (B) — Boulder
- **** — Debris

Vegetation:
- CT — Cattail
- RC — Reed Canary
- SV — Submergent Vegetation
- FV — Floating Vegetation
- EV — Emergent Vegetation
- Gr — Grasses
- (R) — Riparian Tree
- — Forested Area

Banks:
- /////// — Eroded Bank
- xxxxxxx — Riprap/other Stabilization
- — — — — Undercut Bank
- TH — Thatch

Barriers:
- — Instream Log/Tree
- ^^^^^^ — Dam/Weir/Obstruction
- — Barrier to fish movement
- S — Seasonal Barrier
- -X- - -X- — Fenceline
- — Culvert

Habitat Indicators:
- Fe — Iron Staining
- — Seep/Spring
- (W) — Watercress

Sixteen Mile Creek
• Aquatic Habitat Mapping (at preferred alternative crossing Option B)

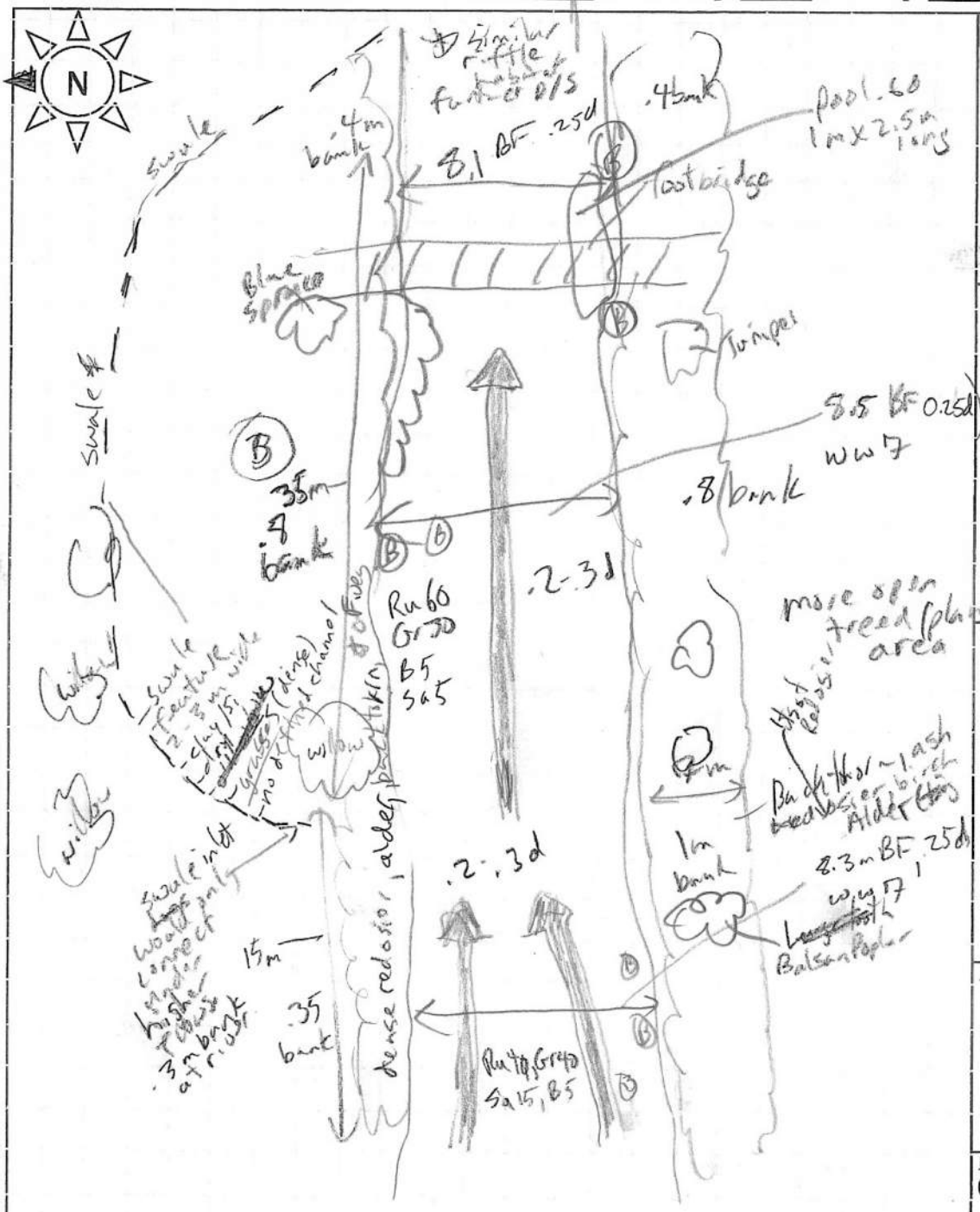
Aquatic Habitat Assessment

Page: 1 of 1

Project Name / #: Steeles Ave Reconstruction **Date:** NOV 29/17 **Time:** 14:30 **Photos:**

Watercourse Name: Sixteen Mile Creek **Location:** 260m d/s of Steeles **Length:** 50m **Observers:** A.D.

Zone: 17T **Easting:** 588729.87 **Northing:** 4818427.73 **Water Temp:** 5°C **Air Temp:** 10°C **% Overhead Cover:**



Physical Characteristics:
- 10d — Depth (cm)
- 6w — Width (m)
- — Riffle
- — Flat
- — Run/Glide
- — Pool

Substrate:
- — Island/Bar
- — Fine Substrate
- Sa, Si, M — Sand, Silt, Muck
- #### — Gravel Substrate
- — Cobble
- Sh — Shale
- (B) — Boulder
- — Debris

Vegetation:
- CT — Cattail
- RC — Reed Canary
- SV — Submergent Vegetation
- FV — Floating Vegetation
- EV — Emergent Vegetation
- Gr — Grasses
- (R) — Riparian Tree
- — Forested Area

Banks:
- /////// — Eroded Bank
- xxxxxxx — Riprap/other Stabilization
- — — — — Undercut Bank
- TH — Thatch

Barriers:
- — Instream Log/Tree
- ^^^^^^ — Dam/Weir/Obstruction
- — Barrier to fish movement
- S — Seasonal Barrier
- -X- -X- — Fenceline
- — Culvert

Habitat Indicators:
- Fe — Iron Staining
- — Seep/Spring
- (W) — Watercress

Profile: Horizontal Scale: Vertical Scale:

Tributary NW-1-E (at crossing location) at preferred alignment GPS 17T 0588317 4817783 (#218)

- agricultural reach

WSP

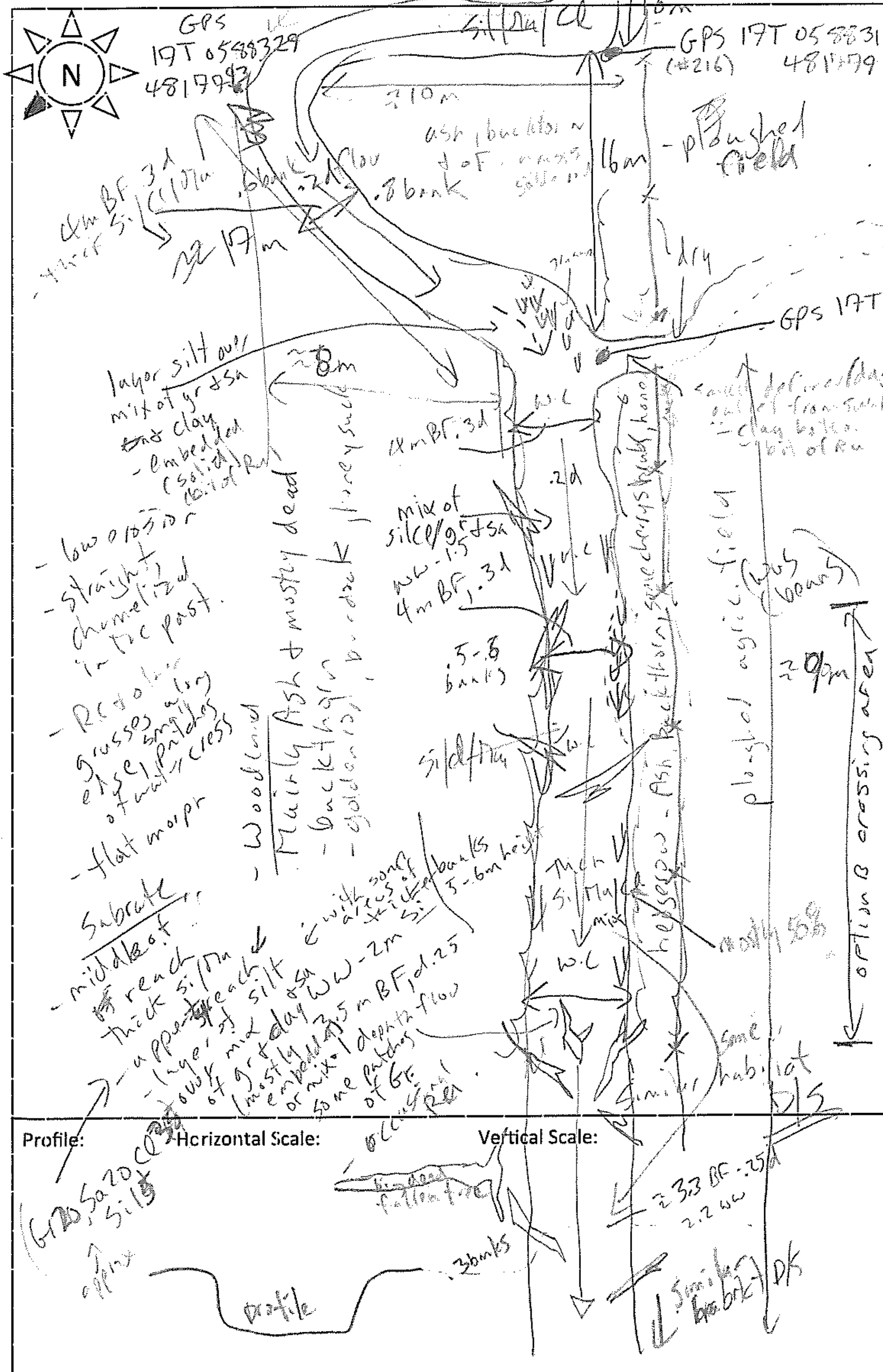
Aquatic Habitat Assessment

Page: 1 of 1 + Nov 28

Project Name / #: Steeles Ave Reconstruct **Date:** Nov 3/17 **Time:** 10:30 **Photos:**

Watercourse Name: Tributary NW-1-E **Location:** **Length:** ~120m **Observers:** A.D.

Zone: 17T **Easting:** 588316.29 **Northing:** 4817845.19 **Water Temp:** 10.5°C **Air Temp:** 10°C **% Overhead Cover:** 80



Physical Characteristics:
- 10d — Depth (cm)
- 6w — Width (m)
- Riffle
- Flat
- Run/Glide
- Pool

Substrate:
- Island/Bar
- Fine Substrate
- Sa, Si, M — Sand, Silt, Muck
- #### — Gravel Substrate
- ooo — Cobble
- Sh — Shale
- (B) — Boulder
- **** — Debris

Vegetation:
- CT — Cattail
- RC — Reed Canary
- SV — Submergent Vegetation
- FV — Floating Vegetation
- EV — Emergent Vegetation
- Gr — Grasses
- (R) — Riparian Tree
- Forested Area

Banks:
- /////// — Eroded Bank
- xxxxxxx — Riprap/other Stabilization
- — — — Undercut Bank
- TH — Thatch

Barriers:
- Instream Log/Tree
- ^^^^^^ — Dam/Weir/Obstruction
- Barrier to fish movement
- S — Seasonal Barrier
- -X- - -X- — Fenceline
- Culvert

Habitat Indicators:
- Fe — Iron Staining
- Seep/Spring
- (W) — Watercress

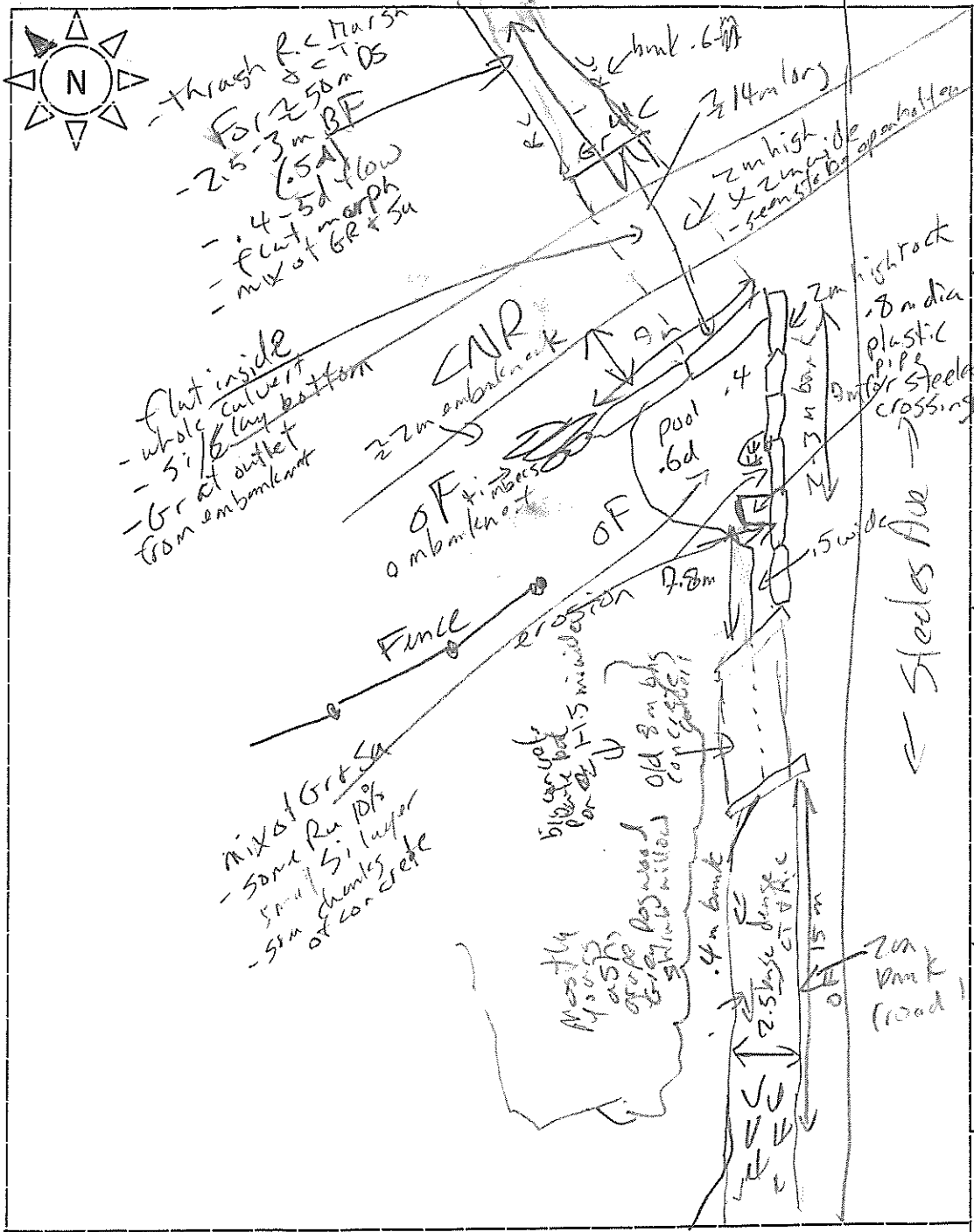
Trib. NW-1-E, at Steeles Ave, downstream (north) of existing culvert (C1)

Aquatic Habitat Assessment Page: 1 of 2

Project Name / #: Steeles Ave. Reconstruction **Date:** July 14/17 **Time:** 10 AM **Photos:**

Watercourse Name: Trib. NW-1-E of Petticoat Creek **Location:** culvert (C1) at Steeles **Length:** ~60 m **Observers:** A.D.

Zone: 17T **Easting:** 588301.33 **Northing:** 4818023.8 **Water Temp:** 22 **Air Temp:** 23 **%-Overhead Cover:** 5



Profile: Horizontal Scale: Vertical Scale:

Physical Characteristics:
- 10d — Depth (cm)
- 6w — Width (m)
- — Riffle
- — Flat
- — Run/Glide
- — Pool

Substrate:
- — Island/Bar
- — Fine Substrate
- Sa, Si, M — Sand, Silt, Muck
- ##### — Gravel Substrate
- — Cobble
- Sh — Shale
- (B) — Boulder
- **** — Debris

Vegetation:
- CT — Cattail
- RC — Reed Canary
- SV — Submergent Vegetation
- FV — Floating Vegetation
- EV — Emergent Vegetation
- Gr — Grasses
- (R) — Riparian Tree
- — Forested Area

Banks:
- /////// — Eroded Bank
- xxxxxxx — Riprap/other Stabilization
- — — — — Undercut Bank
- TH — Thatch

Barriers:
- — Instream Log/Tree
- ^^^^^^ — Dam/Weir/Obstruction
- — Barrier to fish movement
- S — Seasonal Barrier
- -X- - -X- — Fenceline
- — Culvert

Habitat Indicators:
- Fe — Iron Staining
- — Seep/Spring
- (W) — Watercress

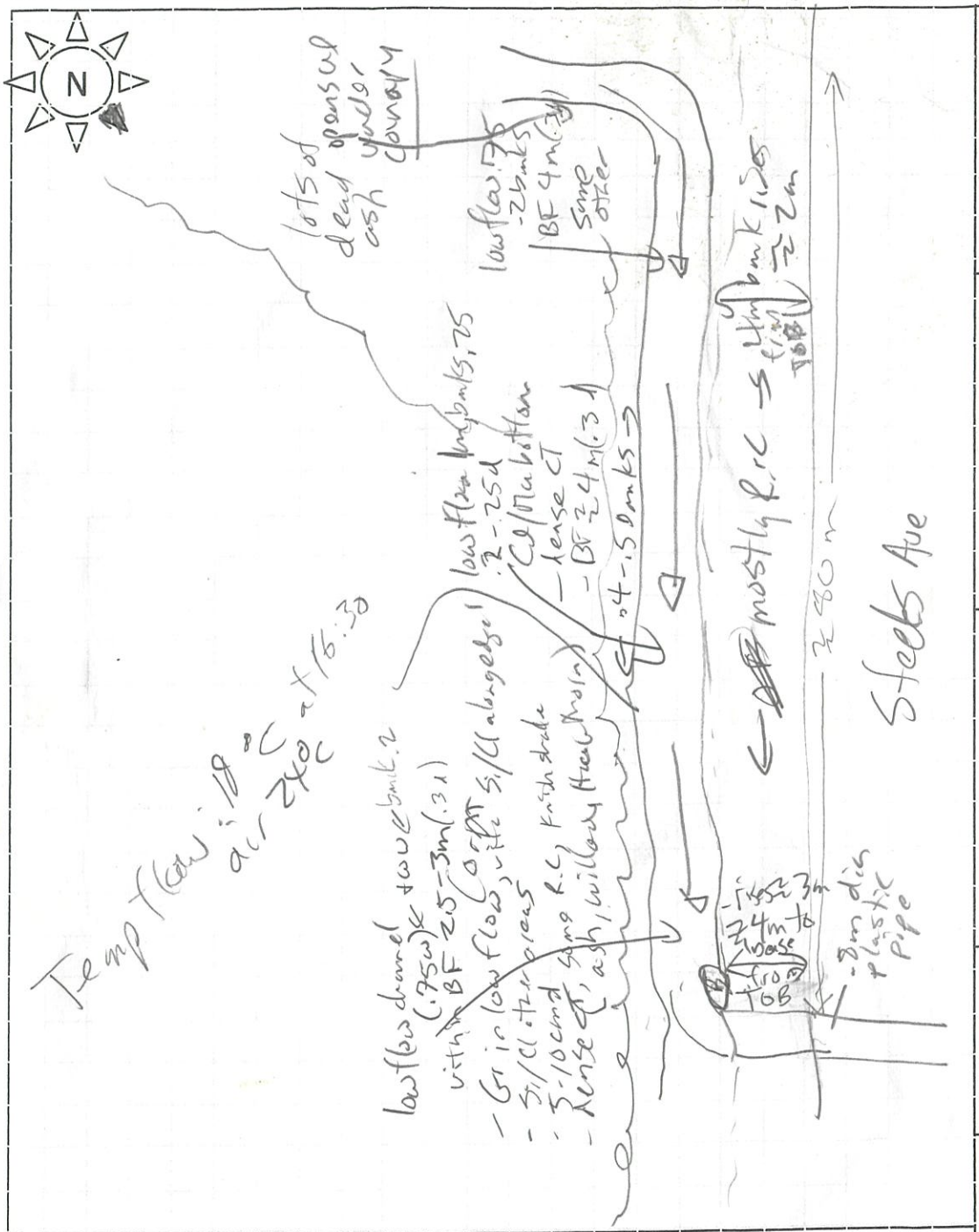
Trib. NW-1-E, at Steeles Ave, upstream (south) of existing culvert (C1)

Aquatic Habitat Assessment Page: ___ of ___ WSP | MMM GROUP

Project Name / #: Steeles Ave. Reconstruction **Date:** July 14, 17 **Time:** 10:35 **Photos:** ____

Watercourse Name: Trib NW-1-E of Sixteen Mile Creek **Location:** ____ **Length:** 290m **Observers:** A.D

Zone: 17T **Easting:** 588301.33 **Northing:** 4818823.81 **Water Temp:** 22°C **Air Temp:** 25°C **% Overhead Cover:** ____



Physical Characteristics:
- 10d — Depth (cm)
- 6w — Width (m)
- — Riffle
- — Flat
- — Run/Glide
- — Pool

Substrate:
- — Island/Bar
- — Fine Substrate
- Sa, Si, M — Sand, Silt, Muck
- #### — Gravel Substrate
- — Cobble
- Sh — Shale
- (B) — Boulder
- **** — Debris

Vegetation:
- CT — Cattail
- RC — Reed Canary
- SV — Submergent Vegetation
- FV — Floating Vegetation
- EV — Emergent Vegetation
- Gr — Grasses
- (R) — Riparian Tree
- — Forested Area

Banks:
- /////// — Eroded Bank
- xxxxxxx — Riprap/other Stabilization
- — — — — Undercut Bank
- TH — Thatch

Barriers:
- — Instream Log/Tree
- ^^^^^^ — Dam/Weir/Obstruction
- — Barrier to fish movement
- S — Seasonal Barrier
- -X- - -X- — Fenceline
- — Culvert

Habitat Indicators:
- Fe — Iron Staining
- — Seep/Spring
- (W) — Watercress

Profile: Horizontal Scale: Vertical Scale:

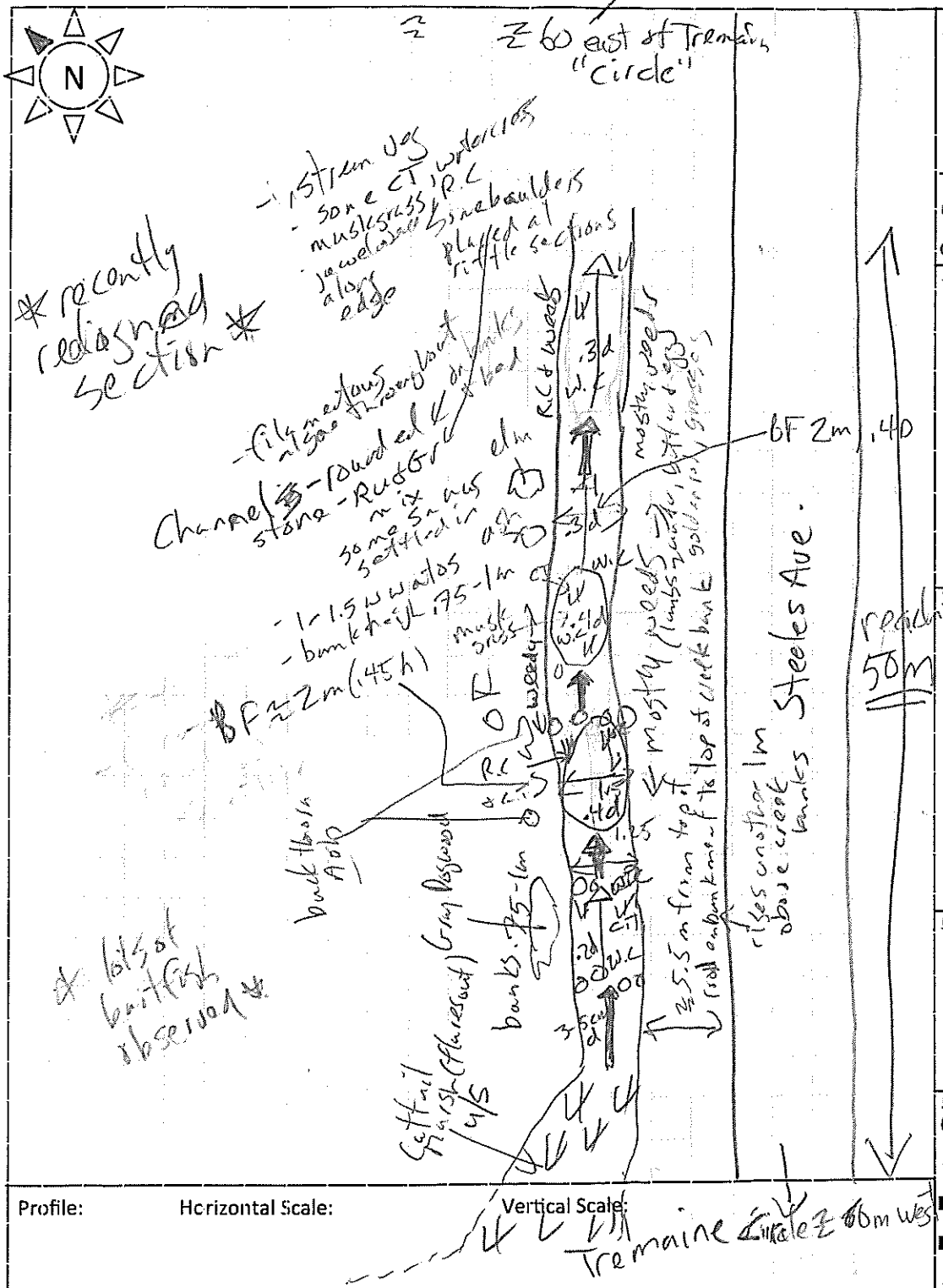
Unnamed Tributary of NW-1-E (at impacted area)

Aquatic Habitat Assessment Page: 1 of 1

Project Name / #: Steeles Ave. Reconstruction **Date:** Jul 4 14 19 **Time:** 13:30 **Photos:**

Watercourse Name: Unnamed Tributary of NW-1-E **Location:** [redacted] **Length:** 50m **Observers:** A.D

Zone: 17T **Easting:** 588109.34 **Northing:** 4819727.31 **Water Temp:** 14 **Air Temp:** 22 **% Overhead Cover:**



Profile: Horizontal Scale: Vertical Scale:

Physical Characteristics:
- 10d — Depth (cm)
- 6w — Width (m)
- — Riffle
- — Flat
- — Run/Glide
- — Pool

Substrate:
- — Island/Bar
- — Fine Substrate
- Sa, Si, M — Sand, Silt, Muck
- #### — Gravel Substrate
- — Cobble
- Sh — Shale
- (B) — Boulder
- **** — Debris

Vegetation:
- CT — Cattail
- RC — Reed Canary
- SV — Submergent Vegetation
- FV — Floating Vegetation
- EV — Emergent Vegetation
- Gr — Grasses
- (R) — Riparian Tree
- — Forested Area

Banks:
- /////// — Eroded Bank
- xxxxxxx — Riprap/other Stabilization
- — — — — Undercut Bank
- TH — Thatch

Barriers:
- — Instream Log/Tree
- ^^^^^^ — Dam/Weir/Obstruction
- — Barrier to fish movement
- S — Seasonal Barrier
- -X- - -X- — Fenceline
- — Culvert

Habitat Indicators:
- Fe — Iron Staining
- — Seep/Spring
- (W) — Watercress