

Appendix D – Fish and Fish Habitat Report



407 TRANSITWAY – WEST OF HURONTARIO STREET TO EAST OF HIGHWAY 400

MINISTRY OF TRANSPORTATION - CENTRAL REGION

FISH AND FISH HABITAT – EXISTING CONDITIONS AND IMPACT ASSESSMENT REPORT

TRANSIT PROJECT ASSESSMENT PROCESS

407 TRANSITWAY

**FROM WEST OF HURONTARIO STREET TO EAST OF HIGHWAY 400
CITY OF BRAMPTON (PEEL REGION) AND CITY OF VAUGHAN (YORK REGION)**

G.W.P. 14-20001

prepared for:

**MINISTRY OF TRANSPORTATION
CENTRAL REGION**

prepared by:



JULY 2018

FISH AND FISH HABITAT – EXISTING CONDITIONS AND IMPACT ASSESSMENT REPORT

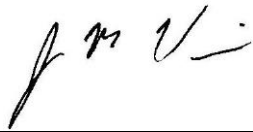
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CITY OF BRAMPTON (PEEL REGION) AND CITY OF VAUGHAN (YORK REGION)**

G.W.P. 14-20001

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**JULY 2018
LGL PROJECT TA #8558-04**

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1.0 INTRODUCTION

The Ontario Ministry of Transportation (MTO) is undertaking the Transit Project Assessment Process (TPAP) for the 407 Transitway from west of Hurontario Street in the City of Brampton, Region of Peel, to east of Highway 400 in the City of Vaughan, Region of York. The study area is also located directly adjacent to the City of Mississauga and the City of Toronto and extends slightly within the City of Mississauga and City of Toronto boundaries in a few locations. The project limits are presented in **Figure 1**.

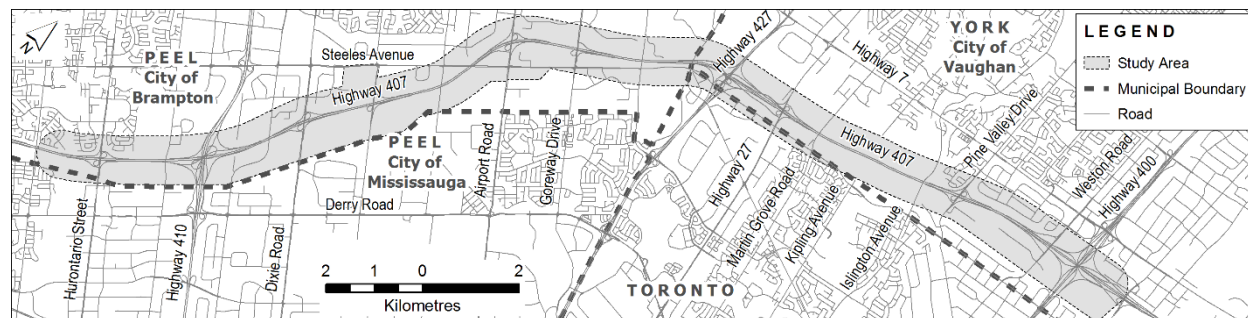


FIGURE 1. 407 TRANSITWAY WEST - KEY PLAN

The study is following the requirements prescribed in *Ontario Regulation 231/08, Transit Projects and Metrolinx Undertakings* under the *Environmental Assessment Act*. The 407 Transitway will be a two-lane, fully grade separated transit facility on an exclusive right-of-way, running along the Highway 407 corridor. This section of the transitway facility will consist of 23.7 km of runningway and seven stations. The station layouts will include vehicular and pedestrian access(es), park-and-ride and passenger pick-up/drop off (PPUDO) facilities, bus lay-by facilities, on-street integration with local transit, shelters, buildings and other amenities. Subject to the outcome of the study, the 407 Transitway will be implemented initially as Bus Rapid Transit (BRT) with the opportunity to convert to Light Rail Transit (LRT) in the future.

This 23.7 km segment forms part of the 150 km long high-speed interregional facility planned to be ultimately constructed on a separate right-of-way that parallels 407 ETR from Brant Street in Burlington to Highway 35/115 in Clarington, with stations, parking and access connections. This transitway is a component within the official plans of the stakeholder municipalities and of the Province's commitment to support transit initiatives in the Greater Golden Horseshoe through the Metrolinx Regional Transportation Plan.

This is a total project management (TPM) assignment, where the consultant delivers all aspects of the study on behalf of MTO. The TPM prime consultant is Parsons. Parsons has assembled a team of engineering and environmental specialists to provide the services required for this study. LGL Limited is providing environmental design and planning services on behalf of Parsons.

The fisheries assessment for this TPAP was undertaken in accordance with the MTO *Environmental Guide for Fish and Fish Habitat* (2009) and the PILOT MTO/Department of Fisheries and Oceans (DFO)/Ontario Ministry of Natural Resources and Forestry (OMNRF) *Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings* (2016). The purpose of this report is to document fish and fish habitat within the study area. The existing conditions information was collected during field investigations in the spring and summer of 2016. The results of these two field investigations

are presented in this report. This report also documents the impacts to fish and fish habitat and outlines appropriate environmental protection/mitigation measures.

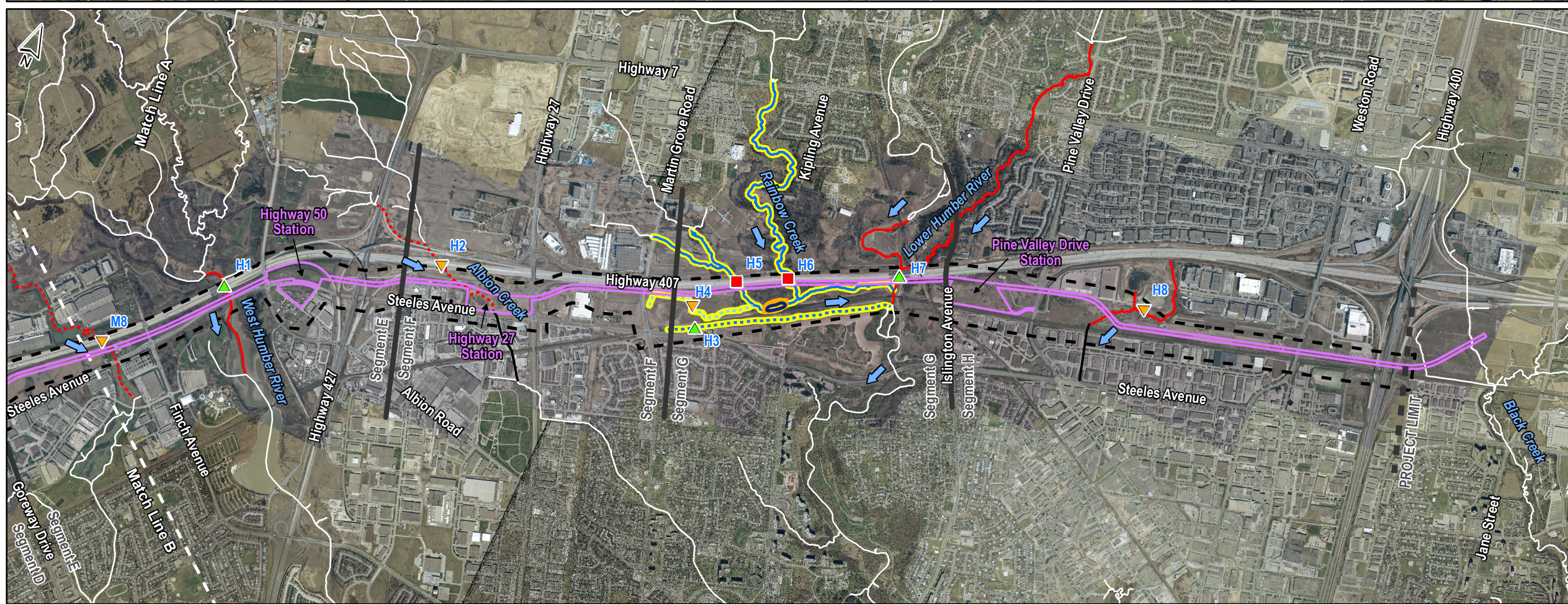
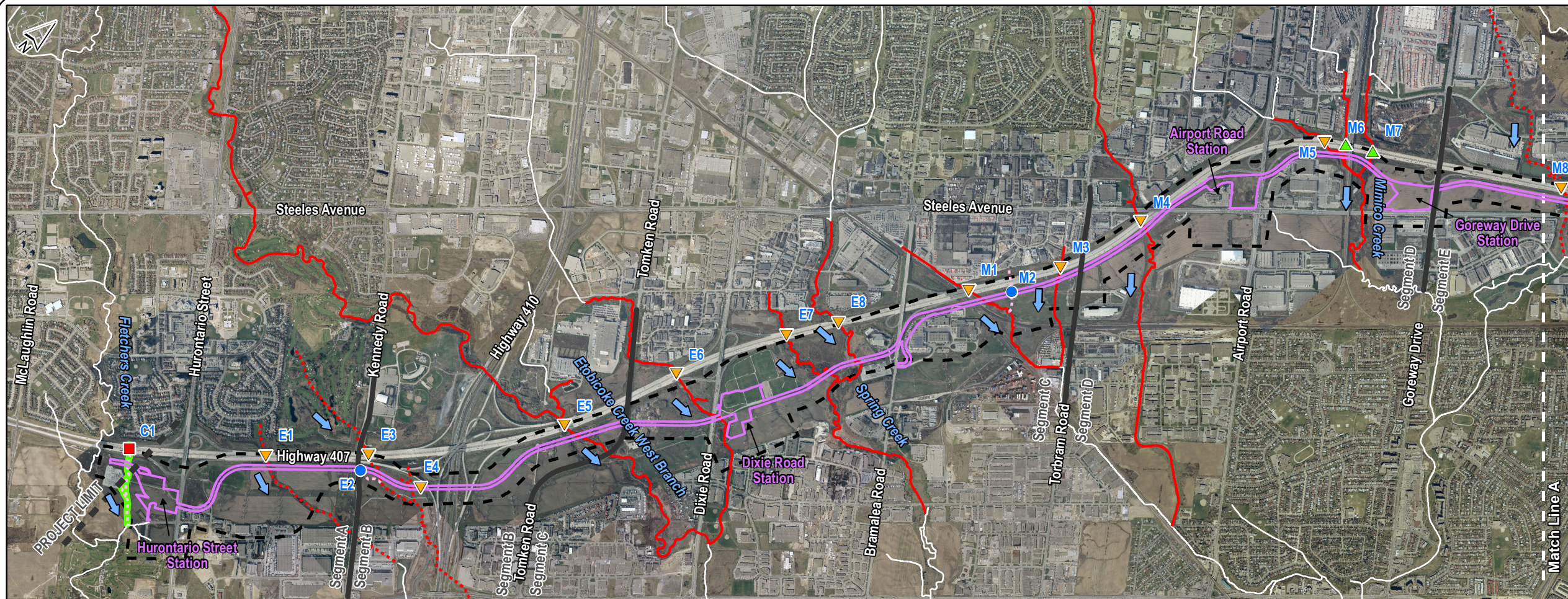
A total of 21 new structure/culvert watercourse crossings along the Transitway facility are proposed. Of the 21 structure/culvert crossings, 20 support fish or fish habitat either directly or indirectly. The locations of the watercourses in the study area where work is required are provided in **Table 1/Template 10.1**.

TABLE 1/TEMPLATE 10.1. LOCATION OF WORK TABLE

Waterbody	Highway	Municipality	Location of Stream (GPS Coordinates)
E1: Tributary of Etobicoke Creek West Branch	407 TWY	Peel	603910 mE 4834691mN
E3: Tributary of Etobicoke Creek West Branch	407 TWY	Peel	604403 mE 4835334 mN
E4: Tributary of Etobicoke Creek West Branch	407 TWY	Peel	604796 mE 4835451 mN
E5: Etobicoke Creek West Branch	407 TWY	Peel	605169 mE 4836695 mN
E6: Tributary of Etobicoke Creek West Branch	407 TWY	Peel	605391 mE 4837641 mN
E7: Tributary of Spring Creek	407 TWY	Peel	605683 mE 4838515 mN
E8: Spring Creek	407 TWY	Peel	605861 mE 4838898 mN
M1: Tributary of Mimico Creek	407 TWY	Peel	606293 mE 4839863 mN
M3: Tributary of Mimico Creek	407 TWY	Peel	606597 mE 4840544 mN
M4: Tributary of Mimico Creek	407 TWY	Peel	606698 mE 4841270 mN
M5: Tributary of Mimico Creek	407 TWY	Peel	607098 mE 4842796 mN
M6: Tributary of Mimico Creek	407 TWY	Peel	607212 mE 4842917 mN
M7: Mimico Creek	407 TWY	Peel	607388 mE 4843051 mN
M8: Tributary of Mimico Creek	407 TWY	Peel	608536 mE 4844045 mN
H1: West Humber River	407 TWY	Peel	609243 mE 4844845 mN
H2: Albion Creek	407 TWY	York	610713 mE 4845720 mN
H5: Tributary of Rainbow Creek	407 TWY	York	612893 mE 4846579 mN
H6: Rainbow Creek	407 TWY	York	613251 mE 4846773 mN
H7: Lower Humber River	407 TWY	York	614038 mE 4847166 mN
H8: Tributary of the Lower Humber River	407 TWY	York	614281 mE 4847069 mN

2.0 CONSTRAINTS AND OPPORTUNITIES MAP

The purpose of the constraints and opportunities map is to show biological and physical constraints (i.e. fish and fish habitat) to highway development. The study area was reviewed to identify opportunities and constraints using the criteria outlined in the MTO *Environmental Guide for Fish and Fish Habitat* (2009). See **Figure 2** for constraints/opportunities mapping for the study area.



LEGEND

- Field Investigation Area
- Impact Assessment Corridor
- Area of Natural and Scientific Interest (Woodbridge Pleistocene Cut)
- Environmentally Significant Area (Woodbridge Cut)
- Watercourse Flow Direction
- Watercourse - Coldwater Permanent
- Watercourse - Coldwater Intermittent
- Watercourse - Coldwater Ephemeral
- Watercourse - Warmwater Permanent
- Watercourse - Warmwater Intermittent
- Watercourse - Warmwater Ephemeral
- Watercourse Piped
- Watercourse Not Surveyed
- Watercourse - Reside Dace Habitat Contributing
- Watercourse - Reside Dace Habitat Historical

Habitat Sensitivity

- High with opportunity for enhancement
- Moderate with opportunity for enhancement
- Low with opportunity for enhancement
- Not fish habitat

Data Sources: Ministry of Natural Resources and Forestry, LGL field investigations spring/summer 2016.

800 400 0 800 Metres

407 TRANSITWAY WEST - FISHERIES OPPORTUNITIES AND CONSTRAINTS



Project: TA8558	Figure: 2
Date: June, 2018	Prepared By: MWF
Scale: 1 : 14,000	Checked By: SLL

3.0 BACKGROUND DATA COLLECTION

3.1 Background Information and Methodology

3.1.1 Secondary Source Data

Data was obtained from published data sources and unpublished information made available by relevant stakeholders. This data was then reviewed and used to identify data gaps and deficiencies, and to scope the type, location and level of detail for field investigations (see **Section 4.0** below).

The study area spans four main watersheds: Credit River, Etobicoke Creek, Mimico Creek, and Humber River. These watersheds are managed under the jurisdiction of the MNRF Aurora District and two Conservation Authorities: Credit Valley Conservation (CVC) and Toronto and Region Conservation Authority (TRCA).

A search of the Natural Heritage Information Centre (NHIC) database (MNRF 2015) and the DFO aquatic species at risk mapping (2015) was completed, and revealed one aquatic species at risk, Redside Dace (*Clinostomus elongatus*), as occurring within the vicinity of the study area at Fletchers Creek (Credit River watershed) (just west of the study area) and Rainbow Creek (Humber River watershed). This species is regulated as ‘Endangered’ under the Ontario *Endangered Species Act* (ESA), 2007. As of May 2, 2017, Redside Dace is now also regulated federally as ‘Endangered’, as it has been added to Schedule 1 of SARA (9). MNRF confirmed the presence of Redside Dace within the study area in their letters dated February 4, 2016 and January 10, 2018, and they provided modified information regarding the presence of Redside Dace via personal correspondence on December 9, 2016. During the December 9, 2016 correspondence, MNRF indicated that Redside Dace regulated habitat does not occur within Rainbow Creek (now historical); however, Redside Dace contributing habitat was confirmed in a tributary of Fletchers Creek (C1 in **Figure 2**) although this watercourse is located just west of the westerly study limits.

In accordance with the MTO Fish Guide, a project notification and MNRF information request letter was sent to the MNRF Aurora District Office on November 11, 2015 and December 8, 2015 requesting information regarding the thermal regime of the watercourses located within the study area, habitat information, available data, fisheries management considerations, sensitivity and in-water timing windows for construction. An email response was received on February 5, 2016 from Megan Eplett, Management Biologist at MNRF Aurora District. This fisheries data, including the MNRF interpretation of sensitivity, has been incorporated into the report and further details, including community information, are presented in **Table 2** and **Section 5.1** below. In addition to the original data request sent to the MNRF, LGL requested a change to some of the sensitivities that were initially provided based on the results of the detailed field investigations conducted by LGL, as per the MTO Fish Guide. This request was sent via email on November 15, 2016, and an email response was received on December 9, 2016 from Ben Keen, Management Biologist at MNRF Aurora District. Updated sensitivities, based on LGL and MNRF interpretation, are presented below in **Section 5.1**.

In addition to the required correspondence with MNRF in accordance with the MTO Fish Guide, CVC and TRCA were also contacted by Parsons in November 2015 to request any available fisheries information from their records. An email response from TRCA was received on January 5, 2016 from Christopher Menary, GIS Technician, providing fish point data for watercourses within the Etobicoke Creek, Mimico Creek and Humber River watersheds. Email responses from CVC were received on

January 26, 2016 and February 1, 2016 from Eric James, Planning Technician, providing fish point data for watercourses within the Fletchers Creek subwatershed.

Table 2 provides a summary of the information provided by MNRF in relation to the MTO protocol and includes fish community, thermal regime, important/exceptional fish habitat, critical/species at risk habitat and timing window information for each watercourse/crossing within the study area. All correspondence with the MNRF, TRCA and CVC is presented in **Appendix A**.

3.1.2 Data Sources

The following data sources relevant to fish and fish habitat within the study area were reviewed:

- CVC. 2012a. *Draft Fletchers Creek Restoration Study. Appendix 1: Characterization Report*;
- CVC. 2012b. *Draft Fletchers Creek Restoration Study. Appendix 2: Restoration Report*;
- CVC. 2016. Personal Correspondence (through Parsons) with Eric James, Planning Technician. January 26, 2016 and February 1, 2016 via email;
- DFO. 2015a. *Distribution of Species at Risk Mapping; Credit Valley Conservation (Map 2)*. May 2015;
- DFO. 2015b. *Distribution of Species at Risk Mapping; Toronto and Region Conservation Authority (Map 1)*. May 2015;
- DFO. 2015c. *Species at Risk Public Registry Vol. 151, No. 9 -- May 3, 2017*. <http://www.registrelep-sararegistry.gc.ca/default.asp?lang=En&n=30A38547-1>;
- MNR. 2011. *DRAFT Guidance for Development Activities in Redside Dace Protected Habitat*. Ontario Ministry of Natural Resources. Peterborough, Ontario. ii+42 pp.;
- MNRF. 2015. *Natural Heritage Information Centre Biodiversity Explorer*. Website available online: <http://nhic.MNRF.gov.on.ca/>. Ministry of Natural Resources and Forestry. Peterborough, Ontario;
- MNRF. 2016. Personal Correspondence with Megan Eplett/Ben Keen, Management Biologists. February 5, 2016 and December 9, 2016 via email;
- MNRF. 2018. Personal Correspondence with Alexander Kissel, Management Biologist. January 10, 2018 via email;
- TRCA. 2008. *Humber River Watershed Plan. Pathways to a Healthy Humber*. Published by Toronto and Region Conservation Authority;
- TRCA. 2010. *Etobicoke and Mimico Creeks Watershed Technical Update Report. Section 9.0 Aquatic System - Instream Barriers to Fish Passage*. Published by Toronto and Region Conservation Authority; and,
- TRCA. 2016. Personal Correspondence (through Parsons) with Christopher Menary, GIS Technician. January 5, 2016 via email.

**TABLE 2/TEMPLATE 10.2 -
 EXISTING FISH AND FISH HABITAT CONDITIONS SUMMARY TABLE**

GWP or Project Name	Waterbody	Latitude	Longitude	Flow*	Thermal Regime***	Fish Habitat	Fish Species Present**	Substrate Type*	Vegetation*	Constraints and Opportunity	Important, Exceptional Fish Habitat	Species at Risk / Critical Habitat Present	In Water Works Timing Window***
CREDIT RIVER WATERSHED													
14-20001	C1: Tributary of Fletchers Creek (located just west of study limits)	4833879 mN	603199 mE	Ephemeral	Not provided	None	Redside Dace contributing (MNRF 2016). Not sampled by LGL (no flow).	Upland soils	Terrestrial (cattails present downstream of study area)	N/A	N/A	Identified as Contributing Redside Dace Habitat by MNRF	July 1- September 15
ETOBICOKE CREEK WATERSHED													
14-20001	E1: Tributary of Etobicoke Creek West Branch	4834691 mN	603910 mE	Intermittent	Warmwater	Seasonal (refuge habitat in online pond)	White Sucker, Johnny Darter, Tessellated Darter, Golden Shiner, Common Shiner, Spotfin Shiner, Bluntnose Minnow, Eastern Blacknose Dace, Longnose Dace, Creek Chub (MNRF 2016). Cyprinids Spp. (LGL 2016).	Silt, detritus	Cattails, submerged, floating aquatic	Barrier to fish identified D/S of the pond	N/A	N/A	July 1- March 31
	E2: Tributary of Etobicoke Creek West Branch	4835222 mN	604553 mE	Ephemeral	Not provided	None	Not provided (MNRF 2016). Not sampled by LGL (no flow).	Upland soils	Terrestrial	N/A	N/A	N/A	Not Provided
	E3: Tributary of Etobicoke Creek West Branch	4835334 mN	604403 mE	Intermittent	Warmwater	Seasonal	White Sucker, Johnny Darter, Tessellated Darter, Golden Shiner, Common Shiner, Spotfin Shiner, Bluntnose Minnow, Eastern Blacknose Dace, Longnose Dace, Creek Chub (MNRF 2016). Cyprinids Spp. (LGL 2016).	Silt, cobble	Cattails, submerged	Small buffer from agricultural activities, channel appears to be regularly dredged	N/A	N/A	July 1- March 31
	E4: Tributary of Etobicoke Creek West Branch	4835451 mN	604796 mE	Intermittent	Not provided	Indirect	Not provided (MNRF 2016). Sampling conducted by LGL and no catch yielded (LGL 2016).	Silt	Terrestrial, cattails	Small buffer from agricultural activities	N/A	N/A	July 1-March 31
	E5: Etobicoke Creek West Branch	4836695 mN	605169 mE	Permanent	Warmwater	Direct	Blacknose Dace, Bluntnose Minnow, Common Shiner, Creek Chub, Johnny Darter, Longnose Dace, White Sucker, Brook Stickleback, Fathead Minnow, Rock Bass, Northern Hog Sucker, Rainbow Darter (MNRF 2016; TRCA 2016).	Cobble, gravel, boulder, sand, silt	Terrestrial	ATV use has damaged banks, connection to adjacent wetland	Groundwater sources noted to the west of the watercourse (no direct connection to the creek at the time of the site visit)	N/A	July 1- March 31

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 EXISTING FISH AND FISH HABITAT CONDITIONS SUMMARY TABLE**

GWP or Project Name	Waterbody	Latitude	Longitude	Flow*	Thermal Regime***	Fish Habitat	Fish Species Present**	Substrate Type*	Vegetation*	Constraints and Opportunity	Important, Exceptional Fish Habitat	Species at Risk / Critical Habitat Present	In Water Works Timing Window***
							Rock Bass, Tessellated Darter, Rainbow Darter, Fantail Darter, Blacknose Shiner, Spottail Shiner (MNR 2016). Central Stoneroller, Green Sunfish (TRCA 2016). Cyprinids Spp. (LGL 2016).						
	E6: Tributary of Etobicoke Creek West Branch	4837641 mN	605391 mE	Permanent	Warmwater	Direct	Blacknose Dace, Creek Chub, Brook Stickleback (MNR 2016; TRCA 2016) Rock Bass, White Sucker, Johnny Darter, Tessellated Darter, Common Shiner, Bluntnose Minnow, Longnose Dace, Fathead Minnow (MNR 2016). Creek Chub, Central Stoneroller (LGL 2016).	Cobble, gravel, sand, silt, detritus, boulder	Cattails, emergent, submerged vegetation	Culvert at hydro access road restricting flows	N/A	N/A	July 1- March 31
	E7: Tributary of Spring Creek	4838515 mN	605683 mE	Permanent	Warmwater	Direct	Rock Bass, White Sucker, Johnny Darter, Tessellated Darter, Common Shiner, Bluntnose Minnow, Eastern Blacknose Dace, Longnose Dace, Creek Chub, Brook Stickleback, Fathead Minnow (MNR 2016). Sampling conducted by LGL and no catch yielded (LGL 2016).	Silt, sand, gravel, cobble	Emergent, submerged vegetation	ATV use has damaged banks	N/A	N/A	July 1- March 31
	E8: Spring Creek	4838898 mN	605861 mE	Permanent	Warmwater	Direct	Blacknose Dace, Bluntnose Minnow, Brook Stickleback, Common Shiner, Creek Chub, Fathead Minnow, Longnose Dace, White Sucker, Golden Shiner, Pumpkinseed, Spottail Shiner, Green Sunfish, Pumpkinseed, Central Stoneroller, Johnny Darter (TRCA 2016).	Gravel, cobble, sand, silt, boulder	Terrestrial	Small plastic beads (possibly from industrial activity) were identified all through the channel	N/A	N/A	July 1- March 31

**TABLE 2/TEMPLATE 10.2 -
 EXISTING FISH AND FISH HABITAT CONDITIONS SUMMARY TABLE**

GWP or Project Name	Waterbody	Latitude	Longitude	Flow*	Thermal Regime***	Fish Habitat	Fish Species Present**	Substrate Type*	Vegetation*	Constraints and Opportunity	Important, Exceptional Fish Habitat	Species at Risk / Critical Habitat Present	In Water Works Timing Window***
							Creek Chub, Central Stoneroller, Common Shiner, Rosyface Shiner, Green Sunfish, White Sucker (LGL 2016).						
MIMICO CREEK WATERSHED													
14-20001	M1: Tributary of Mimico Creek	4839863 mN	606293 mE	Permanent	Warmwater	Direct	Not provided (MNR 2016). Sampling conducted by LGL and no catch yielded (LGL 2016).	Silt, sand, gravel, detritus, rip rap	Cattails, <i>Phragmites</i>	CN crossing likely barrier to fish movement	N/A	N/A	July 1- March 31
	M2: Tributary of Mimico Creek	4840112 mN	606522 mE	Ephemeral	Not provided	None	Not provided (MNR 2016). Not sampled by LGL (no flow).	Upland soils	Terrestrial	N/A	N/A	N/A	Not provided
	M3: Tributary of Mimico Creek	4840544 mN	606597 mE	Permanent	Warmwater	Indirect	Not provided (MNR 2016). Sampling conducted by LGL and no catch yielded (LGL 2016).	Silt, detritus, rip rap	Cattails	Watercourse is channelized through the study area	N/A	N/A	July 1- March 31
	M4: Tributary of Mimico Creek	4841270 mN	606698 mE	Permanent	Warmwater	Direct	Fathead Minnow, Creek Chub (MNR 2016). Creek Chub, Fathead Minnow, Fathead Minnow (rosy-red strain) (LGL 2016).	Silt, detritus, sand, gravel, cobble	Cattails, emergent, submerged vegetation	Bank erosion was noted	N/A	N/A	July 1- March 31
	M5: Tributary of Mimico Creek	4842796 mN	607098 mE	Permanent	Warmwater	Direct	Creek Chub, Fathead Minnow (MNR 2016; TRCA 2016). White Sucker, Mottled Sculpin, Common Shiner, Bluntnose Minnow, Eastern Blacknose Dace, Brook Stickleback (MNR 2016). Creek Chub (LGL 2016).	Cobble, gravel, sand, silt, rip rap	Cattails	CN crossing likely barrier to fish movement	N/A	N/A	July 1- March 31
	M6: Tributary of Mimico Creek	4842917 mN	607212 mE	Permanent	Warmwater	Direct	White Sucker, Mottled Sculpin, Common Shiner, Bluntnose Minnow, Eastern Blacknose Dace, Creek Chub, Brook Stickleback, Fathead Minnow (MNR 2016). Sampling conducted by LGL and no catch yielded (LGL	Gravel, silt, sand, detritus	Cattails	CN crossing likely barrier to fish movement	N/A	N/A	July 1- March 31

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 EXISTING FISH AND FISH HABITAT CONDITIONS SUMMARY TABLE**

GWP or Project Name	Waterbody	Latitude	Longitude	Flow*	Thermal Regime***	Fish Habitat	Fish Species Present**	Substrate Type*	Vegetation*	Constraints and Opportunity	Important, Exceptional Fish Habitat	Species at Risk / Critical Habitat Present	In Water Works Timing Window***
							2016).						
	M7: Mimico Creek	4843051 mN	607388 mE	Permanent	Warmwater	Direct	Creek Chub (MNRF, TRCA, 2016). White Sucker, Mottled Sculpin, Common Shiner, Bluntnose Minnow, Eastern Blacknose Dace, Brook Stickleback, Fathead Minnow (MNRF 2016). Creek Chub, Fathead Minnow, Fathead Minnow (rosy-red strain), Brook Stickleback (LGL 2016).	Gravel, sand, silt, cobble	Cattails, submerged vegetation	Bank erosion was noted	N/A	N/A	July 1- March 31
	M8: Tributary of Mimico Creek	4844045 mN	608536 mE	Intermittent	Warmwater	Seasonal	White Sucker, Mottled Sculpin, Common Shiner, Bluntnose Minnow, Eastern Blacknose Dace, Creek Chub, Brook Stickleback, Fathead Minnow (MNRF 2016). Cyprinids Spp. (LGL 2016).	Silt, detritus	Cattails, <i>Phragmites</i>	N/A	N/A	N/A	July 1- March 31
HUMBER RIVER WATERSHED													
14-20001	H1: West Humber River	4844845 mN	609243 mE	Permanent	Warmwater	Direct	Rock Bass, Goldfish, White Sucker, Common Carp, Johnny Darter, Northern Hog Sucker, Largemouth Bass, Common Shiner, Creek Chub, Pumpkinseed (MNRF 2016; TRCA 2016). Blacknose Dace, Fantail Darter, Mimic Shiner, Rainbow Darter (TRCA 2016). Yellow Bullhead, Northern Pike, Tessellated Darter, Bluegill, Rainbow Trout,	Silt, detritus, boulder	Submerged, emergent vegetation, cattails	Riparian vegetation sparse in study area	Groundwater contributions noted	N/A	July 1- September 15

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 EXISTING FISH AND FISH HABITAT CONDITIONS SUMMARY TABLE**

GWP or Project Name	Waterbody	Latitude	Longitude	Flow*	Thermal Regime***	Fish Habitat	Fish Species Present**	Substrate Type*	Vegetation*	Constraints and Opportunity	Important, Exceptional Fish Habitat	Species at Risk / Critical Habitat Present	In Water Works Timing Window***
							Spottail Shiner, Rosyface Shiner, Bluntnose Minnow, Fathead Minnow, Blackchin Shiner, Brown Bullhead, Yellow Perch (MNR 2016). Cyprinids Spp. (LGL 2016). Not Provided (MNR 2016).						
	H2: Albion Creek	4845720 mN	610713 mE	Intermittent	Warmwater	Indirect	Sampling conducted by LGL and no catch yielded (LGL 2016).	Silt	Cattails, terrestrial grasses	Channel is piped downstream of Steeles Avenue	N/A	N/A	July 1- March 31
	H3: Tributary of the Lower Humber River	4846030 mN	611629 mE	Intermittent	Coldwater	Indirect	White Sucker, Brook Stickleback, Rainbow Darter, Johnny Darter, Tessellated Darter, Northern Hog Sucker, Largemouth Bass, River Chub, Emerald Shiner, Common Shiner, Blackchin Shiner, Sand Shiner, Bluntnose Minnow, Fathead Minnow, Longnose Dace, Creek Chub, Redside Dace (Historical) (MNR 2016). Sampling conducted by LGL and no catch yielded (LGL 2016).	Silt	Cattails, <i>Phragmites</i> , terrestrial	Watercourse is channelized	Groundwater contributions noted	N/A	July 1- September 15
	H4: Tributary of Rainbow Creek	4846271 mN	612639 mE	Ephemeral	Coldwater	None	White Sucker, Brook Stickleback, Rainbow Darter, Johnny Darter, Tessellated Darter, Northern Hog Sucker, Largemouth Bass, River Chub, Emerald Shiner, Common Shiner, Blackchin Shiner, Sand Shiner, Bluntnose Minnow, Fathead Minnow, Longnose Dace, Creek Chub, Redside Dace (Historical) , Eastern Blacknose Dace, Pumpkinseed (MNR 2016). Not sampled by LGL (no flow).	Terrestrial	Isolated sections of cattails	N/A	N/A	N/A	July 1- September 15

**TABLE 2/TEMPLATE 10.2 -
 EXISTING FISH AND FISH HABITAT CONDITIONS SUMMARY TABLE**

GWP or Project Name	Waterbody	Latitude	Longitude	Flow*	Thermal Regime***	Fish Habitat	Fish Species Present**	Substrate Type*	Vegetation*	Constraints and Opportunity	Important, Exceptional Fish Habitat	Species at Risk / Critical Habitat Present	In Water Works Timing Window***
	H5: Tributary of Rainbow Creek	4846579 mN	612893 mE	Permanent	Coldwater	Direct	<p>White Sucker, Brook Stickleback, Rainbow Darter, Johnny Darter, Tessellated Darter, Northern Hog Sucker, Largemouth Bass, River Chub, Emerald Shiner, Common Shiner, Blackchin Shiner, Sand Shiner, Bluntnose Minnow, Fathead Minnow, Longnose Dace, Creek Chub, Redside Dace (Historical), Eastern Blacknose Dace, Pumpkinseed (MNRF 2016).</p> <p>Cyprinids Spp. (LGL 2016 visual observations); Sampling conducted by LGL and no catch yielded (LGL 2016).</p>	Silt, sand, gravel, rip rap	Cattails, emergent, submerged vegetation	Barriers to fish movement identified in study area	Flows through wetland habitat.	N/A	July 1- September 15
	H6: Rainbow Creek	4846773 mN	613251 mE	Permanent	Coldwater	Direct	<p>White Sucker, Brook Stickleback, Rainbow Darter, Johnny Darter, Northern Hog Sucker, Common Shiner, Bluntnose Minnow, Fathead Minnow, Longnose Dace, Creek Chub, Blacknose Dace, Pumpkinseed (MNRF 2016; TRCA 2016).</p> <p>Central Stoneroller, Fantail Darter, Green Sunfish, Rock Bass, Rainbow Darter, Golden Shiner (TRCA 2016).</p> <p>Redside Dace (Historical) Tessellated Darter, Largemouth Bass, River Chub, Emerald Shiner, Blackchin Shiner, Sand Shiner (MNRF 2016).</p> <p>Sampling conducted by LGL and no catch yielded (LGL 2016).</p>	Gravel, sand, silt, rip rap, cobble, detritus	Submerged vegetation, <i>Phragmites</i>	Flows adjacent to 407 ETR	N/A	N/A	July 1- September 15

**TABLE 2/TEMPLATE 10.2 -
 EXISTING FISH AND FISH HABITAT CONDITIONS SUMMARY TABLE**

GWP or Project Name	Waterbody	Latitude	Longitude	Flow*	Thermal Regime***	Fish Habitat	Fish Species Present**	Substrate Type*	Vegetation*	Constraints and Opportunity	Important, Exceptional Fish Habitat	Species at Risk / Critical Habitat Present	In Water Works Timing Window***	
	H7: Lower Humber River	4847166 mN	614038 mE	Permanent	Warmwater	Direct	Rock Bass, White Sucker, Northern Hog Sucker, Pumpkinseed, River Chub, Common Shiner, Rosyface Shiner, Stonecat, Bluntnose Minnow, Longnose Dace, Creek Chub, Fantail Darter, Johnny Darter, American Brook Lamprey (MNR 2016; TRCA 2016). Blacknose Dace, Central Stoneroller, Rainbow Darter, Rainbow Trout, Green Sunfish, Sand Shiner, Largemouth Bass, Golden Shiner, Lamprey Spp. (TRCA 2016). Brown Bullhead, Brook Stickleback, Common Carp, Yellow Perch, Blackside Darter, Fathead Minnow, Central Mudminnow, Rainbow Darter, Tessellated Darter (MNR 2016). Sampling conducted by LGL and no catch yielded (LGL 2016).	Silt, sand, gravel, cobble, boulder, detritus	<i>Phragmites</i>	N/A	N/A	N/A	N/A	July 1- March 31
	H8: Tributary of the Lower Humber River	4847069 mN	614281 mE	Permanent	Warmwater	Indirect	Not provided (MNR 2016). Sampling conducted by LGL and no catch yielded (LGL 2016).	Silt, detritus, gravel, sand, rip rap	Cattails, emergent, submerged vegetation	Channel is piped downstream of study area	N/A	N/A	July 1- March 31	

* Data based on LGL field investigations completed in Spring/Summer of 2016.

** Fish Point Data based on secondary source review including personal correspondence with Credit Valley Conservation (2016), Toronto and Region Conservation Authority (2016), and the Ministry of Natural Resources and Forestry (2016), and LGL field investigations completed in Spring/Summer of 2016.

*** Thermal regime, in-water timing window and sensitivity provided by the Ministry of Natural Resources and Forestry (2016), where missing provided by LGL based on field investigations.

4.0 FIELD INVESTIGATIONS

Field investigations focused on the facility footprint, including the proposed preferred Transitway alignments/station locations and adjacent lands up to 120 m (north and south) from the future infrastructure footprint (see **Figure 2**), all located south of the 407 ETR.

LGL Fisheries Specialists conducted fisheries surveys on June 3, 6 and 9, August 15, and September 14 and 20, 2016 to identify and document fish habitat along and adjacent to the proposed preferred Transitway alignments and station locations.

Physical features within 50 m of the transitway corridor and station locations (facility footprint) were surveyed in sufficient detail to enable mapping and identification of key habitat types. The fisheries investigations by LGL Limited staff were carried out in accordance with the MTO Fish Guide (2009), MTO Pilot Fisheries Protocol (2016) and MTO Environmental Reference for Highway Design (2013). The physical habitat attributes assessed included: (a) instream cover; (b) bank stability; (c) substrate characteristics; (d) stream dimensions and depths; (e) barriers; (f) stream morphology; (g) terrain characteristics; (h) stream canopy cover; (i) stream gradient; (j) aquatic vegetation; (k) ground water seepage; and (l) general comments. Dip net and visual fish sampling were conducted (at all watercourses with flow during the field surveys) to confirm and augment existing fish community data obtained from secondary source review, except for site M8, where access issues were encountered. At this site only visual observations were obtained. Sampling was not conducted by LGL at the four ephemeral watercourses (with no flow) within the study area including C1, E2, M2 and H4. Formal electrofishing surveys were not necessary for this project due to the abundance of existing fish data that exists for the watercourses within the study area. Fish data for all major watercourses within the study limits were provided to LGL by MNRF and TRCA. Watercourses where data was not available from secondary source review are small contributing intermittent/ephemeral features directly connected to the well documented communities. The results of LGL's visual observations and sampling are provided in **Table 2** (under Fish Species Present column) and are discussed in **Section 5.1**.

5.0 EXISTING FISH AND FISH HABITAT CONDITIONS

Aquatic habitat for each of the watercourses within the study area is described in detail below based on the review of secondary source information and a two-season field investigation. A summary of this information, which includes habitat and fish community information, can be found in **Table 2**. The thermal regime, fish community, in-water timing window, important/exceptional habitat, and species at risk information for each watercourse in **Table 2** is based on data received from MNRF (and LGL's field investigation where no data was available from MNRF). Data collection followed the *PILOT MTO/DFO/OMNR Protocol* (2016), specifically Section 4 of the *Environmental Guide for Fish and Fish Habitat* (MTO 2009). Photos of the watercourse crossings and Watercourse Field Record Forms and Habitat Mapping are included in **Appendices B** and **C**, respectively.

5.1 General Description of Watercourses within the Study Area

Watercourses within the study area flow in a generally north to south direction, and ultimately drain into Lake Ontario, with the exception of a tributary of the Lower Humber River (H3), and two tributaries of Rainbow Creek (H4 and H5) which flow in generally an easterly direction along the facility footprint. There are a total of 25 watercourse crossings occurring within the study area: one within the Credit River watershed (although this watercourse is located just west of the study limits); eight within the Etobicoke Creek watershed; eight within the Mimico Creek watershed; and, eight within the Humber River watershed. The locations of these watercourses can be found in **Figure 2**. The watercourse labels are

numbered from west to east, and are preceded by the first letter of the watershed name (i.e., the westerly crossing of the Credit River is labelled C1).

A total of 21 new structure/culvert watercourse crossings along the Transitway facility are proposed based on the Transitway design. Of the 21 structure/culvert crossings, 20 support fish or fish habitat either directly or indirectly (see **Table 1** and **Figure 2**). All the crossings within the study area, including those affected by the Transitway footprint, are summarized in **Table 2/Template 10.2**, and are described in detail below.

5.1.1 Credit River Watershed

One watercourse within the Credit River watershed is located 55 m west of the 407 Transitway study limits according to the Drainage Report (Parsons 2017): a tributary of Fletchers Creek (Site C1 on **Figure 2**). The Fletchers Creek Main Branch is also located beyond the westerly study area limits. As a result, these watercourses are not anticipated to be impacted. The tributary of Fletchers Creek (C1) will remain in this report due to the highlighted sensitivity from MNRF and proximity to the study limits. Based on a review of the Draft Fletchers Creek Restoration Study (CVC 2012a), the tributary of Fletchers Creek (C1) is a headwater feature which conveys surface water from the 407 ETR and surrounding residential areas to the north of the 407 ETR into the Fletchers Creek Main Branch which is classified as coldwater and occupied Redside Dace habitat (MNRF 2016). No fish community or thermal regime data was available for the tributary of Fletchers Creek (C1) from personal correspondence that took place with MNRF and CVC in 2016, although MNRF noted the sensitivity was high.

Below is a description of the tributary of Fletchers Creek that is located just west of the 407 Transitway study limits.

5.1.1.1 C1: Tributary of Fletchers Creek

This tributary of Fletchers Creek was dry during the spring and summer field investigations. The channel within the limits of the study area is not defined, and vegetation is predominately terrestrial, consisting of grasses and *Phragmites*. Construction for utilities has recently occurred in the area, and a wetted depression was present within this works area. Downstream of the transitway corridor a more defined channel, densely vegetated with cattails is present. No evidence of any critical habitat features was noted. This watercourse functions as ephemeral drainage and does not appear to constitute as fish habitat within the study limits. Flow/standing water was not present; therefore, sampling was not conducted by LGL.

MNRF originally classified this watercourse as an unknown thermal regime, **high** sensitivity and contributing Redside Dace habitat. Based on the results of the field investigations, LGL requested the sensitivity be modified to **none**. MNRF did not agree with LGL's change in sensitivity and requested that the sensitivity remain **high** with contributing Redside Dace habitat.

5.1.2 Etobicoke Creek Watershed

There are eight watercourses within the Etobicoke Creek watershed that are located within the 407 Transitway study area. These watercourses include the Etobicoke Creek West Branch and five tributaries, and Spring Creek and one tributary of Spring Creek (Sites E1-E8 on **Figure 2**).

According to the Etobicoke and Mimico Creeks Watershed Technical Update Report (TRCA 2010), the fish communities within Etobicoke Creek are comprised of cool and warmwater species. Fish abundance and diversity are reported to be lower in Etobicoke Creek relative to less urban watersheds within the Greater Toronto Area. Migratory salmonids have been reported within Etobicoke Creek, but are unlikely

to reach as far north as the 407 Transitway due to barriers to fish passage present downstream (TRCA 2010). A review of the Aquatic Species at Risk Mapping (DFO 2015) confirms that no aquatic species at risk occur within Etobicoke Creek within the vicinity of the study area.

Fish community data for the Etobicoke Creek West Branch and its tributaries provided by TRCA and MNRF (2016 personal correspondence) is consistent with the cool/warmwater fish community information provided by the TRCA (2010). Personal correspondence with MNRF (2016) indicated that all watercourses within the Etobicoke Creek watershed are warmwater and **low** sensitivity or **unknown** sensitivity.

Below are descriptions of each of the watercourses that are located within the 407 Transitway corridor.

5.1.2.1 E1: Tributary of Etobicoke Creek West Branch

Based on air photo interpretation, this tributary of Etobicoke Creek West Branch originates north of the 407 ETR from a residential storm water outlet. Within the area of investigation, this feature is bordered by agricultural fields, and is characterized as a wetted cattail corridor, which ranges from approximately 4 m to 20 m in width. Substrates in this watercourse were comprised of silt and detritus. During both the spring and summer field investigations, the channel was generally diffuse and had little flow. Refuge habitat, however, was noted within the area of investigation. An online pond feature (80 m x 30 m) is present approximately 400 m south (downstream) of the 407 ETR and likely supports fish year-round. An old farm access road, concrete berm and culvert are present at the downstream end of the pond and appear to be functioning as a complete barrier to fish movement. A pool 3 m wide and 50 cm deep is present immediately downstream of this barrier in which cyprinids were observed during the spring field investigation. Another pool is present at the upstream end of the area of investigation, immediately downstream of the 407 ETR culvert, and measures approximately 5 m wide and 40 cm deep. Submerged and floating aquatic vegetation were noted throughout the area of investigation. It appears that recently utility works were undertaken through an approximately 10 m stretch of the watercourse within the study limits, and channel/bank restoration measures, including rip rap and coir matting, have been applied. It also appears, based on air photo interpretation, that this watercourse is piped downstream of the study limits. Dip net and visual fish sampling were conducted by LGL during the field investigations. Other than the Cyprinids observed by LGL (see note above), no fish were observed or dip netted within the channel.

MNRF originally classified this watercourse as warmwater and **low** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL agrees with the MNRF **low** sensitivity designation. This tributary should be classified as seasonal fish habitat, and it should be noted that the pond and pool immediately downstream of the pond may provide permanent fish refugia.

5.1.2.2 E2: Tributary of Etobicoke Creek West Branch

This tributary is a headwater feature characterized as an agricultural swale, and appears to flow ephemerally, as no water was noted within this feature during either site visit. This feature has defined banks, measuring approximately 1 m in width. Terrestrial vegetation is present within the channel and it was evident during the field investigations that it is frequently crossed by farm equipment. This feature directs ephemeral runoff to tributary E3 within the study limits and does not provide fish habitat. Flow was not present; therefore, sampling was not conducted by LGL. No information from MNRF was available for this tributary.

5.1.2.3 E3: Tributary of Etobicoke Creek West Branch

This watercourse has a well-defined channel with minimal flow during spring and stagnant conditions in the summer. Emergent and submergent vegetation, including significant amounts of filamentous green algae, are present. The channel averages 1 m in width and less than 10 cm in depth. Silt is the dominant substrate, with some cobble (from the base soil) scattered within the channel. The adjacent fields are being actively farmed and, in many locations, there is little to no buffer between the fields and the watercourse. In some locations, the channel appears to have been dredged along the edge of the field. Cyprinids were observed within this channel approximately 50 m downstream of the area of investigation during the spring field investigation. Two contributing features (tributaries E2 and E4) provide runoff to this watercourse. Dip net and visual fish sampling were conducted by LGL during the field investigations. No fish were observed or dip netted directly within the channel.

MNRFP originally classified this watercourse as warmwater and **low** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL agrees with the MNRFP **low** sensitivity designation. This tributary of Etobicoke Creek West Branch likely provides seasonal habitat within the study limits.

5.1.2.4 E4: Tributary of Etobicoke Creek West Branch

During the spring field investigation, this tributary contained standing water, terrestrial vegetation, and cattails. It was dry during the summer visit. Silt is the dominant substrate. Channel dimensions during the spring visit averaged 40 cm in width and <10 cm in depth. Within the study area, it appears that construction for a gas line was recently conducted, and channel/bank restoration works in the form of an erosion control blanket have been applied. To the upstream of the Transitway alignment, a small pond feature (10 m x 12 m) was noted; however, fish presence is unlikely, due to the degraded channel condition downstream of this feature. Downstream of the Transitway alignment, the channel is ploughed through before converging with tributary E3. In addition, an access road crosses this feature and the twin corrugated steel pipe culverts at this location are slightly perched. Dip net and visual fish sampling were conducted by LGL during the field investigations. No fish were observed or dip netted within the channel.

No information from MNRFP was available for this tributary. This watercourse appears to function as indirect fish habitat. Based on the results of the field investigation, and the available secondary source information, this watercourse should be classified as warmwater and **low** sensitivity. MNRFP agreed with this interpretation of sensitivity.

5.1.2.5 E5: Etobicoke Creek West Branch

This watercourse is permanently flowing, with average channel dimensions of 6 m in width and 30 cm in depth. Several trails parallel and cross this watercourse within the study area, and appear to be predominantly from recreational ATV use. To the west of the watercourse, wetland/pond features were noted, however; no direct connection to the Etobicoke Creek West Branch was observed. ATV use appears particularly heavy within this area. It appears that pond overflow and groundwater seeps historically discharged into the watercourse from the west, however rutting from the ATV use appears to have disrupted this connection. The riparian cover generally is moderate throughout the study area, and provided by overhanging grasses and trees. Instream cover is also moderate, and is provided by cobble, boulders, algae and undercut banks. North of the Transitway alignment, in the vicinity of the 407 ETR bridge structure, boulder bank protection is present.

The Etobicoke Creek West Branch throughout the study area is characterized predominantly by riffles and runs and some flats. One pool was noted. Substrates are comprised of cobble, gravel, boulders, sand

and silt. Bankfull dimensions are 7 m in width and 50 cm in depth. Minor erosion was noted, throughout the Transitway alignment, and significant erosion was noted on one outside bank of a bend downstream of the Transitway alignment. This bank is highly entrenched and rises approximately 4 m above from the high water mark. Dip net and visual fish sampling were conducted by LGL during the field investigations. Cyprinids were noted visually throughout the area of investigation. Dip net sampling did not yield a catch.

MNRFP originally classified this watercourse as warmwater and **low** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL agrees with the MNRFP **low** sensitivity designation. Etobicoke Creek West Branch provides direct fish habitat within the study limits.

5.1.2.6 E6: Tributary of Etobicoke Creek West Branch

This tributary within the study area is permanently flowing with an average width of 3 m and an average depth of 30 cm. At the upstream (north) area of investigation, the watercourse flows through naturalized meadow habitat and is well shaded by overhanging riparian grasses. Instream vegetation consists of cattails, along with other emergent and submerged species. Evidence of highly variable flows was observed during the summer site investigation (bent over riparian vegetation and debris along the top of bank). Bankfull measurements throughout the area of investigation average 7 m width and 1 m depth. Erosion was noted along many of the outside banks as much bank material has slumped into the wetted channel forcing the channel to braid. A mixed morphology is present within the channel and is dominated by runs, but includes pools, riffles and flats. Pools are generally large through this channel (up to 15 m in length) and up to 50 cm in depth. Many fish were noted within these pools. Substrates within the channel were comprised of cobble, gravel, sand, silt, detritus and boulders. This tributary of Etobicoke Creek West Branch crosses underneath Dixie Road via a concrete arch structure. Both east and west of Dixie Road, ATV tracks were noted crossing the channel, and it also appears they cross underneath Dixie Road within the wetted channel of the watercourse.

Downstream of Dixie Road, runs/flats comprise the dominant morphology and riparian vegetation is again comprised of meadow species. Bank erosion was noted throughout the downstream section. Channel disturbance has also recently occurred downstream of Dixie Road where utility works were conducted across the watercourse as bank stabilization measures (crib walls, erosion control blankets and silt fence) were present along an approximately 20 m section of channel. Further downstream of this disturbance, an access road crosses the creek. The access road crossing consists of a small (and likely undersized) culvert, embedded in rip-rap. A large pool/flat is located upstream of this crossing as flow has been restricted. Downstream of the access road, channel conditions change as riffles dominate the morphology. There is a large pool approximately 20 m downstream of the access road, where the channel bends 90 degrees to the east. Significant erosion was noted on the banks at this location and evidence of bank overtopping was present (a very large area of debris spread over riparian vegetation). Downstream of this bend, runs/flats once again dominate the morphology within the watercourse which flows within a cattail-dominated bankfull corridor. Dip net and visual fish sampling were conducted by LGL during the field investigations. Creek Chub (*Semotilus atromaculatus*) and Central Stoneroller (*Campostoma anomalum*) were observed within this watercourse during the site investigations. Dip net sampling did not yield a catch.

MNRFP originally classified this watercourse as warmwater and **low** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL agrees with the MNRFP **low** sensitivity designation. This tributary of Etobicoke Creek West Branch provides direct fish habitat within the study limits.

5.1.2.7 E7: Tributary of Spring Creek

This tributary within the area of investigation is permanently flowing with an average width of 1 m and an average depth of 30 cm. At the north (upstream) end of the Transitway alignment, the watercourse flows through a field with scattered tree cover. Overhanging grasses comprise the riparian vegetation with cattails and *Phragmites* also present. The creek is notably entrenched, with bankfull dimensions averaging 3 m in width and 90 cm in depth. Variable flows are evident, as debris was noted at the top of the banks, and channel erosion was observed on many outside bends. Substrates were comprised of silt, sand, gravel, and cobble. At the upstream end, flats/runs are the dominant morphology. As the creek flows south through the Transitway alignment, it flows through a deciduous woodlot where morphology becomes more diverse with riffles and runs and occasional pools. Throughout the entire area of investigation, ATV use was evident and several creek crossing locations were noted and trails are present throughout much of the surrounding area. Instream cover is provided by both in-water and riparian woody debris. Emergent and submerged aquatic vegetation are also common within this watercourse. In addition to the ATV trails, channel works were recently undertaken immediately upstream of the convergence with E8 (Spring Creek). It appears that linear utility works were completed in this area as stabilization measures (cobble placement and erosion control blankets) have been applied to the banks. Dip net and visual fish sampling were conducted by LGL during the field investigations. No fish were observed or dip netted within the channel.

MNRFP originally classified this watercourse as warmwater and **low** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL agrees with the MNRFP **low** sensitivity designation. Although no fish were noted within this channel, no barriers to fish movement were identified within the area of investigation. Therefore, this tributary of Spring Creek should be classified as permanent, direct fish habitat.

5.1.2.8 E8: Spring Creek

Spring Creek within the area of investigation is a permanently flowing watercourse. At the upstream end of the study area, it crosses under the 407 ETR via a clear span bridge. Downstream of this crossing, Spring Creek exhibits a diverse mix of riffles, runs/flats and pools with a mean width of 3.5 m and a mean depth of 30 cm. Some pools, however, are approximately 75 cm deep. Bankfull width is approximately 7 m and bankfull depth is 70 cm. Substrates are comprised of gravel, cobble, sand, silt, and boulders. Riparian habitat consists of meadow dominated by grasses. Scattered trees and shrubs along with overhanging grasses provide much of the riparian cover, which overall is low. Severe erosion was noted predominantly throughout the downstream section of channel, and in some locations scattered concrete debris is present on the banks and in-stream, possibly placed as erosion protection for the banks. ATV use is evident throughout the area and crossings through the watercourse were noted during both site investigations. Similar to the other sites discussed above, utility works occurred within the study area as bank stabilization measures (including cobble placement and erosion control blankets) have been applied. Dip net and visual fish sampling were conducted by LGL during the field investigations. Creek Chub, Central Stoneroller, Common Shiner (*Luxilus cornutus*), Rosyface Shiner (*Notropis rubellus*), Green Sunfish (*Lepomis cyanellus*) and White Sucker (*Catostomus commersonii*) were observed/dip netted within Spring Creek during the summer site investigation.

MNRFP originally classified this watercourse as warmwater and **unknown** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL classifies this watercourse as **low** sensitivity. MNRFP agreed with this interpretation of sensitivity. Spring Creek should be classified as permanent, direct fish habitat.

5.1.3 Mimico Creek Watershed

There are eight watercourses within the Mimico Creek watershed that are located within the 407 Transitway study area. These crossings include Mimico Creek and seven tributaries (Sites M1-M8 on **Figure 2**).

According to secondary source review, the fish communities within Mimico Creek are comprised of cool and warmwater species. It has been reported that fish species of greater sensitivity have not been found within this watershed for several decades (TRCA 2010). A review of the Aquatic Species at Risk Mapping (DFO 2015) indicates that no aquatic species at risk occur within Mimico Creek within the vicinity of the study area.

Fish community data for some watercourses within the Mimico Creek watershed was provided by TRCA and MNR (2016 personal correspondence). Fish data provided is consistent with the cool/warmwater fish community information provided in the Watershed Technical Update Report (TRCA 2010). Personal correspondence with MNR (2016) indicated that all Mimico Creek watercourses are warmwater (or unknown – M2), and have **moderate/low** or **unknown** sensitivities.

5.1.3.1 *M1: Tributary of Mimico Creek*

This tributary of Mimico Creek is a permanently flowing watercourse that passes underneath the 407 ETR via a twin cell concrete box culvert. It is bordered by a railway line to the west and an active agricultural field to the east. The wetted channel averages 3 m in width and 30 cm in depth. Morphology generally consists of flats, with the exception of some riffles and runs within the middle reaches of the study area. Bankfull width is approximately 5 m and bankfull depth is approximately 50 cm. Substrates throughout the channel consist of silt, sand, gravel, detritus and rip rap (mainly present at the 407 ETR culvert outlet). Tree cover is present through the middle reaches and provides shading to the watercourse. Outside of this treed area, riparian habitat consists of meadow species (mainly grasses) with much cattail and *Phragmites* growth along the banks and in the channel, which in some areas is very dense. At the downstream end of the Transitway alignment, the channel widens to approximately 8 m at a relatively stagnant section of channel, before crossing underneath the railway line to the south.

MNR originally classified this watercourse as warmwater and **unknown** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL classifies this watercourse as **low** sensitivity. MNR agreed with this interpretation of sensitivity. Dip net and visual fish sampling were conducted by LGL during the field investigations. Although no fish were observed or dip netted within this channel, no barriers to fish movement were identified within the area of investigation and, therefore, this tributary of Mimico Creek should be classified as permanent, direct fish habitat.

5.1.3.2 *M2: Tributary of Mimico Creek*

This tributary is a headwater drainage feature characterized as an agricultural swale. It likely flows ephemerally as it was dry in the spring with the exception of some areas of standing water within tire ruts caused by the crossing of farm vehicles/equipment. A defined channel, approximately 40 cm in width, was noted in the spring, and was slightly wetted (as noted above). During the summer investigation, a defined channel was difficult to identify as this feature was overgrown with dense terrestrial vegetation and was dry. Flow/standing water was not present; therefore, sampling was not conducted by LGL. This feature directs surface runoff to tributary M1 within the study limits and does not provide fish habitat. No information from MNR was available for this crossing.

5.1.3.3 M3: Tributary of Mimico Creek

The tributary of Mimico Creek at this location is a channelized feature that is bordered by active agricultural fields on both sides. Within the area of investigation, this watercourse contained no flowing water but the channel held standing water during both the spring and summer field investigations. Mean wetted width was 1 m and depths were generally less than 10 cm during the site visits. The channel is located within a corridor of cattails approximately 3 m in width. An access road crosses this feature approximately 130 m south of the 407 ETR crossing. Twin CSP culverts convey the flow under the access road. To the north of the access road, shrub cover is dominant, and provides shading to this watercourse. Substrates within this feature include silt, detritus and rip rap. Dip net and visual fish sampling were conducted by LGL during the field investigations. No fish were observed or dip netted within the channel.

MNRFP originally classified this watercourse as warmwater and **unknown** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL classifies this watercourse as **low** sensitivity. MNRFP agreed with this interpretation of sensitivity. Due to the observed conditions, it appears that this feature is unlikely to provide direct fish habitat, and likely supports downstream communities indirectly.

5.1.3.4 M4: Tributary of Mimico Creek

The tributary of Mimico Creek at this location is a permanently flowing watercourse that flows through a meadow habitat that itself is providing a large buffer between the channel and the active agricultural fields to the east and west. This feature averages 4 m in width and 25 cm in depth, with bankfull measurements of 6 m in width and 1.5 m in depth. Flows appear to be highly variable and likely flashy during storm events which has resulted in the severe erosion that was observed during the site visits. Morphology through the area of investigation is dominated by flats, with some runs and pools. Riffles are uncommon in this watercourse. Substrates are comprised of silt, detritus, sand, gravel and cobble. Very little tree cover is present, and much of the shade for this watercourse is provided by grasses, cattails (riparian and instream) and other emergent and submerged aquatic vegetation. Dip net and visual fish sampling were conducted by LGL during the field investigations. Many fish, including Creek Chub and Fathead Minnow (*Pimephales promelas*), including some of the rosy-red strain, were observed or dip netted within this watercourse.

MNRFP originally classified this watercourse as warmwater and **low** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL agrees with the MNRFP **low** sensitivity designation. This tributary of Mimico Creek provides direct fish habitat within the study limits.

5.1.3.5 M5: Tributary of Mimico Creek

This tributary of Mimico Creek is a permanently flowing watercourse within the study area. The channel averages 3 m in width and 25 cm in depth, with a mean bankfull width of 4 m and bankfull depth of 40 cm. Morphology consists of riffles, runs and flats with a single pool noted at the north (upstream) end of the Transitway alignment. Immediately downstream of the 407 ETR, boulders line the banks and it is likely that they were placed during the 407 ETR construction as bank protection. Substrates consist of rip rap, cobble, gravel, sand and silt. Riparian shading is moderate throughout the Transitway alignment and is provided by cattails, grasses and overhanging trees/shrubs. A fair amount of instream woody debris was also noted during site investigations. This watercourse generally flows in a southeasterly direction, and crosses underneath a railway line via a CSP culvert. Before this point, a connector channel exists, which allows cross flow between the M5 channel and another tributary of Mimico Creek (M6). With the exception of this small connector channel, these watercourses remain separated, and flow within

individual culverts underneath the railway line. These tributaries converge at the railway culvert outlets into a large plunge pool, lined with riprap, that is approximately 6 m wide and 50 cm deep. It should be noted that these CSP culverts are both perched approximately 30 cm, and appear to be functioning as barriers to fish movement. Erosion is present along the banks of the entire length of the single channel that conveys flows from both watercourses downstream of the culvert outlets to the confluence with Mimico Creek (M7), approximately 30 m downstream. Rip rap lines the channel though this entire section, with a rip rap berm creating a seasonal barrier to fish passage at the convergence. Dip net and visual fish sampling were conducted by LGL during the field investigations. Creek chub were observed and dip netted in this watercourse, both upstream and downstream of the railway line.

MNRFB originally classified this watercourse as warmwater and **low** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL agrees with the MNRFB **low** sensitivity designation. This tributary of Mimico Creek provides direct fish habitat within the study area.

5.1.3.6 M6: Tributary of Mimico Creek

This tributary of Mimico Creek is a permanently flowing watercourse with a mean channel width of 0.5 m and a mean depth of 20 cm. Bankfull width was approximately 3 m and bankfull depth was approximately 40 cm. The watercourse appears to have been historically channelized to run parallel to the railway line before crossing underneath it to the east via a CSP culvert. As stated in the previous section, a small connector channel joins this watercourse to the tributary of Mimico Creek (M5) just upstream of the railway crossing, but other than this small connection, the channels remain separate on the west side of the railroad. The M6 channel flows within a corridor of cattails and grasses, which in some sections are growing densely within the channel. Substrates consist of gravel, silt, sand and detritus. This watercourse converges with the M5 tributary immediately downstream of the railway line before discharging to Mimico Creek (M7) approximately 30 m downstream of the railway crossing. Dip net and visual fish sampling were conducted by LGL during the field investigations. No fish were observed or dip netted within this channel upstream of the railway.

MNRFB originally classified this watercourse as warmwater and **moderate** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL requested the sensitivity be modified to **low**. MNRFB did not agree with the change in sensitivity and requested the sensitivity remain as **moderate**. This tributary of Mimico Creek provides direct fish habitat within the study limits.

5.1.3.7 M7: Mimico Creek

Mimico Creek is a permanently flowing watercourse with a mean width of 4 m and a mean depth of 30 cm. This watercourse appears to experience highly variable flows, as erosion is evident and deposition of debris was noted at the top of banks. Bankfull dimensions were estimated to be 10 m in width and 70 cm in depth. Much of the section of Mimico Creek within the study area flows through a deciduous woodlot which provides shading to the watercourse. Woody debris and undercut banks are present which provide good instream cover. Aquatic vegetation is also present throughout this channel and includes cattails and submerged vegetation. A diverse mix of riffles, runs, pools and flats are present within this channel, and substrates consist of gravel, sand, silt and cobble. Dip net and visual fish sampling were conducted by LGL during the field investigations. Many fish were observed/dip netted within this channel and include Creek Chub, Fathead Minnow (including some of the rosy-red strain), and Brook Stickleback (*Culaea inconstans*).

MNRFB originally classified this watercourse as warmwater and **moderate** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL requested the

sensitivity be modified to **low**. MNRF did not agree with the change in sensitivity and requested the sensitivity remain as **moderate**. Mimico Creek provides direct fish habitat within the study limits.

5.1.3.8 M8: Tributary of Mimico Creek

This tributary of Mimico Creek was only accessed from the Steeles Avenue right-of-way due to private property restrictions. This watercourse appears to flow intermittently, as water was stagnant during the spring site visit and dry during the summer site visit. During the spring visit, the channel averaged 1.5 m in width and less than 10 cm in depth. The channel contains dense cattail and *Phragmites* growth and the reach examined is also shaded by scattered riparian tree cover. Substrates consist of silt and detritus. Cyprinids were observed within an area of standing water to the north (upstream) of Steeles Avenue during the spring site visit. These fish were “gulping” at the surface, likely from hypoxia due to low oxygen concentration as the creek had ceased to flow and was drying up. Dip net sampling was not undertaken due to the property access issues.

MNRF originally classified this watercourse as warmwater and **moderate** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL requested the sensitivity be modified to **low**. MNRF agreed with the change in sensitivity. Mimico Creek provides seasonal fish habitat within the study area.

5.1.4 Humber River Watershed

There are eight watercourses within the Humber River watershed that are located within the 407 Transitway study area. These crossings include the main branch of the West Humber River, Albion Creek, the main branch of the Lower Humber River and two of its tributaries, and Rainbow Creek and two of its tributaries (Sites H1-H8 on **Figure 2**).

West Humber River Subwatershed

According to the Humber River Watershed Plan (TRCA 2008), the West Humber River occurs within fish management zone (FMZ) 7, which is managed for coolwater species including Redside Dace, Rainbow Darter (*Etheostoma caeruleum*) and Smallmouth Bass (*Micropterus dolomieu*).

Fish community data for the West Humber River (H1) was provided by TRCA and MNRF (2016 personal correspondence). Fish data provided are consistent with a cool/warmwater fish community. No records of Redside Dace were provided by the TRCA or MNRF. MNRF (2016) originally classified the West Humber River as warmwater and **high** sensitivity, although MNRF changed the sensitivity to **moderate** in the most recent correspondence (Dec. 9, 2016).

Middle/Lower Humber River Subwatershed

The Middle/Lower Humber River and its tributaries occur along the edge of three FMZs: 5 (Middle Humber River), 6 (Rainbow Creek) and 10 (Lower Humber River) (TRCA 2008). FMZ 5, to the north of the Transitway alignment, is managed for coolwater species including Redside Dace, Rainbow Darter, Blackside Darter (*Percina maculata*), Rainbow Trout (*Oncorhynchus mykiss*) and Smallmouth Bass. FMZ 6, also to the north of the Transitway alignment, is managed for coolwater species including Redside Dace, Rainbow Darter and Blackside Darter. FMZ 10, to the south of the Transitway alignment, is managed for coolwater species including Rainbow Darter and Smallmouth Bass (TRCA 2008).

Some fish community data for the West Humber River, Lower Humber River and Rainbow Creek were provided by TRCA and MNRF (2016 personal correspondence) and is consistent with a cool/warmwater fish community and includes records of Rainbow Trout, a migratory gamefish species, in the main branch. No records of Redside Dace were provided by the TRCA in the 2016 personal correspondence.

Personal correspondence with MNRF (2016) indicated that Albion Creek (H2) supports warmwater fish habitat. A sensitivity classification was not originally provided, however LGL assigned a **low** sensitivity to this watercourse as a result of field investigations. Rainbow Creek and its tributaries (H4-H6) were originally classified by MNRF as **high** sensitivity and supporting coldwater fish habitat, although MNRF indicated in the most recent personal correspondence (December 9, 2016) that the sensitivity of H4 is now **low**. It was originally noted by MNRF that Rainbow Creek (H6) supports Redside Dace occupied habitat, and the Rainbow Creek tributaries support historical Redside Dace habitat (MNRF 2016). However, since that time, it was confirmed by MNRF (2016) that Redside Dace regulated habitat is not present in Rainbow Creek (see **Section 5.2**) and this watercourse, like the Rainbow Creek tributaries, supports historical Redside Dace habitat. The main branch of the Lower Humber River (H7) was originally classified as warmwater, however no sensitivity information was originally provided. MNRF indicated in the most recent personal correspondence (December 9, 2016) that the sensitivity of H7 is **moderate**. One Lower Humber River tributary (H3) was originally classified by MNRF as **high** sensitivity and supporting coldwater fish habitat (although MNRF indicated in the most recent personal correspondence (December 9, 2016) that the sensitivity of H3 is **moderate**), and the second Lower Humber River tributary (H8) was originally classified by MNRF as **low** sensitivity and supporting warmwater fish habitat.

5.1.4.1 H1: West Humber River

The West Humber River is the largest watercourse within the study area with a mean width of 25 m and a mean depth of 40 cm. Water within the channel was fairly turbid during both site visits which made accurate depth estimates difficult. Therefore, it is possible that this watercourse within the study area reaches greater depths than reported during the field investigations. Bankfull width is approximately 30 m and bankfull depth is approximately 70 cm. It should be noted that, although still flowing, this section of the river is fairly lacustrine in nature due to the presence of the Claireville Reservoir located in close proximity downstream. The banks of the watercourse are gently sloped, and are dominated by grasses. Cattails and *Phragmites* were also present along the banks in a few locations and in some areas cattails were also noted in-stream. Submerged and other species of emergent vegetation are common, and, along with occasional boulders and instream woody debris, provided nearshore instream cover for aquatic organisms. Overall, instream cover is sparse due to the large wetted width. Deciduous tree cover lined both banks but is set back from the watercourse and does not provide shading within the study area. Substrates in this watercourse are comprised of silt, detritus and boulders. Groundwater inputs were noted in this watercourse along the west bank as iron staining and two small water inputs were noted as originating from a stand of cattails/*Phragmites* between the 407 ETR and the Steeles Avenue bridges. An additional input of groundwater that was iron stained was noted as originating from adjacent to one of the Steeles Avenue bridge piers. Dip net and visual fish sampling were conducted by LGL during the field investigations. Fish were observed in the shallow areas vegetated with emergent species downstream of the Steeles Avenue bridge during the summer field investigation. Dip net sampling yielded no catch.

MNRF originally classified this watercourse as warmwater and **high** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL requested the sensitivity be modified to **moderate**. MNRF agreed with this change in sensitivity. The West Humber River provides direct fish habitat within the study limits.

5.1.4.2 H2: Albion Creek

Albion Creek was mostly dry during the spring investigation and completely dry during the summer investigation. A small defined channel, approximately 40 cm in width, was noted and vegetation was

predominantly terrestrial. This watercourse is piped to the south underneath Steeles Avenue for approximately 600 m before “daylighting” again into an exposed channel. The upstream end of the Steeles Avenue culvert was dry during both site visits and functions as a complete barrier to fish movement. Standing water, with silt substrate was noted at the culvert inlet during the spring site visit where there was some instream cattail growth indicating that this area remains fairly wet. Dip net and visual fish sampling were conducted by LGL during the field investigations. No fish were observed or dip netted within the channel.

MNRF originally classified this watercourse as warmwater and **unknown** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL classified this watercourse as a **low** sensitivity designation. MNRF agreed with this change in sensitivity. This watercourse flows intermittently and supports fish habitat indirectly.

5.1.4.3 H3: Tributary of the Lower Humber River

This tributary functions as a drainage ditch that flows along the south slope of the railway line towards the east where it discharges into the Lower Humber River (H7). During the spring site investigation, the drainage feature was determined to originate at Gihon Spring Drive. West of this point (upstream), a defined channel is not evident and all vegetation is terrestrial. To the east of this point, cattails dominate the vegetation within the ditch, and the channel was wet with standing water less than 10 cm deep. The ditch is approximately 1.5 m wide, with silt substrate. This ditch conveys drainage for approximately 1.3 km before it meets the Lower Humber River. Some evidence of groundwater inputs (wetland vegetation, iron staining) were noted throughout the ditch. To the west of the outlet to the Lower Humber River, two culverts convey flow underneath access roads. This channel was completely dry during the summer field investigation. Dip net and visual fish sampling were conducted by LGL. No fish were observed or dip netted within the channel.

MNRF originally classified this watercourse as coldwater, **high** sensitivity and historical Redside Dace habitat. Based on the results of the field investigation, and the available secondary source information, LGL requested the sensitivity be modified to **low**. MNRF did not agree with this modification and requested a **moderate** sensitivity. This watercourse appears to flow intermittently and supports fish habitat indirectly.

5.1.4.4 H4: Tributary of Rainbow Creek

This watercourse is an ephemeral flowing feature and is dominated by terrestrial vegetation. A formal channel is not present throughout much of the north (upstream) section which flows through meadow habitat. Isolated sections of cattails were noted during the field investigation with no evidence of connectivity between these areas. At the downstream end of this drainage feature, near the convergence with a tributary of Rainbow Creek (H5), the drainage feature enters a woodlot. At this point, channel form is present, as the feature flows through a small ravine within the woodlot. Erosion was noted and it appears that high flows were directed through this channel historically. Based on the LGL assessment, it does not appear that any significant flow has been directed through this channel for a substantial period of time, as leaf litter from the previous fall remained within the channel during the spring visit. Flow/standing water was not present; therefore, sampling was not conducted by LGL.

MNRF originally classified this watercourse as coldwater, **high** sensitivity and historical Redside Dace habitat. Based on the results of the field investigation, LGL requested the sensitivity be modified from **high** to **none**. MNRF did not agree with this modification and requested a **low** sensitivity. This feature does not appear to support fish habitat.

5.1.4.5 H5: Tributary of Rainbow Creek

This tributary of Rainbow Creek is a permanently flowing watercourse which enters the study area from the north, crossing the 407 ETR via a pipe culvert. This channel averages 1 m in width and 30 cm in depth. Bankfull measurements were difficult to determine as this watercourse braids frequently and flows through wetland habitat throughout much of the study area. During both site investigations, the wetland held standing water and was located between two steeply sloped upland areas. The tributary of Rainbow Creek flows through this area in either single or multiple defined channels and is connected to the areas of standing water throughout this floodplain. Substrates in the channel are comprised of silt, sand and gravel. Upstream of the wetland, a single defined channel exists. Rip rap lines this channel near the culvert outlet at the 407 ETR. Downstream (south) of the 407 ETR outlet, the channel is dominated by runs, and the channel flows along the bottom of the slopes from the upland areas in a treed area. Several ATV trails cross the channel south of the 407 ETR fence and north of the wetland. The watercourse continues south and bends to the east as it flows along the toe of a wooded slope. At this point, the watercourse enters the wetland, and the channel becomes less defined, braiding in multiple locations into two or three channels through the cattails, as discussed above. Morphology remains run dominant, with a few riffles and flats also present.

Approximately 300 m downstream of the 407 ETR, the watercourse exits the wetland towards the east, and the channel elevation drops approximately 1 m down a rip rap lined chute, which likely functions as a barrier to fish passage. Downstream of this chute, the channel flows through a steeply-sloped valley located between the railway bed and the Woodbridge Pleistocene Cut ANSI/Woodbridge Cut ESA. Rip rap channel protection is present throughout this section of the channel and, in addition, an approximately 20 m long CSP culvert is conveying flow across what may have previously been an access road for heavy equipment. This culvert is perched approximately 20 cm and appears to be functioning as a seasonal barrier to fish movement. Downstream of the culvert, the channel gradient drops fairly rapidly and riffles dominate the morphology. The channel continues east, and remains defined, measuring 70 cm in width and 30 cm in depth. The watercourse flows through a woodlot before outletting into Rainbow Creek (H6). Bank erosion was noted at a few points along the channel at the downstream end. Overall, this watercourse is well shaded throughout the study area by trees and emergent wetland vegetation. Instream cover is abundant and is provided by instream woody debris, undercut banks and emergent and submerged vegetation. Dip net and visual fish sampling were conducted by LGL during the field investigations. Cyprinids were observed within this channel during the summer site visit throughout the wetland section (upstream of the potential fish barriers). Dip net sampling yielded no catch.

MNRF originally classified this watercourse as coldwater, **high** sensitivity and historical Redside Dace habitat. Based on the results of the field investigation, and the available secondary source information, LGL agrees with the **high** sensitivity designation. This watercourse flows permanently and supports direct fish habitat.

5.1.4.6 H6: Rainbow Creek

Rainbow Creek is a permanent watercourse that flows south into the study area, underneath the 407 ETR via a clear span bridge. A rip rap-lined channel downstream of the 407 ETR discharges flow into a large pool, approximately 10 m in width and greater than 50 cm in depth. Downstream of this pool, a diverse mix of riffles, runs and flats occurs, and the channel varies in width (4 m to 8 m). Depth remains relatively constant at an average of 30 cm. Bankfull measurements are between 8 m and 15 m wide and 0.75 m deep. Erosion was noted on the outside banks. ATV use is also evident throughout the channel reach with trails along the banks. This channel is generally well-shaded as it travels through a deciduous forest. Instream cover, consisting of woody debris, cobble, boulders and aquatic vegetation, is abundant.

Approximately 200 m downstream of the 407 ETR, where the tributary of Rainbow Creek (H5) converges with Rainbow Creek, the watercourse bends to the east, and erosion was noted on the outside bank at this location. A pool is present at this bend and a large amount of woody debris is providing cover. Downstream of this point, the watercourse continues east through a woodlot. Through this reach, runs, riffles and flats make up the morphology, and rip rap was noted in the channel in several locations creating large riffles.

Another 200 m downstream of the convergence with the Tributary of Rainbow Creek (H5), the watercourse flows along the toe of the 407 ETR embankment. In this area, riparian cover is fairly sparse along the north bank of the watercourse with the exception of grasses and occasional shrubs. Bank erosion was also noted along the base of the embankment. The channel flows along the toe of the embankment for approximately 150 m, before meandering slightly southeast away from the 407 ETR. For approximately 150 m, the watercourse flows through an area of deciduous forest, and consists predominantly of flats with occasional riffles. A single pool was noted on a bend in this reach. The watercourse then meanders back northeast, and once again flows along the toe of the 407 ETR embankment. Riffles, runs and pools make up the morphology in this section, and rip rap slope protection is present throughout this reach. Bank erosion is present within this reach as well as disturbance from ATVs. Substrates throughout the reach are comprised of gravel, sand, silt, rip rap, cobble and detritus. A small bridge crosses the channel, approximately 40 m upstream of the confluence of Rainbow Creek and the Lower Humber River (H7). Dip net and visual fish sampling were conducted by LGL during the field investigations. No fish were observed or dip netted in this watercourse.

MNRF originally classified this watercourse as coldwater, **high** sensitivity and occupied Redside Dace habitat. As stated above, in **Section 5.1.4**, personal correspondence with MNRF (December 9, 2016) indicates that this watercourse is no longer regulated Redside Dace habitat (and is now considered historical). Based on the results of the field investigation, and the available secondary source information, LGL requested the sensitivity be modified to **moderate**. MNRF did not agree with this modification and requested a **high** sensitivity. This watercourse flows permanently and supports direct fish habitat.

5.1.4.7 H7: Lower Humber River

The Lower Humber River is a permanently flowing watercourse which flows south into the study area underneath the 407 ETR via a clear span bridge. Armourstone bank protection lines the banks under the bridge. Downstream of the 407 ETR, the watercourse flows through a valley, with occasional tree and shrub cover. The channel averages 12 m in width and 30 cm depth. Bankfull width is approximately 14 m and bankfull depth 200 cm. Riffles and runs dominate the morphology and no pools were observed within the area of investigation. Instream island features and boulders were noted in the channel and along the banks they appear to be providing much of the instream cover. In addition, some overhanging and instream woody debris was noted in the channel towards the downstream end of the study area. Bank erosion is present along both sides of the channel throughout the study area. Substrates throughout the channel consist of silt, sand, gravel, cobble, boulders and detritus. Approximately 90 m downstream of the 407 ETR crossing, Rainbow Creek (H6) converges with the Lower Humber River from the west. An additional 60 m downstream of the convergence, a large railway bridge crosses the river. Dip net and visual fish sampling were conducted by LGL during the field investigations. No fish were observed or dip netted in this watercourse.

MNRF originally classified this watercourse as warmwater and **unknown** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL requested a

moderate sensitivity designation. MNRF agreed with this change in sensitivity. This watercourse flows permanently and supports direct fish habitat.

5.1.4.8 H8: Tributary of the Lower Humber River

This tributary of the Lower Humber River is a permanently flowing watercourse which, based on air photo interpretation, originates from 407 ETR surface drainage and a storm water pond to the north of the study area. This channel, through the upstream end of the study area, can be described as generally diffuse, flowing in a southwesterly direction within a corridor of cattails that is approximately 50 m wide. As mentioned above, this watercourse receives flow from a storm water pond to the north that discharges via a concrete pipe, approximately 700 m east of Pine Valley Drive. This outlet from the pond is a drop structure and a permanent barrier to fish movement. The channel continues to the southwest diffusely for another 250 m before a defined channel is formed. This defined channel is approximately 1.5 m wide and 10 cm deep. Substrates consist of silt, detritus, gravel, sand and rip rap. Within the defined section, the channel flows through a well-shaded riparian area, dominated by shrubs, and bends west, following the railway embankment for approximately 80 m, before being piped to the south, exiting the study area. Dip net and visual fish sampling were conducted by LGL during the field investigations. No fish were observed or dip netted in this watercourse.

MNRF originally classified this watercourse as warmwater and **low** sensitivity. Based on the results of the field investigation, and the available secondary source information, LGL agrees with the **low** sensitivity designation. This watercourse flows permanently and provides fish habitat indirectly.

5.2 Aquatic Species at Risk

5.2.1 Credit River Watershed

As stated above in **Section 5.1.1**, one aquatic species at risk, Redside Dace (contributing habitat), occurs in the tributary of Fletchers Creek (C1) based on personal correspondence with MNRF (2016). However, this watercourse is located just west of the study limits and is not expected to be impacted. No structures/culverts are proposed at this watercourse.

Redside Dace (occupied habitat) has been identified in the main branch of Fletchers Creek which is located to the west of the study area boundary and will not be impacted (CVC 2012a; DFO 2015; MNRF 2016).

5.2.2 Etobicoke Creek Watershed

According to a review of secondary source data, no aquatic species at risk occur within the Etobicoke Creek watershed within the vicinity of the study area (TRCA 2010; DFO 2015; MNRF 2016).

5.2.3 Mimico Creek Watershed

According to a review of secondary source data, no aquatic species at risk occur within the Mimico Creek watershed within the vicinity of the study area (TRCA 2010; DFO 2015; MNRF 2016).

5.2.4 Humber River Watershed

According to the Species at Risk Mapping (DFO 2015), one aquatic species at risk, Redside Dace (occupied habitat), occurs in Rainbow Creek (H6) located in FMZ 6 within the study area. It was noted via original personal correspondence with MNRF (2016) that occupied Redside Dace habitat exists in Rainbow Creek (H6), and historical records for Redside Dace are present in two tributaries of Rainbow Creek (H4 and H5) and one tributary of the Lower Humber River (H3) (MNRF 2016).

Correspondence with MNRF on December 9, 2016, however, indicates that Redside Dace regulated habitat is not present in Rainbow Creek or its tributaries. Historical Redside Dace habitat is present in H3, H4, H5 and H6.

5.3 Critical Fish Habitat

The study limits were reviewed for the potential presence of critical habitat (i.e., spawning areas, groundwater discharge, nursery habitat, seasonal refugia, etc.). There was evidence of critical habitat in the form of groundwater discharge observed at several watercourses during field investigations. Groundwater discharge areas, depending upon the amount of flow, can be used by fish as seasonal refugia or spawning habitat. Details can be found in the watercourse descriptions above.

5.4 Sensitivity/Significance

The watercourses within the study area support a diversity of warmwater, coolwater and coldwater fish communities; however, all of the watercourses in the study area have experienced some type of impact from urbanization and agriculture.

Based on personal correspondence with MNRF (2016), the habitat sensitivity of the watercourses located within the study limits ranges from none to low to moderate to high. Where sensitivity was not provided by MNRF, LGL assigned sensitivities based on the results of the field investigations. Details regarding interpretation of final sensitivity are described above in **Section 5.1**.

Redside Dace is listed provincially as an ‘Endangered’ species and is regulated by the Ontario ESA, 2007. As of May 2, 2017, Redside Dace is now also regulated federally as ‘Endangered’, as it has been added to Schedule 1 of SARA (9). It is stated on the SARA registry page that “restrictions imposed on infrastructure projects that affect Redside Dace habitat are already in place due to this species being listed under Ontario’s *Endangered Species Act, 2007* and the prohibitions under SARA are not anticipated to result in any additional impacts to the delivery and implementation of infrastructure projects.” C1 (tributary of Fletchers Creek) with Redside Dace (contributing habitat) is unlikely to be affected as a result of this project. However, if there is disturbance to this feature, specialized mitigation measures to prevent negative impacts to this species and/or its habitat may be required. It is understood at this time, that a permit from DFO would be required in addition to a permit from MNRF only when works are to be undertaken in “occupied” habitat. Therefore, if there are any impacts to C1, it would likely be exempt from a SARA permit because the habitat is “contributing”. All best management practices (BMPs) outlined in the Draft Guidance for Development Activities in Redside Dace Protected Habitat (MNR 2011) will need to be incorporated into the project design, if necessary. Depending on the proposed works, structure types, and area of regulated habitat being affected, the activities can be registered with the MNRF/and or a letter of advice may be issued. An ESA 17(2)(c) overall benefit permit could be avoided if effects on the species can be minimized and enhancements to the habitat are undertaken beyond the immediate work area. If it is determined effects to the species are of a certain magnitude, an ESA 17(2)(c) overall benefit permit may be required.

5.5 Thermal Regime

The watercourses within the study area support a mix of warmwater, coolwater, and coldwater fish communities. In-water works timing windows were provided by MNRF in accordance with the protocol. Warmwater watercourses are subject to an in-water timing window of July 1 to March 31 (with the exception of H1 which was identified as a warmwater watercourse but is subject to an in-water timing window of July 1-September 15). Coldwater and Redside Dace watercourses are subject to an in-water timing window of July 1 to September 15.

6.0 IMPACT ASSESSMENT

6.1 Fisheries Act, 2014, Endangered Species Act, 2007

This assessment outlines the fish habitat and fisheries resources that will be affected by the Transitway corridor and stations. This project will directly affect the watercourses listed in **Table 1** and discussed above in **Section 5.1**. “Serious Harm to Fish” could result as a result of the proposed works with the addition of new watercourse crossings, a potential channel realignment, clearing of vegetation within the riparian areas (including wetland species), modifications to drainage due to increased impermeable surfaces in the vicinity of the watercourses, and the addition of storm water management features.

In addition to the impacts above, potential impacts to fish and fish habitat during construction could include erosion and sediment inputs to the watercourses, temporary disruption of flows, increased water temperatures and barriers to fish movement.

“Serious Harm to Fish”, according to DFO, is considered to occur based on the following;

- the **death of fish**;
- a **permanent alteration** to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes;
- the **destruction of fish habitat** of a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes. (DFO 2015).

The impact assessment below assesses the potential for causing “Serious Harm to Fish” based on proposed impacts, and the sensitivity classifications provided by the MNRF and LGL’s field investigations.

One watercourse (C1) in close proximity to the study limits may also be considered regulated under the *Endangered Species Act, 2007* due to the presence of contributing habitat for Redside Dace (MNRF, 2016). According to the *Act*, “No person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario List as an endangered or threatened species.” Regulated Redside Dace habitat, by definition, includes the bankfull stream width, in addition to the meander belt width and associated riparian habitat that is a minimum of 30 m from the meander belt measured horizontally. Work is unlikely to be required at C1 but if it is determined that C1 will be impacted as a result of the 407 Transitway, the work may affect the habitat of Redside Dace and permitting may need to occur prior to construction in consultation with the MNRF (see **Section 6.2**).

6.2 Summary of Proposed Works at Watercourse Crossings

The proposed new structures will result in temporary and permanent impacts at the twenty (20) watercourses supporting fish or fish habitat described above. However, through proper mitigation measures and careful planning, the impacts can be minimized to prevent negative effects to fish and fish habitat.

Culvert/structure type should be designed in accordance with Section 5.5.3 in the MTO Fish Guide, to avoid causing “Serious Harm to Fish”. At watercourses supporting direct fish habitat, passage and

habitat provision are important and thus open bottomed culverts or box culverts that are embedded and backfilled with substrates should be considered throughout design.

Table 3 below provides a summary of the proposed works/impacts for each individual watercourse crossing. Also included are site-specific mitigation measures, and potential net environmental effects for each watercourse based on the Transitway design. Net environmental effects are calculated assuming all general proposed mitigation measures outlined in **Section 6.3** are applied.

6.2.1 In-water works

Where possible, structures shall be constructed outside of the watercourse banks, eliminating the need for in-water works. However, at some of the crossings, in-water work may be necessary. At all locations where in-water work is proposed, cofferdams (pea gravel bags, sheet piles, etc.) will be used to isolate the work area from the watercourse to enable work to be done in-the-dry (OPSS 517 Construction Specification for Dewatering). Flow will be maintained through either damming and pumping or fluming. If possible, work shall be done during the driest part of the year when the lowest flows are present. This will minimize disturbance to fish habitat at the site and downstream. To further reduce the potential for serious harm, the following environmental protection measures will be implemented:

1. No in-water work (or work on watercourse banks) will be permitted from April 1 to June 30 to protect spawning warmwater fish, incubating eggs and fry emergence and from September 16 to June 30 to protect cool and coldwater fish spawning, egg incubation and fry emergence, and to protect Redside Dace.
2. Where cofferdams are to be employed, dewatering effluent will be treated prior to discharge to receiving watercourse (OPSS 517 Construction Specification for Dewatering).
3. Cofferdams will be constructed using pea gravel bags, sheet piling or other appropriate material to isolate the work area: flow will be maintained at all stations.
4. Only clean material free of particulate matter will be placed in the watercourse (OPSS 1005 Streambed Material).
5. Fish isolated by construction activities (if present) will be captured by a qualified fisheries specialist and safely released to the watercourse (OPSS 182 Construction In and Around Waterbodies and on Waterbody Banks).

6.2.2 Standard Mitigation Measures

Standard erosion and sedimentation control measures will be implemented prior to soil disturbance / ground breaking, as necessary, to mitigate impacts on water quality of the surface drainage features adjacent to the study area. In addition, best management / construction practices will be implemented during construction to reduce the potential for spills or other materials to exit the work area. Mitigation measures which shall be implemented to avoid impacts to fish and fish habitat are described below.

TABLE 3.
SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Name	Proposed Works	Net Environmental Effects	Site Specific Mitigation
C1: Tributary of Fletchers Creek	<ul style="list-style-type: none"> • No structure proposed (C1 is located west of study limits) 	<ul style="list-style-type: none"> • Possible disturbance to Redside Dace Contributing Habitat (MNRF 2016). • LGL field investigations indicated this feature does not support fish habitat (directly or indirectly). 	<ul style="list-style-type: none"> • Any in-water works to be conducted within the Redside Dace timing window (July 1 to September 15). • Follow standard mitigation and best management practices for surface water quality. • Works may be subject to the best management practices (BMPs) outlined in the <i>Draft Guidance for Development Activities in Redside Dace Protected Habitat</i> (MNR 2011).
E1: Tributary of Etobicoke Creek West Branch	<ul style="list-style-type: none"> • Structural Box Culvert • Length 20 m • Span 3.5 m 	<ul style="list-style-type: none"> • Permanent enclosure of ~70 m² of seasonal, warmwater fish habitat. 	<ul style="list-style-type: none"> • In-water works to be conducted within the warmwater timing window (July 1 to March 31). • Work will be done “in the dry”. • An open footed structure, or box structure with embedded natural substrates should be considered.
E3: Tributary of Etobicoke Creek West Branch	<ul style="list-style-type: none"> • Structural Box Culvert • Length 15 m • Span 3.0 m 	<ul style="list-style-type: none"> • Permanent enclosure of ~22.5 m² of seasonal, warmwater fish habitat. 	<ul style="list-style-type: none"> • In-water works to be conducted within the warmwater timing window (July 1 to March 31). • Work will be done “in the dry”. • An open footed structure, or box structure with embedded natural substrates should be considered.
E4: Tributary of Etobicoke Creek West Branch	<ul style="list-style-type: none"> • Pipe • Length 15 m • Diameter 1.0 m 	<ul style="list-style-type: none"> • Permanent enclosure of ~15 m² of indirect, warmwater fish habitat. 	<ul style="list-style-type: none"> • In-water works to be conducted within the warmwater timing window (July 1 to March 31). • Work will be done “in the dry”.
E5: Etobicoke Creek West Branch	<ul style="list-style-type: none"> • Three Span Bridge • Span 160 m • Width 15 m 	<ul style="list-style-type: none"> • No impacts within bankfull channel 	<ul style="list-style-type: none"> • All works must adhere to conditions outlined in the MTO Best Management Practices Manual for Fisheries - Draft for Pilot, 2016 (Clear Span Bridges).
E6: Tributary of Etobicoke Creek West Branch	<ul style="list-style-type: none"> • Bridge • Span 100 m • Width 15 m 	<ul style="list-style-type: none"> • No impacts within bankfull channel. 	<ul style="list-style-type: none"> • All works must adhere to conditions outlined in the MTO Best Management Practices Manual for Fisheries - Draft for Pilot, 2016 (Clear Span Bridges).

**TABLE 3.
 SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS**

Name	Proposed Works	Net Environmental Effects	Site Specific Mitigation
E7: Tributary of Spring Creek	<ul style="list-style-type: none"> • Structural Twin Box Culvert • Length 19 m • Span 9.2 m • Retaining wall (285 m long) proposed to preserve the bank of watercourse at a meander to the west of the main crossing structure 	<ul style="list-style-type: none"> • Permanent enclosure of ~57 m² of direct, warmwater fish habitat. • Permanent removal of riparian vegetation at the retaining wall (285 linear m). 	<ul style="list-style-type: none"> • In-water works to be conducted within the warmwater timing window (July 1 to March 31). • Work will be done “in the dry”. • An open footed structure, or box structure with embedded natural substrates should be considered. • Retaining wall should be set back from the high water mark of the watercourse.
E8: Spring Creek	<ul style="list-style-type: none"> • Single Span Bridge • Span 120 m • Width 15 m 	<ul style="list-style-type: none"> • No impacts within bankfull channel. 	<ul style="list-style-type: none"> • All works must adhere to conditions outlined in the MTO Best Management Practices Manual for Fisheries - Draft for Pilot, 2016 (Clear Span Bridges).
M1: Tributary of Mimico Creek	<ul style="list-style-type: none"> • Twin Box Culvert • Length 20 m • Width 14.4 m 	<ul style="list-style-type: none"> • Permanent enclosure of ~120 m² of direct, warmwater fish habitat. 	<ul style="list-style-type: none"> • In-water works to be conducted within the warmwater timing window (July 1 to March 31). • Work will be done “in the dry”. • An open footed structure, or box structure with embedded natural substrates should be considered.
M3: Tributary of Mimico Creek	<ul style="list-style-type: none"> • Box Culvert • Length 15 m • Width 4.7 m 	<ul style="list-style-type: none"> • Permanent enclosure of ~45 m² of indirect, warmwater fish habitat. 	<ul style="list-style-type: none"> • In-water works to be conducted within the warmwater timing window (July 1 to March 31). • Work will be done “in the dry”. • An open footed structure, or box structure with embedded natural substrates should be considered.
M4: Tributary of Mimico Creek	<ul style="list-style-type: none"> • Twin Box Culvert • Length 20 m • Width 8 m 	<ul style="list-style-type: none"> • Permanent enclosure of ~120 m² of direct, warmwater fish habitat. 	<ul style="list-style-type: none"> • In-water works to be conducted within the warmwater timing window (July 1 to March 31). • Work will be done “in the dry”. • An open footed structure, or box structure with embedded natural substrates should be considered.

**TABLE 3.
 SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS**

Name	Proposed Works	Net Environmental Effects	Site Specific Mitigation
M5: Tributary of Mimico Creek	<ul style="list-style-type: none"> • Twin Box Culvert • Length 15 m • Width 12 m 	<ul style="list-style-type: none"> • Permanent enclosure of ~60 m² of direct, warmwater fish habitat. 	<ul style="list-style-type: none"> • In-water works to be conducted within the warmwater timing window (July 1 to March 31). • Work will be done “in the dry”. • An open footed structure, or box structure with embedded natural substrates should be considered.
M6: Tributary of Mimico Creek	<ul style="list-style-type: none"> • Box Culvert • Length 15 m • Width 6.3 m 	<ul style="list-style-type: none"> • Permanent enclosure of ~45 m² of direct, warmwater fish habitat. 	<ul style="list-style-type: none"> • In-water works to be conducted within the warmwater timing window (July 1 to March 31). • Work will be done “in the dry”. • An open footed structure, or box structure with embedded natural substrates should be considered.
M7: Mimico Creek	<ul style="list-style-type: none"> • Three Span Bridge • Span 60 m • Width 15.8 m 	<ul style="list-style-type: none"> • No impacts within bankfull channel. 	<ul style="list-style-type: none"> • All works must adhere to conditions outlined in the MTO Best Management Practices Manual for Fisheries - Draft for Pilot, 2016 (Clear Span Bridges).
M8: Tributary of Mimico Creek	<ul style="list-style-type: none"> • Box Culvert • Length 15 m • Span 6 m 	<ul style="list-style-type: none"> • Permanent enclosure of ~100 m² of seasonal, warmwater fish habitat. 	<ul style="list-style-type: none"> • In-water works to be conducted within the warmwater timing window (July 1 to March 31). • Work will be done “in the dry”. • An open footed structure, or box structure with embedded natural substrates should be considered.
H1: West Humber River	<ul style="list-style-type: none"> • Two Span Bridge • Length 120 m • Width 15.8 m 	<ul style="list-style-type: none"> • No impacts within bankfull channel. 	<ul style="list-style-type: none"> • All works must adhere to conditions outlined in the MTO Best Management Practices Manual for Fisheries - Draft for Pilot, 2016 (Clear Span Bridges).
H2: Albion Creek	<ul style="list-style-type: none"> • Box Culvert • Length 20 m • Width 5 m • Channel realignment around proposed station 	<ul style="list-style-type: none"> • Permanent enclosure of ~100 m² of indirect, warmwater fish habitat. • Channel realignment proposed for existing 411 m linear channel. • Realignment length will measure 435 m. • Net gain of 24 m of indirect, warmwater fish habitat due to realignment. 	<ul style="list-style-type: none"> • In-water works to be conducted within the warmwater timing window (July 1 to March 31). • Work will be done “in the dry”. • Implement natural channel design into realignment channel to maintain, or enhance natural fluvial processes. • An open footed structure, or box structure with embedded natural substrates should be considered.

**TABLE 3.
 SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS**

Name	Proposed Works	Net Environmental Effects	Site Specific Mitigation
H5: Tributary of Rainbow Creek	<ul style="list-style-type: none"> • Pipe • Length 10 m • Diameter 1 m 	<ul style="list-style-type: none"> • Permanent enclosure of ~15 m² of direct, coldwater fish habitat. 	<ul style="list-style-type: none"> • In-water works to be conducted within the coldwater timing window (July 1 to September 15). • Work will be done “in the dry”. • An open footed structure, or box structure with embedded natural substrates should be considered (open footed preferred due to observed groundwater contributions).
H6: Rainbow Creek	<ul style="list-style-type: none"> • Single Span Bridge • Span 55 m • Width 15 m • Retaining walls proposed along the south edge of the Transitway footprint 	<ul style="list-style-type: none"> • Flow characteristics of large storm events may be impacted through potential restriction of flows to north of watercourse. • Permanent removal of riparian vegetation at the retaining wall (760 m to east and 1,100 m to west of bridge). 	<ul style="list-style-type: none"> • All works must adhere to conditions outlined in the MTO Best Management Practices Manual for Fisheries - Draft for Pilot, 2016 (Clear Span Bridges). • Retaining wall should be set back from the high water mark of the watercourse.
H7: Lower Humber River	<ul style="list-style-type: none"> • Three Span Bridge • Each Span 52 m • Width 15 m 	<ul style="list-style-type: none"> • No impacts within bankfull channel. 	<ul style="list-style-type: none"> • All works must adhere to conditions outlined in the MTO Best Management Practices Manual for Fisheries - Draft for Pilot, 2016 (Clear Span Bridges).
H8: Tributary of the Lower Humber River	<ul style="list-style-type: none"> • Bridge • Span 45 m • Width 15 m 	<ul style="list-style-type: none"> • No impacts within bankfull channel. 	<ul style="list-style-type: none"> • All works must adhere to conditions outlined in the MTO Best Management Practices Manual for Fisheries - Draft for Pilot, 2016 (Clear Span Bridges).

6.3 Mitigation Measures

To mitigate for the harmful alteration of fish habitat, the measures identified below will be implemented pre-, during and post-construction at the locations where work is proposed.

TABLE 4/TEMPLATE 10.3. AQUATIC EFFECTS ASSESSMENT SUMMARY TABLE

Waterbody	Pathway of Effect (s)	Stressor (Potential Impact)	Mitigation Measures	Residual Effects	Serious Harm Y/N
E1, E3, E4, E7, M1, M3, M4, M5, M6, M8, H2, H5 New Culvert Structures	L1- Vegetation clearing	<ul style="list-style-type: none"> • Alteration of riparian vegetation • Addition or removal of in stream organic structure • Change in shade • Change in external nutrient/energy inputs • Changes to bank stability / exposed soils 	Removal of riparian vegetation shall be in accordance with OPSS 182 and OPSS 804. <ul style="list-style-type: none"> • Minimize vegetation removal and disturbances on embankments and surface drainage ditches adjacent to the watercourse. • Seed and mulch disturbed banks with appropriate seed mixture. • Limit the duration that areas are left disturbed/exposed. • Erosion and Sediment Control (ESC) will be used to contain/isolate the construction zone during and following vegetation clearing and to manage site drainage to prevent erosion and sedimentation to the waterbody. ESC measures will be in place until all areas are stabilized. 	<ul style="list-style-type: none"> • Change in habitat structure and cover • Change in food supply • Change in nutrient concentrations The residual effects of vegetation clearing for the new culvert structures will result in permanent alteration or change in habitat structure and cover of the affected area. Residual effects, however, are not likely to result in serious harm.	N
	L2 – Grading	<ul style="list-style-type: none"> • Addition or removal of in stream organic structure • Changes to bank stability / exposed soils • Changes in slope / land drainage patterns • Increased erosion potential 	Installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 182 and OPSS 805. Removal of riparian vegetation shall be in accordance with OPSS 182 and OPSS 804. Vegetation protection and rehabilitation shall be in accordance with OPSS 182 and OPSS 804.	There will be minor residual effects in habitat structure and cover from the removal of the instream organic material, however not likely to result in serious harm.	N

TABLE 4/TEMPLATE 10.3. AQUATIC EFFECTS ASSESSMENT SUMMARY TABLE

Waterbody	Pathway of Effect (s)	Stressor (Potential Impact)	Mitigation Measures	Residual Effects	Serious Harm Y/N
	L3 – Excavation	<ul style="list-style-type: none"> • Alteration of groundwater flow to surface water • Creations of pond, pit or trench • Dewatering of pit or trench • Removal of topsoil • Changes to bank stability / exposed soils • Changes in slope / land drainage patterns • Increased erosion potential 	The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 182 and OPSS 805.	No permanent residual effects are expected.	N
	B2 – Industrial equipment	<ul style="list-style-type: none"> • Changes to bank stability / exposed soils • Increased erosion potential • Re-suspension and entrainment of sediment • Oil / grease / fuel leaks 	<p>Use of equipment shall be in accordance with OPSS 182.</p> <p>The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 182 and OPSS 805.</p> <p>All equipment will be operated, stored, and maintained in a manner that prevents the entry of any deleterious substances to the waterbody. Any part of equipment entering the waterbody or operating on the bank shall be free of fluid leaks and externally cleaned/degreased.</p>	No permanent residual effects are expected.	N
	W1 – Placement of Material or Structures in	<ul style="list-style-type: none"> • Partial constriction of flow • Change in channel morphology 	Design crossing structures to appropriate flow regime to protect banks and not to constrict flows.	<ul style="list-style-type: none"> • Change in habitat structure and cover • Change in food supply • Change in nutrient concentrations 	N

TABLE 4/TEMPLATE 10.3. AQUATIC EFFECTS ASSESSMENT SUMMARY TABLE

Waterbody	Pathway of Effect (s)	Stressor (Potential Impact)	Mitigation Measures	Residual Effects	Serious Harm Y/N
	Water	<ul style="list-style-type: none"> • Change in hydraulics • Change in substrate composition • Change in aquatic macrophytes • Complete constriction of flow 	Embed culverts using native materials to prevent a barrier to fish passage. Design temporary and permanent water management system and dewatering operations to maintain flows in adjacent waterbody and to prevent erosion and/or release of sediment-laden or contaminated water to the waterbody.	There will be minor residual effects from the change in the native substrates, however not likely to result in serious harm.	
	W3 – Water extraction	<ul style="list-style-type: none"> • Reduced flow • Entrainment of fish in pumps 	Dewatering activities and the use of pumps shall be conducted in accordance with OPSS 517. Temporary flow diversions shall be conducted in accordance with OPSS 517. Fish salvage operations shall be conducted in accordance with OPSS 182. Any water intakes or outlet pipes in fish bearing waters shall have screens to prevent entrainment or impingement of fish as per OPSS 182 and follow the measures as outlined in the DFO Freshwater Intake End-of-Pipe Fish Screen Guideline.	No permanent residual effects are expected.	N
	W5 – Aquatic Vegetation Management	<ul style="list-style-type: none"> • Change in light penetration • Change in primary productivity • Change in nutrient inputs • Re-suspension and entrainment of 	Isolate the work site. Minimize vegetation removal to the amount which is necessary to maintain proper and safe fish passage.	Minor change in habitat structure and cover, change in light penetration, change in primary productivity, and change in nutrient inputs, however not likely to result in serious harm.	N

TABLE 4/TEMPLATE 10.3. AQUATIC EFFECTS ASSESSMENT SUMMARY TABLE

Waterbody	Pathway of Effect (s)	Stressor (Potential Impact)	Mitigation Measures	Residual Effects	Serious Harm Y/N
		sediment			
	W7 –Change in timing, duration and frequency of flow	<ul style="list-style-type: none"> • Dewatering • Bank erosion • Scouring of channel beds • Change in substrate composition 	<p>Flow diversion via a bypass channel adjacent to the waterbody will be applied for channel and crossing works, to facilitate in the dry construction, maintain existing flow conditions and provide fish passage through the reach.</p> <p>Design crossing structures in new drainage channel to appropriate flow regime to protect banks and not to constrict flows, and embed culverts to prevent a barrier to fish passage.</p>	No permanent residual effects are expected.	N
	W8 – Fish Passage	<ul style="list-style-type: none"> • Channel obstructions • Upstream/downstream passage of fish • Alteration of migration patterns • Change in water chemistry • Change in temperature • Flow alteration • Diversion channels 	<p>Adhere to appropriate in-water work timing windows.</p> <p>Temporary flow diversions shall be conducted in accordance with OPSS 517.</p> <p>Dewatering activities and the use of pumps shall be conducted in accordance with OPSS 517.</p> <p>Any water intakes or outlet pipes in fish bearing waters shall have screens to prevent entrainment or impingement of fish as per OPSS 182 and follow the measures as outlined in the DFO Freshwater Intake End-of-Pipe Fish Screen Guideline.</p>	No permanent residual effects are expected.	N
H2 Channel realignment	L1- Vegetation clearing	<ul style="list-style-type: none"> • Alteration of riparian vegetation • Addition or removal of in stream organic structure 	<p>Removal of riparian vegetation shall be in accordance with OPSS 182 and OPSS 804.</p> <ul style="list-style-type: none"> • Minimize vegetation removal and disturbances on embankments and surface drainage ditches adjacent to the watercourse. 	<ul style="list-style-type: none"> • Change in habitat structure and cover • Change in food supply • Change in nutrient concentrations 	Y

TABLE 4/TEMPLATE 10.3. AQUATIC EFFECTS ASSESSMENT SUMMARY TABLE

Waterbody	Pathway of Effect (s)	Stressor (Potential Impact)	Mitigation Measures	Residual Effects	Serious Harm Y/N
		<ul style="list-style-type: none"> • Change in shade • Change in external nutrient/energy inputs • Changes to bank stability / exposed soils 	<ul style="list-style-type: none"> • Seed and mulch disturbed banks with appropriate seed mixture. • Limit the duration that areas are left disturbed/exposed. • Erosion and Sediment Control (ESC) will be used to contain/isolate the construction zone during and following vegetation clearing and to manage site drainage to prevent erosion and sedimentation to the waterbody. ESC measures will be in place until all areas are stabilized. 	<p>The residual effects of vegetation clearing for the channel infilling will result in permanent alteration of x m² of fish habitat that may limit or diminish the ability of the fish to carry out their life processes</p>	
	L2 – Grading	<ul style="list-style-type: none"> • Addition or removal of in stream organic structure • Changes to bank stability / exposed soils • Changes in slope / land drainage patterns • Increased erosion potential 	<p>Installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 182 and OPSS 805.</p> <p>Removal of riparian vegetation shall be in accordance with OPSS 182 and OPSS 804.</p> <p>Vegetation protection and rehabilitation shall be in accordance with OPSS 182 and OPSS 804.</p>	<p>There will be minor residual effects in habitat structure and cover from the removal of the instream organic material, however not likely to result in serious harm.</p>	N
	L3 – Excavation	<ul style="list-style-type: none"> • Alteration of groundwater flow to surface water • Creations of pond, pit or trench • Dewatering of pit of trench • Removal of topsoil • Changes to bank stability / exposed 	<p>The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 182 and OPSS 805.</p>	<p>No permanent residual effects are expected.</p>	N

TABLE 4/TEMPLATE 10.3. AQUATIC EFFECTS ASSESSMENT SUMMARY TABLE

Waterbody	Pathway of Effect (s)	Stressor (Potential Impact)	Mitigation Measures	Residual Effects	Serious Harm Y/N
		soils; • Changes in slope / land drainage patterns • Increased erosion potential			
	B2 – Industrial equipment	• Changes to bank stability / exposed soils • Increased erosion potential • Re-suspension and entrainment of sediment • Oil / grease / fuel leaks	Use of equipment shall be in accordance with OPSS182. The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 182 and OPSS 805. All equipment will be operated, stored, and maintained in a manner that prevents the entry of any deleterious substances to the waterbody. Any part of equipment entering the waterbody or operating on the bank shall be free of fluid leaks and externally cleaned/degreased.	No permanent residual effects are expected.	N
	W1 – Placement of Material	• Partial constriction of flow • Entrainment fish in pumps • Change in channel morphology • Change in hydraulics • Change in substrate composition • Change in aquatic macrophytes • Complete constriction of flow	Design temporary and permanent water management system and dewatering operations to maintain flows in adjacent waterbody and to prevent erosion and/or release of sediment-laden or contaminated water to the waterbody. Replant and restore exposed areas to original or better conditions.	• Change in habitat structure and cover • Change in food supply • Change in nutrient concentrations The residual effects from infilling the existing channel will result in destruction of x m ² fish habitat.	Y

TABLE 4/TEMPLATE 10.3. AQUATIC EFFECTS ASSESSMENT SUMMARY TABLE

Waterbody	Pathway of Effect (s)	Stressor (Potential Impact)	Mitigation Measures	Residual Effects	Serious Harm Y/N
	W3 – Water extraction	<ul style="list-style-type: none"> • Reduced flow • Entrainment of fish in pumps 	<p>Dewatering activities and the use of pumps shall be conducted in accordance with OPSS 517.</p> <p>Temporary flow diversions shall be conducted in accordance with OPSS 517.</p> <p>Fish salvage operations shall be conducted in accordance with OPSS 182.</p> <p>Any water intakes or outlet pipes in fish bearing waters shall have screens to prevent entrainment or impingement of fish as per OPSS 182 and follow the measures as outlined in the DFO Freshwater Intake End-of-Pipe Fish Screen Guideline.</p>	No permanent residual effects are expected.	N
	W7 –Change in timing, duration and frequency of flow	<ul style="list-style-type: none"> • Dewatering • Bank erosion • Scouring of channel beds • Change in substrate composition 	Flow diversion via a bypass channel adjacent to the waterbody will be applied for channel works, to facilitate in the dry construction, maintain existing flow conditions and provide fish passage through the reach.	No permanent residual effects are expected.	N
	W8 – Fish Passage	<ul style="list-style-type: none"> • Channel obstructions • Upstream/downstream passage of fish • Alteration of migration patterns • Change in water chemistry • Change in temperature • Flow alteration • Diversion channels 	<p>Adhere to appropriate in-water work timing windows.</p> <p>Temporary flow diversions shall be conducted in accordance with OPSS 517.</p> <p>Dewatering activities and the use of pumps shall be conducted in accordance with OPSS 517.</p> <p>Any water intakes or outlet pipes in fish</p>	No permanent residual effects are expected.	N

TABLE 4/TEMPLATE 10.3. AQUATIC EFFECTS ASSESSMENT SUMMARY TABLE

Waterbody	Pathway of Effect (s)	Stressor (Potential Impact)	Mitigation Measures	Residual Effects	Serious Harm Y/N
			bearing waters shall have screens to prevent entrainment or impingement of fish as per OPSS 182 and follow the measures as outlined in the DFO Freshwater Intake End-of-Pipe Fish Screen Guideline.		
E7, H6 Retaining walls in riparian area of watercourse	L1- Vegetation clearing	<ul style="list-style-type: none"> • Alteration of riparian vegetation • Addition or removal of in stream organic structure • Change in shade • Change in external nutrient/energy inputs • Changes to bank stability / exposed soils 	Removal of riparian vegetation shall be in accordance with OPSS 182 and OPSS 804. <ul style="list-style-type: none"> • Minimize vegetation removal and disturbances on embankments and surface drainage ditches adjacent to the watercourse. • Seed and mulch disturbed banks with appropriate seed mixture. • Limit the duration that areas are left disturbed/exposed. • Erosion and Sediment Control (ESC) will be used to contain/isolate the construction zone during and following vegetation clearing and to manage site drainage to prevent erosion and sedimentation to the waterbody. ESC measures will be in place until all areas are stabilized. 	<ul style="list-style-type: none"> • Change in habitat structure and cover • Change in food supply • Change in nutrient concentrations The residual effects of vegetation clearing for the proposed retaining wall structures will result in permanent alteration or change in habitat structure and cover of the affected area. Residual effects, however, are not likely to result in serious harm (depending on the proposed length).	Possible (depending on length of retaining structures)
	L2 – Grading	<ul style="list-style-type: none"> • Addition or removal of in stream organic structure • Changes to bank stability / exposed soils • Changes in slope / land drainage patterns • Increased erosion potential 	Installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 182 and OPSS 805. Removal of riparian vegetation shall be in accordance with OPSS 182 and OPSS 804. Vegetation protection and rehabilitation shall be in accordance with OPSS 182 and OPSS	There will be minor residual effects in habitat structure and cover from the removal riparian vegetation, however not likely to result in serious harm.	N

TABLE 4/TEMPLATE 10.3. AQUATIC EFFECTS ASSESSMENT SUMMARY TABLE

Waterbody	Pathway of Effect (s)	Stressor (Potential Impact)	Mitigation Measures	Residual Effects	Serious Harm Y/N
			804.		
	B2 – Industrial equipment	<ul style="list-style-type: none"> • Changes to bank stability / exposed soils • Increased erosion potential • Re-suspension and entrainment of sediment • Oil / grease / fuel leaks 	<p>Use of equipment shall be in accordance with OPSS 182.</p> <p>The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 182 and OPSS 805.</p> <p>All equipment will be operated, stored, and maintained in a manner that prevents the entry of any deleterious substances to the waterbody. Any part of equipment entering the waterbody or operating on the bank shall be free of fluid leaks and externally cleaned/degreased.</p>	No permanent residual effects are expected.	N

6.3.1 Best Construction Practices

Implementation of best construction practices during construction will reduce the potential for spills or other materials / equipment entering the water. The following measures will be employed:

1. All equipment maintenance and refuelling will be controlled to prevent any discharge of petroleum products. Vehicular maintenance and refuelling will be conducted at least 30 m distance from any surface drainage features to prevent the entry of petroleum, oil or lubricants (POL) to the watercourses.
2. Storage, stockpiling and staging areas will be delineated prior to construction and inspected in accordance with the current MTO Construction Administration and Inspection Task Manual.
3. Construction material, excess material, construction debris, and empty containers will be stored at least 30 m distance from any surface drainage features to prevent their entry into the watercourse.
4. Local Regulatory Authorities will be identified in the contract package for the purpose of reporting spills. All spills that could potentially cause damage to the environment will be reported to the Spills Action Centre of the MECP. In the event of a spill, containment and clean-up shall be completed quickly and effectively. A “Spill Response Plan” and the appropriate contingency materials to absorb or contain a spill will be on the site at all times.
5. No construction machinery or vehicles will cross any watercourse at any time during construction.

6.3.2 Erosion and Sedimentation Control

Effective erosion and sedimentation control will be achieved throughout the project with careful planning and design, stringent construction supervision, monitoring of the site, and maintenance of control works throughout their operational life. The following temporary erosion and sedimentation control measures will be implemented prior to soil disturbance / ground breaking to mitigate impacts on water quality and fish habitat:

1. The extent and duration that disturbed soils are exposed to the elements will be kept to a minimum.
2. Disturbed areas will be stabilized through seeding, mulching or use of an erosion control blanket, as appropriate, to provide slope protection and long-term slope stabilization.
3. Silt fencing will be placed along the watercourse margins in areas of disturbance to prevent the entry of sediment into the watercourses.
4. Flow checks will be placed at appropriate intervals in lateral ditches down gradient from areas of soil disturbance to trap suspended sediments and reduce the erosive force of runoff.

These erosion and sedimentation control measures shall remain in place until soils have been re-stabilized. A number of special provisions related to erosion and sedimentation control are recommended to be included in the contract package to ensure that the above measures are implemented including:

1. General Specification for Environmental Protection for Construction In and Around Waterbodies and on Waterbody Banks (OPSS 182) to cover the environmental protection requirements and mitigation measures that apply to construction involving work in and around waterbodies and on waterbody banks;
2. Construction Specification for Seed and Cover (OPSS 803) to stabilize disturbed areas.

3. Construction Specification for Topsoil (OPSS 802) and Sodding (OPSS 803) to address the requirements for stockpiling, placing and supplying topsoil and to cover the requirements for sodding.
4. Construction Specification for Temporary Erosion and Sediment Control Measures (OPSS 805) to cover the installation, maintenance, monitoring and removal of the temporary erosion and sediment control measures and the removal of sediment accumulated by the control measures.
5. Amendments to the Construction Specification for Temporary Erosion and Sediment Control Measures to specify the type of temporary erosion and sedimentation control measures to be installed and the timing constraints for the installation and removal of the control measures.
6. Any Non-Standard Special Provisions (NSSPs) required to stipulate the time interval (i.e., maximum of 20 calendar days) between the commencement and completion of any work that disturbs earth surfaces, and to provide direction for seeding, mulching or use of an erosion control blanket to be placed in areas of soil disturbance to provide slope protection and long-term slope stabilization.
7. General Specification for the Management of Excess Materials (OPSS 180) to ensure material generated during maintenance of sediment control measures will be taken off-site for disposal.

Erosion and sedimentation will have a minor effect on surface water quality provided these measures are installed pre-construction, maintained during construction and removed post-construction following soil re-stabilization.

6.3.3 Maintenance of Riparian Vegetation

Maintaining riparian vegetation to the extent possible will help to stabilize the watercourse banks, provide shading/cover for the watercourse, filter contaminants, and improve wildlife habitat and aesthetics. The Contractor will be responsible for vegetation management.

1. Prior to construction, trees/shrubs to be retained will be clearly identified in the field by the installation of tree/shrub protection barrier in accordance with OPSS 801 (Construction Specification for the Protection of Trees).
2. Trees/shrubs identified to remain, which become damaged by construction activities, will be repaired or replaced in accordance with MTO's NSSP - landscaping specifications.
3. In areas where riparian vegetation removal is necessary to accommodate construction, measures to protect the local fish communities shall include the following: no clearing of mature trees providing a bank stabilization function; no felling of trees into the watercourse; minimize the amount of debris produced from entering the watercourse; and, only clearing the vegetation required to complete the necessary works.

6.3.4 Storm Water Management

A storm water management study is ongoing to ensure construction and post-construction conditions maintain flow to downstream habitats, maintain existing water temperatures and ensure water quality is not impaired.

1. Prior to construction, a storm water management plan will be prepared that will address both water quantity and quality, in accordance with MTO guidelines and in consultation with regulatory agencies.
2. The proponent will strive to design storm water management ponds to detain the minimum of a 2-hour 25 mm storm event for 24 hours to address water quality and erosion concerns. Where agencies

demonstrate a need, other detention times or additional quantity sizing requirements will be considered prior to construction in consultation with stakeholders.

3. When designing BMPs, consideration will be given to measures for reducing adverse environmental impacts to surface and groundwater, including those related to temperature and salt.
4. Bridge runoff will be discharged to storm water management facilities (preferably a pond or swale) prior to discharge to watercourses where this can be achieved and will not cause unacceptable environmental, highway design, safety or operational problems.
5. Where feasible, opportunities for providing ease of containment of accidental spills will be provided during the design of storm water management facilities

6.4 Assessment of Negative Residual Effects

An assessment of negative residual effects for the watercourses is outlined below.

For watercourses at locations where clear span bridges are proposed and no works are expected to occur within the high water mark, no further assessment was undertaken. These crossings are expected to meet all the conditions of MTO's Best Management Practices Manual for Fisheries Clear Span Bridges (MTO 2015) and are therefore "not likely to result in serious harm". Watercourses which meet this BMP include: E5, E6, E8, M7, H1, H6, H7 and H8.

For watercourses in which culvert structures are proposed (E1, E3, E4, E7, M1, M3, M4, M5, M6, M8, H2, H5), the assessment of negative effects are as follows:

- extent (size) for culvert installations are classified as "low", as these installations affect a site, or segment, and effects are localized;
- duration for these structure installations are "high", as the residual changes to the fish habitat will be permanent; and,
- intensity is classified as "low" as the altered habitat is expected to remain at a similar level of productivity as the baseline condition.

Overall, negative residual effects at these watercourse locations should be classified as "low". No permanent impacts to fishes' ability to carry out life processes will result from these works, therefore "serious harm" is not expected to occur. Details regarding specific stressors and residual effects related to the works are outlined in **Table 4/Template 10.3** above.

For watercourses for which retaining walls in the riparian area are proposed in addition to the new crossing structures (E7, H6), the assessment of negative effects are as follows:

- extent (size) for the retaining walls are classified as "low", as these installations affect a site, or segment, and effects are localized;
- duration for these structure installations are "high", as the residual changes to the fish habitat will be permanent; and,
- intensity is classified as "low" as the altered habitat is expected to remain at a similar level of productivity as the baseline condition.

The overall extent (length) of these retaining walls is relatively large. Therefore, conservatively, at this point, it is assumed that a review from DFO will be required, unless it is determined that the size and extent of these retaining walls are confirmed to result in "low" likelihood of causing serious harm. As

these walls are being constructed to eliminate the need for infringement into the watercourses or the need for realignments, it is likely that their construction will result in low residual negative effects. Details regarding specific stressors and residual effects related to the works are outlined in **Table 4/Template 10.3** above.

For the watercourse in which a channel realignment is proposed in addition to the new crossing structure (H2), the assessment of negative effects are as follows;

- extent (size) for realignment is “low”;
- duration for the channel realignment is “high”, as the residual changes to the fish habitat will be permanent; and,
- intensity is classified as “high” as the altered habitat has undergone significant change (infilling).

Overall, negative residual effects at this watercourse location should be classified as “high”, “likely to result in serious harm” and will require a review from DFO prior to construction. Permanent impacts to fishes’ ability to carry out life processes will result from infilling of the channel. Details regarding specific stressors and residual effects related to the works are outlined in **Table 4/Template 10.3** above.

6.5 Analysis of Fish and Fish Habitat Sensitivity

Based on a combination of the fisheries assessment by LGL fisheries staff and input by MNRF regarding the interpretation of sensitivity, watercourse sensitivities within the 407 Transitway corridor range from Low to High. In addition, one watercourse feature was identified by MNRF as contributing habitat for Redside Dace (C1), which may be regulated under the Ontario *Endangered Species Act, 2007*. As stated above, LGL field investigations determined that this feature does not provide fish habitat and is located west of the study limits so should not be impacted. Consultation with MNRF will need to occur during later stages of this project as necessary. Details regarding interpretation of sensitivity for each individual watercourse are provided in **Section 5.0: Existing Fish and Fish Habitat Conditions**.

6.6 Categorization of Project Risk

6.6.1 “No Likelihood of Causing Serious Harm” Step 3: MTO Best Management Practices

The proposed works at the following watercourses meet the conditions of the MTO Best Management Practices Manual for Fisheries Clear Span Bridges, thus are considered “not likely to result in serious harm” (MTO 2016); E5, E6, E8, M7, H1, H6, H7 and H8. The proposed structure designs meet the criteria in this manual by “spanning the waterbody without altering the waterbody bed and bank”, and will be “placed entirely above the high water level (including bridge approaches, abutments, footings, and armouring)”. Clear span bridge construction must meet all the operational constraints and protection measures in order to be in compliance with the MTO Fish Guide (MTO 2013). Review by DFO is not required at these locations. A MTO Project Notification Form will likely be required prior to construction.

6.6.2 “No Likelihood of Causing Serious Harm” Step 4

The proposed works at the remaining crossings did not qualify under any MTO Best Management Practices and therefore risk assessments were conducted to determine which works would result in “No Likelihood of Causing Serious Harm” and, thus do not require review from DFO. The applicable pathway of effects assessment was undertaken, and mitigation measures were applied, in order to overcome negative effects. With all mitigation measures taken into account, an assessment of the residual negative effects was conducted for each crossing.

New crossing structures are proposed at the following watercourses; E1, E3, E4, M1, M3, M4, M5, M8 and H2. The results of the assessment for these watercourses determined “No Likelihood of Causing Serious Harm” based on the Transitway design as no permanent impacts to fishes’ ability to carry out life processes are expected to take place. Site specific mitigation measures are included in **Table 3** and general mitigation measures are outlined in **Section 6.3**.

A new crossing structure is proposed at M6. The results of the assessment for this watercourse determined “No Likelihood of Causing Serious Harm” based on the Transitway design as no permanent impacts to fishes’ ability to carry out life processes are expected to take place. Site specific mitigation measures are included in **Table 3** and general mitigation measures are outlined in **Section 6.3**.

A new crossing structure is proposed at H5. The results of the assessment for this watercourse determined “No Likelihood of Causing Serious Harm” based on the Transitway design as no permanent impacts to fishes’ ability to carry out life processes are expected to take place. Site specific mitigation measures are included in **Table 3** and general mitigation measures are outlined in **Section 6.3**.

“No Likelihood of Causing Serious Harm” will apply at all of the above crossings as long as the site specific (**Table 3**) and general mitigation measures outlined in **Section 6.3** are implemented. Review by DFO is likely not required at these locations. A MTO Project Notification Form will likely be required prior to construction.

6.6.3 “Likelihood of Causing Serious Harm” Step 4

The applicable pathway of effects assessment was undertaken, and mitigation measures were applied, in order to overcome negative effects. With all mitigation measures taken into account, an assessment of the residual negative effects was conducted for each crossing.

Watercourses in which retaining structures in the riparian area are proposed fall under the “Likelihood of Causing Serious Harm”. This is a conservative classification and the rationale for “Likelihood of Causing Serious Harm” includes the potential for loss of riparian vegetation, and altered flows during storm events. Retaining structures are proposed at E7 (low sensitivity) and H6 (high sensitivity). A DFO Request for Review Form may need to be filled out prior to construction.

The watercourse in which a channel realignment is proposed at this time falls under the “Likelihood of Causing Serious Harm”. Regardless of realignment length, the rationale for “Likelihood of Causing Serious Harm” is due to the permanent alteration/infilling of a channel in which fish require to carry out life processes directly, or indirectly. A channel realignment is proposed at H2 (low sensitivity). A DFO Request for Review Form may need to be filled out prior to construction.

7.0 POTENTIAL ENHANCEMENT/OFFSETTING OPPORTUNITIES

Credit River Watershed

The Fletchers Creek Restoration Report (CVC 2012b) presents many enhancement and compensation opportunities to benefit the health of the watershed. Some of the general enhancement opportunities presented in this report include: reconnecting partially or fully disconnected creeks from adjacent floodplains, bank stabilization, removals of barriers to fish movement greater than 12 cm, buffer enhancement, invasive species management, and addition of aquatic habitat improvement structures (CVC 2012b).

Etobicoke and Mimico Creek Watersheds

The Etobicoke and Mimico Creeks Watersheds Technical Update Report (TRCA 2010) presents some enhancement and compensation opportunities to improve the health of the watershed. The first enhancement opportunity involves expanding and enhancing natural cover and habitat connectivity. The report states that a target of 14.1% natural cover has been recommended by restoring wetlands and regenerating forest communities. The report also discusses addressing storm water management controls to incorporate “low impact development controls” which addresses quality, quantity, erosion, baseflow maintenance and water balance (TRCA 2010).

Humber River Watershed

The Humber River Watershed Plan (TRCA 2008) presents many enhancement opportunities to improve the health of the watershed. This report outlines a regeneration plan for each of the subwatersheds, and many have similar enhancement recommendations. Opportunities for enhancement within the entire watershed include creating and enhancing natural cover in the target terrestrial natural heritage system and the enhancement of storm water infiltration technologies. Other opportunities include planting trees and shrubs in riparian areas lacking natural cover, and restoring wetlands.

Some watercourse specific opportunities include the enhancement of Brook Trout (*Salvelinus fontinalis*) and Redside Dace habitat in the middle reaches of the Humber River (FMZ 5, 6, 7) encompassing the West Humber River and Rainbow Creek and the Lower Humber River north of the 407 ETR. Opportunities include increasing riparian tree cover, restoration of wetlands on marginal agricultural land, and improved development practices to avoid increases in surface water runoff. Other subwatershed specific opportunities include the creation of habitat restoration site plans along the Lower Humber River (FMZ 10) to implement stormwater retrofits, tree planting and sustainable community technologies (TRCA 2008).

8.0 CONCLUSIONS

The proposed works identified at each of the crossings which include bridge and culvert installations will result in a temporary alteration and disruption of fish habitat. In some cases, where a channel realignment is proposed and/or retaining walls are proposed, “Serious harm” may occur. The mitigation measures proposed in this document will minimize negative impacts to fish and fish habitat, and offsetting opportunities are presented above in **Section 7.0**. The proposed works will take place between July 1 and September 15 in accordance with the coldwater/Redside Dace fisheries timing window, and July 1 and March 31 in accordance with the warmwater timing window. Works are also to be conducted during a period of low flow and precipitation to further reduce the potential impacts. **Templates 10.1, 10.2, and 10.3** summarize the process through which the “Likelihood of Causing Serious Harm” at each crossing location was determined.

9.0 REFERENCES

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- Credit Valley Conservation. 2016. Personal Correspondence (through Parsons) with Eric James, Planning Technician. January 26, 2016 and February 1, 2016 via email.
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- Toronto and Region Conservation Authority. 2016. Personal Correspondence (through Parsons) with Christopher Menary, GIS Technician. January 5, 2016 via email.

APPENDICES

**APPENDIX A
CORRESPONDENCE WITH MNRF, TRCA and CVC**

See Appendix A in the Environmental Project Report

APPENDIX B
PHOTOGRAPHIC RECORD

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



C1: Facing north (upstream) from south of the runningway (Spring 2016).



C1: Facing north (upstream) from south of the runningway (Summer 2016).



E1: Facing north (upstream) from the runningway (Spring 2016).



E1: Facing south (downstream) from the runningway (Spring 2016).



E1: Facing north (upstream) from the runningway (Summer 2016).



E1: Facing south (downstream) from the runningway (Summer 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



E2: Facing north (upstream) from the runningway (Spring 2016).



E2: Facing north (upstream) from the runningway (Summer 2016).



E3: Facing north (upstream) from the runningway (Spring 2016).



E3: Facing south (downstream) from the runningway (Spring 2016).



E3: Facing north (upstream) from the runningway (Summer 2016).



E3: Facing south (downstream) from the runningway (Summer 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



E4: Facing north (upstream) from the runningway (Spring 2016).



E4: Facing south (downstream) from the runningway (Spring 2016).



E4: Facing north (upstream) from the runningway (Summer 2016).



E4: Facing south (downstream) from south of the runningway (Summer 2016).



E5: Facing north (upstream) from the runningway (Spring 2016).



E5: Facing south (downstream) from the runningway (Spring 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



E5: Facing north (upstream) from the runningway (Summer 2016).



E5: Facing south (downstream) from the runningway (Summer 2016).



E6: Facing north (upstream) from Dixie Road (Spring 2016).



E6: Facing south (downstream) from east of Dixie Road (Spring 2016).



E6: Facing north (upstream) from west of Dixie Road (Summer 2016).



E6: Facing south (downstream) from east of Dixie Road (Summer 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



E7: Facing north (upstream) from between several proposed alignments (Spring 2016).



E7: Facing north (upstream) from upstream of the convergence with E8 (Spring 2016).



E7: Facing south (downstream) from upstream of the convergence with E8 (Summer 2016).



E7: Facing north (upstream) from upstream of the convergence with E8 (Summer 2016).



E8: Facing north (upstream) from between the proposed alignments (Spring 2016).



E8: Facing south (downstream) from between the proposed alignments (Spring 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



E8: Facing north (upstream) from between the proposed alignments (Summer 2016).



E8: Facing south (downstream) from between the proposed alignments (Summer 2016).



M1: Facing north (upstream) from the runningway (Spring 2016).



M1: Facing south (downstream) from the runningway (Spring 2016).



M1: Facing south (downstream) from the runningway (Summer 2016).



M1: Facing north (upstream) from the runningway (Summer 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



M2: Facing south (downstream) from the runningway (Spring 2016).



M2: Facing north (upstream) from the runningway (Summer 2016).



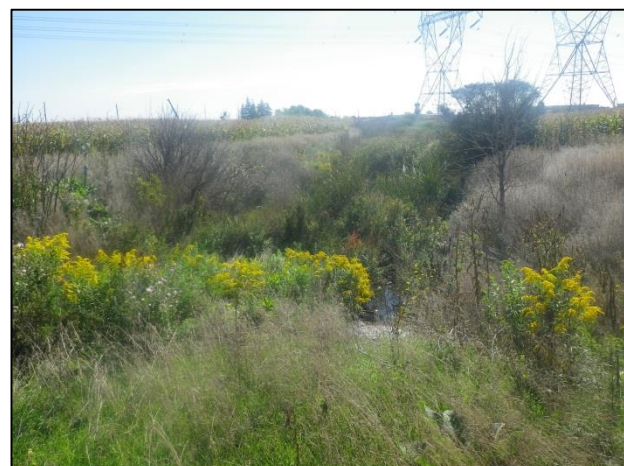
M3: Facing north (upstream) from the hydro access road (Spring 2016).



M3: Facing south (downstream) from the hydro access road (Spring 2016).



M3: Facing north (upstream) from the hydro access road (Summer 2016).



M3: Facing south (downstream) from the hydro access road (Summer 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



M4: Facing south (downstream) from south of the runningway (Spring 2016).



M4: Facing north (upstream) from the runningway (Spring 2016).



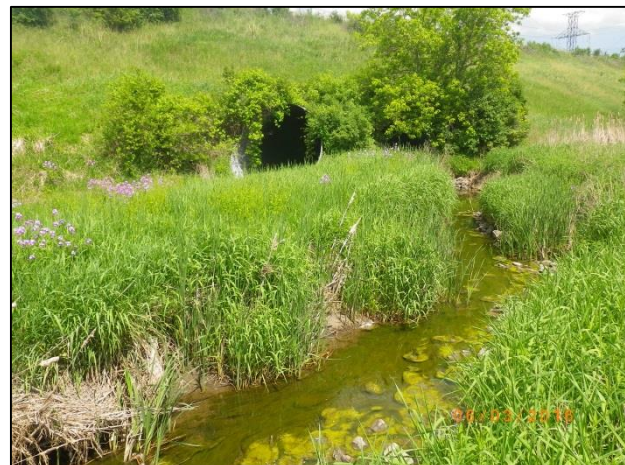
M4: Facing north (upstream) from the runningway (Summer 2016).



M4: Facing south (downstream) from the runningway (Summer 2016).



M5: Facing north (upstream) from west of the CNR (Spring 2016).



M5: Facing south (downstream) from west of the CNR (Spring 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



M6: Facing north (upstream) from west of the CNR (Spring 2016).



M6: Facing south (downstream) from west of the CNR (Spring 2016).



M5/6: Facing west (upstream) from east of the CNR (Spring 2016).



M5: Facing north (upstream) from west of the CNR (Summer 2016).



M5: Facing south (downstream) from west of the CNR (Summer 2016).



M6: Facing north (upstream) from west of the CNR (Summer 2016).

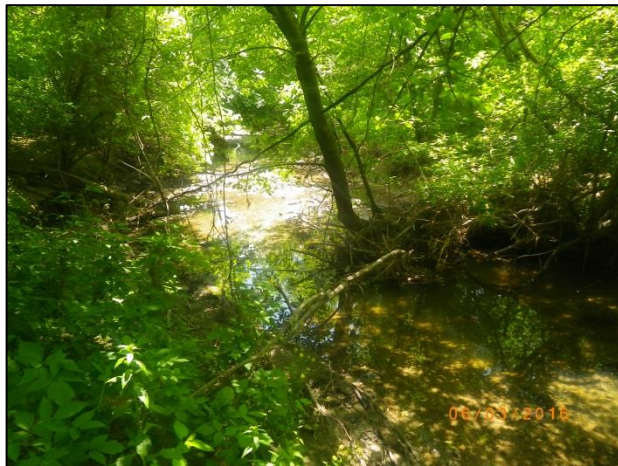
PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



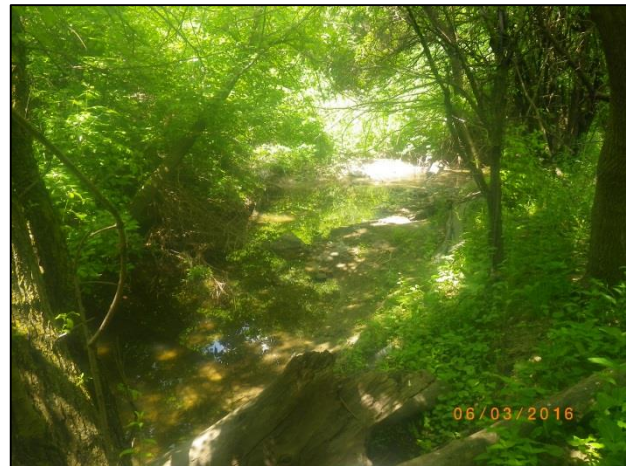
M6: Facing south (downstream) from west of the CNR (Summer 2016).



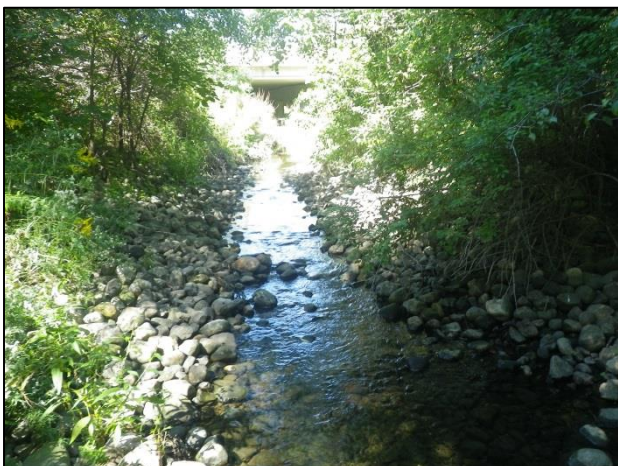
M5/6: Facing east (downstream) from east of the CNR (Summer 2016).



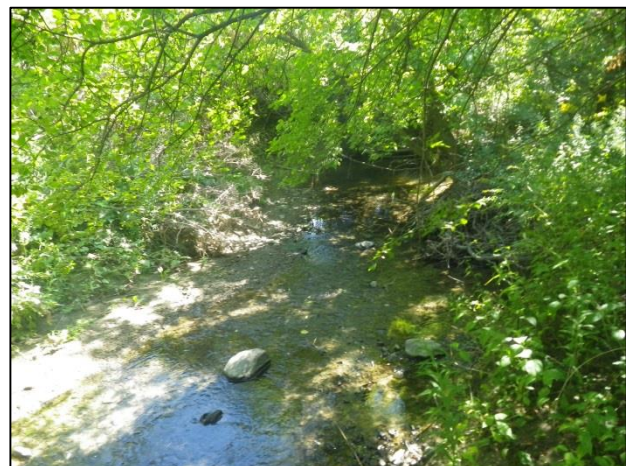
M7: Facing north (upstream) from the runningway (Spring 2016).



M7: Facing south (downstream) from the runningway (Spring 2016).



M7: Facing north (upstream) from the runningway (Summer 2016).



M7: Facing south (downstream) from the runningway (Summer 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



M8: Facing north (upstream) from Steeles Avenue (Spring 2016).



M8: Facing north (upstream) from Steeles Avenue (Summer 2016).



H1: Facing south (downstream) from the runningway (Spring 2016).



H1: Facing north (upstream) from the runningway (Spring 2016).



H1: Facing south (downstream) from the runningway (Summer 2016).



H1: Facing north (upstream) from the runningway (Summer 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



H2: Facing north (upstream) from Steeles Avenue (Spring 2016).



H2: Facing north (upstream) from north of Steeles Avenue (Spring 2016).



H3: Facing east (upstream) from south of the CNR (Spring 2016).



H3: Facing west (downstream) from south of the CNR (Spring 2016).



H3: Facing east (upstream) from south of the CNR (Summer 2016).



H3: Facing west (downstream) from south of the CNR (Summer 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



H4: Facing east (downstream) from the runningway (Spring 2016).



H4: Facing east (downstream) from the runningway (Spring 2016).



H5: Facing north (upstream) from the runningway (Spring 2016).



H5: Facing north (upstream) from the runningway (Spring 2016).



H5: Facing west (upstream) from the runningway (Summer 2016).



H5: Facing east (downstream) from the runningway (Summer 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



H6: Facing north (upstream) from the runningway (Spring 2016).



H6: Facing east (downstream) from the runningway (Spring 2016).



H6: Facing west (upstream) from the runningway (Summer 2016).



H6: Facing east (downstream) from the runningway (Summer 2016).



H7: Facing north (upstream) from the runningway (Spring 2016).



H7: Facing south (downstream) from the runningway (Spring 2016).

PHOTO APPENDIX
407 Transitway from Hurontario Street
to Highway 400



H7: Facing north (upstream) from the runningway (Summer 2016).



H7: Facing south (downstream) from the runningway (Summer 2016).



H8: Facing northeast (upstream) from the runningway (Spring 2016).



H8: Facing southwest (downstream) from the runningway (Spring 2016).



H8: Facing south (downstream) from the CNR (Spring 2016).



H8: Facing southwest (downstream) from the runningway (Spring 2016).


APPENDIX C
WATERCOURSE FIELD RECORD FORMS
AND HABITAT MAPPING

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: 407 Hwy			DAY: 14	MONTH: 09	YEAR: 2016		
Is STREAM REALIGNMENT required for this section: Yes: No: Unknown:									
COLLECTORS: SLL JMV		WEATHER CONDITIONS: Sunny 20°C			TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS: 9124 - 9135									
LOCATION									
NAME OF WATERBODY: Trib of Ffobicoche ck		DRAINAGE SYSTEM: Ffobicoche creek			CROSSING #: E1		STATION #:		
LOCATION OF CROSSING: South of 407 ETR, West of Kennedy Road									
UTM EASTING & NORTHING: 17T 603910 mE 4834691 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Agricultural, urban, naturalized valley					SOURCES OF POLLUTION: Roads, urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: 407 ETR Box culvert						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river	Channellzed	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	inside culvert	Other			
Percentage of area		10		90					
mean depth wetted (m)	wetted = 750m								
mean width wetted (m)	4.0								
Mean bankfull width (m)	4.0-24.0								
Mean bankfull depth (m)	0.1								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Ci	Muck Mu	Detritus D	
		5			80		15		

BANK STABILITY							
	Stable	Slightly Unstable	Moderately Unstable	Unstable			
Left Upstream Bank	X						
Right Upstream Bank	X						
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
			2.5	Instream 2.5 Overhanging		Instream 60 Overhanging	
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60 %	60- 30%	30 – 1%	None		
		X					
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None
	2.5		2.5		60		
Predominant Species							
MIGRATORY OBSTRUCTIONS:	None		Seasonal		Permanent (culvert d/S of pond)		
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
- remove barrier d/S of the pond							
COMMENTS :							
Additional Notes Appended? No Yes number of pages							

West of Kennedy

SECTION IDENTIFIER:		SECTION LOCATION:				SECTION LENGTH (m):		SCALE (cm / m):	
U/S						PROJECT #: 8558			
						MAPPER: SLC			
						NAME OF WATERBODY: Tri-S of Etobicoke Creek			
						CROSSING #: F1			
						STATION #:			
						DATE: DD-MMM-YY Sept 14, 2016			
						LEGEND 10d depth (cm) 6w width → Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ● Fine Substrate ### Gravel Substrate ○ Cobble /Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree ^^^ Dam/Weir/Obstruction ⊗ Riparian Tree ↳ Seep/Spring - - - - Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line □ Culvert			
PROFILE:	Horz. Scale	Vert. Scale							

SECTION IDENTIFIER:		SECTION LOCATION:				SECTION LENGTH (m):		SCALE (cm / m):	
D/S		D/S of entrance							
	PROJECT #: 8558								
	MAPPER: jmv								
	NAME OF WATERBODY: Tribs of Itabikook Creek								
	CROSSING #: E1								
	STATION #:								
	DATE: DD-MMM-YY 14-SEP-16								
LEGEND									
10d depth (cm)									
6w width									
➔ Riffle									
➡ Run/Glide									
○ Pool									
■ Island/Bar									
▨ Fine Substrate									
# # # Gravel Substrate									
○ ○ ○ ○ Cobble / Boulder									
* * * Debris									
CT Cattail									
SV/FV Submerg/Float Veg									
EV Emergent Vegetation									
W Watercress									
Fe Iron Staining									
///// Eroded Bank									
XXX Riprap / Other Stabilization									
○ Instream Log/Tree									
AAA Dam/Weir/Obstruction									
⊗ Riparian Tree									
└ Seep/Spring									
----- Undercut Bank									
— Barrier to Fish Movement									
-S- Seasonal Barrier									
-x-x- Fence line									
┌ Culvert									
PROFILE:		Horz. Scale		Vert. Scale		BFL 10			
						BFL 40			
EV = brush mostly						BFL 15d			
FV = duckweed									
CT areas - wetland thicket									
h → flow meter									

No fish observed

Culvert @ very steep gradient
 No fish observed

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: 407 Trwy			DAY: 14	MONTH: 09	YEAR: 2016		
Is STREAM/REALIGNMENT required for this section: Yes No Unknown									
COLLECTORS: SLC JMV			WEATHER CONDITIONS: Sunny 20°C		TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Tris of Etobicoke Cr		DRAINAGE SYSTEM: Etobicoke Creek		CROSSING #: E3		STATION #:			
LOCATION OF CROSSING: South of 407 ETR, east of Kennedy Road									
UTM EASTING & NORTHING: 17T 604403mE 4835339mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Agricultural, Urban					SOURCES OF POLLUTION: Roads, Urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: 407 ETR crossing box culvert						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
	X			X					
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area				100					
mean depth wetted (m)	20.1								
mean width wetted (m)	1.0								
Mean bankfull width (m)	1.5								
Mean bankfull depth (m)	0.2								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Sl	Clay Cl	Muck Mu	Détritus D	
								10	90

BANK STABILITY							
		Stable	Slightly Unstable	Moderately Unstable	Unstable		
Left Upstream Bank			X				
Right Upstream Bank			X				
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
			2.5	Instream Overhanging		Instream 5 Overhanging 5	
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60-30%	30 – 1%	None		
				X			
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None
	5				5		
Predominant Species							
MIGRATORY OBSTRUCTIONS:	None			Seasonal CSP's @ access road - potential seasonal barrier		Permanent	
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning			Evidence of Groundwater - potential inputs just south of the ETR		Other	
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
<ul style="list-style-type: none"> - Removal of hydro access road, or improve crossing structure - Riparian plantings, increase buffer from agricultural activities - potential adoption of natural channel design to improve current dredged conditions. 							
COMMENTS :							
Additional Notes Appended? No Yes number of pages _____							

SECTION IDENTIFIER:		SECTION LOCATION:			SECTION LENGTH (m):		SCALE (cm / m):	
		PROJECT #:		8558				
		MAPPER:		SLC				
		NAME OF WATERBODY:		Trib of Etobicoke Creek				
		CROSSING #:		E3				
		STATION #:						
		DATE: DD-MMM-YY		14-09-2016				
PROFILE:		Horz. Scale		Vert. Scale		<p align="center">LEGEND</p> <p>10d depth (cm) 6w width</p> <p>→ Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar</p> <p>▨ Fine Substrate ### Gravel Substrate oOooO Cobble /Boulder *** Debris</p> <p>CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress</p> <p>Fe Iron Staining // // // Eroded Bank</p> <p>XXX Riprap / Other Stabilization</p> <p>○ Instream Log/Tree ^^^ Dam/Weir/Obstruction ® Riparian Tree</p> <p>└▶ Seep/Spring ----- Undercut Bank</p> <p>— Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line ┌└ Culvert</p>		

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: 407 Trwy			DAY: 14	MONTH: 09	YEAR: 2016		
Is STREAM/REALIGNMENT required for this section: Yes: No: Unknown:									
COLLECTORS: SLC JMV			WEATHER CONDITIONS: Sunny 20°C		TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Trib of Etobicoke creek		DRAINAGE SYSTEM: Etobicoke creek		CROSSING #: E4		STATION #:			
LOCATION OF CROSSING: South of 407 ETR East of crossing E3									
UTM EASTING & NORTHING: 17T 604796mE 4835451					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Agriculture, Urban					SOURCES OF POLLUTION: Roads, urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe:							Size (w x h) m2		
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (Include on habitat map)					
TYPE:	Stream / river	Channellized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>					
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area				100 - stagnant / or dry					
mean depth wetted (m)									
mean width wetted (m)									
Mean bankfull width (m)									
Mean bankfull depth(m)									
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt SI	Clay CI	Muck Mu	Detritus D	

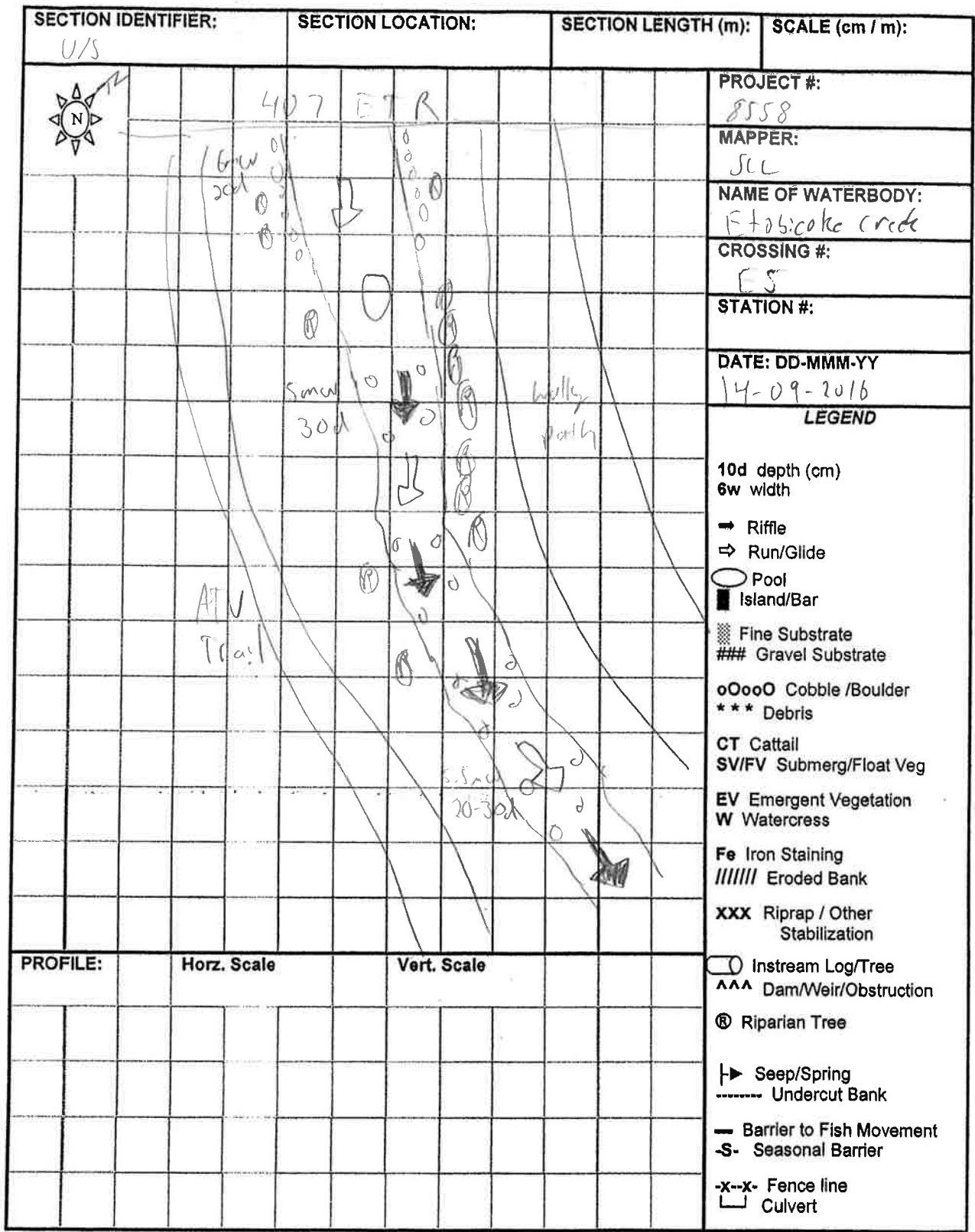
100


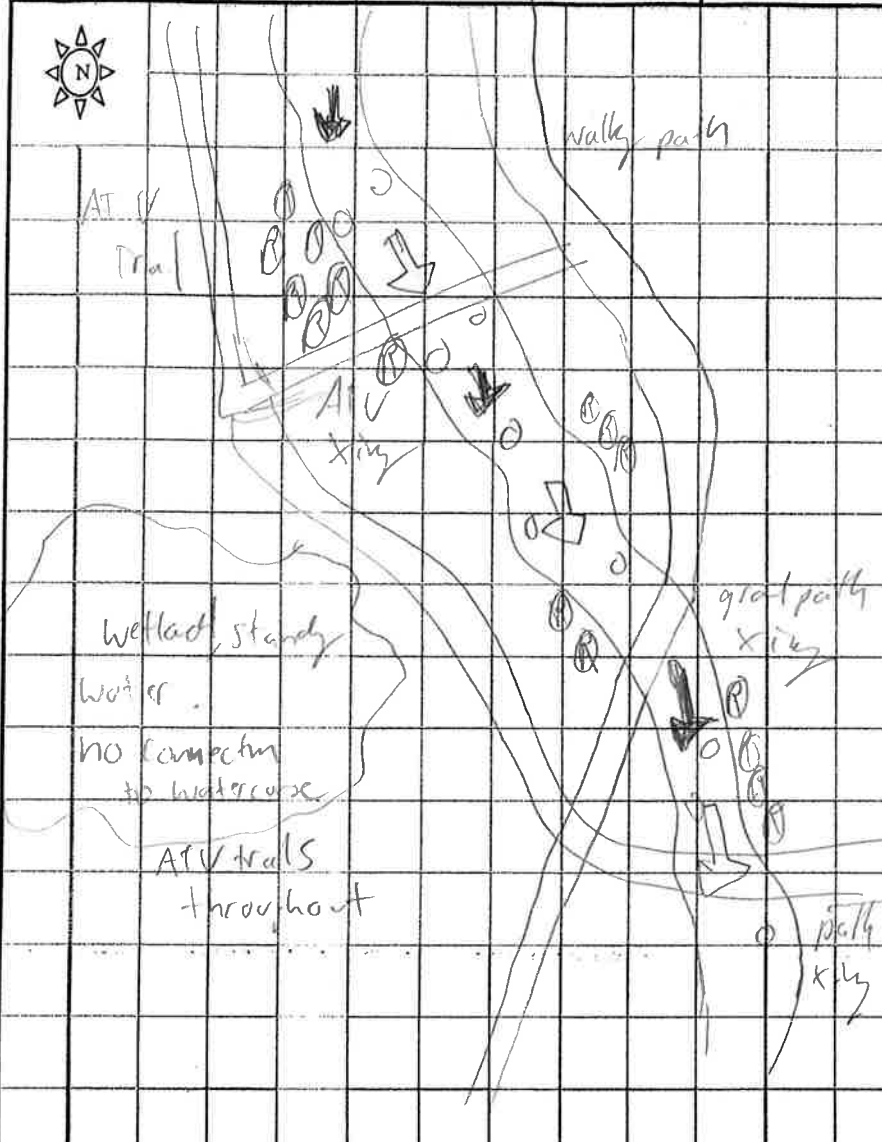
BANK STABILITY								
		Stable	Slightly Unstable	Moderately Unstable	Unstable			
Left Upstream Bank			X					
Right Upstream Bank			X					
HABITAT								
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris		Organic debris	Vascular plants	None
				Instream			Instream 5	
				Overhanging			Overhanging 5	
SHORE COVER (% stream shaded):		100 – 90 %	90 – 60%	60- 30%	30 – 1%	None		
					X			
VEGETATION TYPE (%) :		Submergent		Floating		Emergent		None
Predominant Species						5		
MIGRATORY OBSTRUCTIONS:		None		Seasonal ploughed through		Permanent		
POTENTIAL CRITICAL HABITAT LIMITING:		Spawning		Evidence of Groundwater		Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:								
<ul style="list-style-type: none"> - create buffer from agricultural activities - riparian plantings 								
COMMENTS :								
Additional Notes Appended? No Yes number of pages _____								

SECTION IDENTIFIER:		SECTION LOCATION:		SECTION LENGTH (m):		SCALE (cm / m):			
		PROJECT #: 8558		MAPPER: SLC		NAME OF WATERBODY: Tribute Etosicoke Creek			
		CROSSING #: E4		STATION #:		DATE: DD-MMM-YY 14-09-2016			
		LEGEND		10d depth (cm) 6w width		→ Riffle ⇨ Run/Glide		○ Pool ■ Island/Bar	
		■ Fine Substrate ### Gravel Substrate ○○○○ Cobble /Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining // // // Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree AAA Dam/Weir/Obstruction ⊗ Riparian Tree ▶ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line □ Culvert							
		PROFILE:		Horz. Scale		Vert. Scale			

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: Trans:wa, West			DAY: 14	MONTH: 09	YEAR: 2016		
Is STREAM/REALIGNMENT required for this section: Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>									
COLLECTORS: SLC SMV			WEATHER CONDITIONS: Sunny 20°C		TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Etobicoke Creek		DRAINAGE SYSTEM: Etobicoke Creek		CROSSING #: E5		STATION #:			
LOCATION OF CROSSING: South of 407 ETR, North of Tomken Road									
UTM EASTING & NORTHING: 17T 605169 mE 4836695 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Agricultural, Urban, naturalized Valley					SOURCES OF POLLUTION: Roads, Urban development				
EXISTING STRUCTURE TYPE									
<input checked="" type="checkbox"/> Bridge		<input type="checkbox"/> Box Culvert		<input type="checkbox"/> Open Foot Culvert		<input type="checkbox"/> CSP		<input type="checkbox"/> N/A	
Other Describe: 407 ETR Strucke Bridge						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river <input checked="" type="checkbox"/>	Channelized <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	ASSOCIATED WETLAND:			
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area	40	5	40	15					
mean depth wetted (m)	30								
mean width wetted (m)	5.5								
Mean bankfull width (m)	6.5								
Mean bankfull depth (m)	0.7								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt SI	Clay CI	Muck Mu	Detritus D	
	5	60	20	5	10				

BANK STABILITY							
	Stable	Slightly Unstable	Moderately Unstable	Unstable			
Left Upstream Bank		X					
Right Upstream Bank		X					
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
	5	2.5	5	Instream 2.5 Overhanging 2.5		Instream Algae 5 Overhanging	
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60-30%	30 – 1%	None		
			X				
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None
Predominant Species							X
MIGRATORY OBSTRUCTIONS:	None		Seasonal		Permanent		
	X						
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
- prohibit ATV use in surrounding area / construct padstun crossing - re-establish a connection to the wetland to the west							
COMMENTS:							
Additional Notes Appended? No Yes number of pages _____							




SECTION IDENTIFIER:		SECTION LOCATION:			SECTION LENGTH (m):			SCALE (cm / m):		
D/S								PROJECT #: 8558		
					MAPPER: JLC			NAME OF WATERBODY: Etobicoke Creek		
								CROSSING #: E5		
								STATION #:		
								DATE: DD-MMM-YY 14-09-2016		
								<p style="text-align: center;">LEGEND</p> <p>10d depth (cm) 6w width</p> <p>⇒ Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ▨ Fine Substrate ### Gravel Substrate oOooO Cobble /Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining ///// Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree AAA Dam/Weir/Obstruction ⊙ Riparian Tree └▶ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line ┌└ Culvert</p>		
PROFILE:		Horz. Scale			Vert. Scale					

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: 407 TWY			DAY: 14	MONTH: 09	YEAR: 16		
Is STREAM REALIGNMENT required for this section: Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>									
COLLECTORS: S.L. SMV		WEATHER CONDITIONS: Sunny 20°C			TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Tr. 5 of Etobicoke Creek		DRAINAGE SYSTEM: Etobicoke Creek		CROSSING #: E6		STATION #:			
LOCATION OF CROSSING: South of 407 ETR, east and west of Dixie Road									
UTM EASTING & NORTHING: 17T 605391 mE 4837641 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Urban, agricultural, recreational, natural valley					SOURCES OF POLLUTION: Roads, urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: 407 ETR crossing Box Culvert						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (Include on habitat map)					
TYPE:	Stream / river	Channellized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
	X		X						
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area	60	20	10	10					
mean depth wetted (m)	0.3								
mean width wetted (m)	3.0								
Mean bankfull width (m)	7.0								
Mean bankfull depth (m)	1.0								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Ci	Muck Mu	Détritus D	
	5	30	30	20	10			5	

BANK STABILITY							
		Stable	Slightly Unstable	Moderately Unstable	Unstable		
Left Upstream Bank				X			
Right Upstream Bank				X			
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris Instream Overhanging	Organic debris	Vascular plants Instream Overhanging	None
	5	2.5	5			2.5 2.5	
SHORE COVER (% stream shaded):	100 - 90 %		90 - 60%	60- 30%	30 - 1%	None	
					X		
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None
	2.5				2.5		
Predominant Species							
MIGRATORY OBSTRUCTIONS:	None			Seasonal		Permanent	
						Hydro access crossing against to be complete barrier	
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning			Evidence of Groundwater		Other	
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
<ul style="list-style-type: none"> - Remove hydro access crossing, replace w a properly sized culvert or bridge. - implementation of SWM techniques to reduce "flashiness" 							
COMMENTS :							
Additional Notes Appended? No Yes number of pages _____							

Digit
 RA













SECTION IDENTIFIER: Upstream - 1		SECTION LOCATION: 2		SECTION LENGTH (m):		SCALE (cm / m):	
						PROJECT #:	
						MAPPER: RL	
						NAME OF WATERBODY: Tributary of Etobicoke Creek	
						CROSSING #: E6	
						STATION #:	
DATE: DD-MMM-YY 14-09-16						LEGEND 10d depth (cm) 6w width → Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ● Fine Substrate ### Gravel Substrate ○○○○ Cobble / Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining // // // // Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree ^^^ Dam/Weir/Obstruction ® Riparian Tree ▶ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line ┌ └ Culvert	
PROFILE:		Horz. Scale		Vert. Scale			


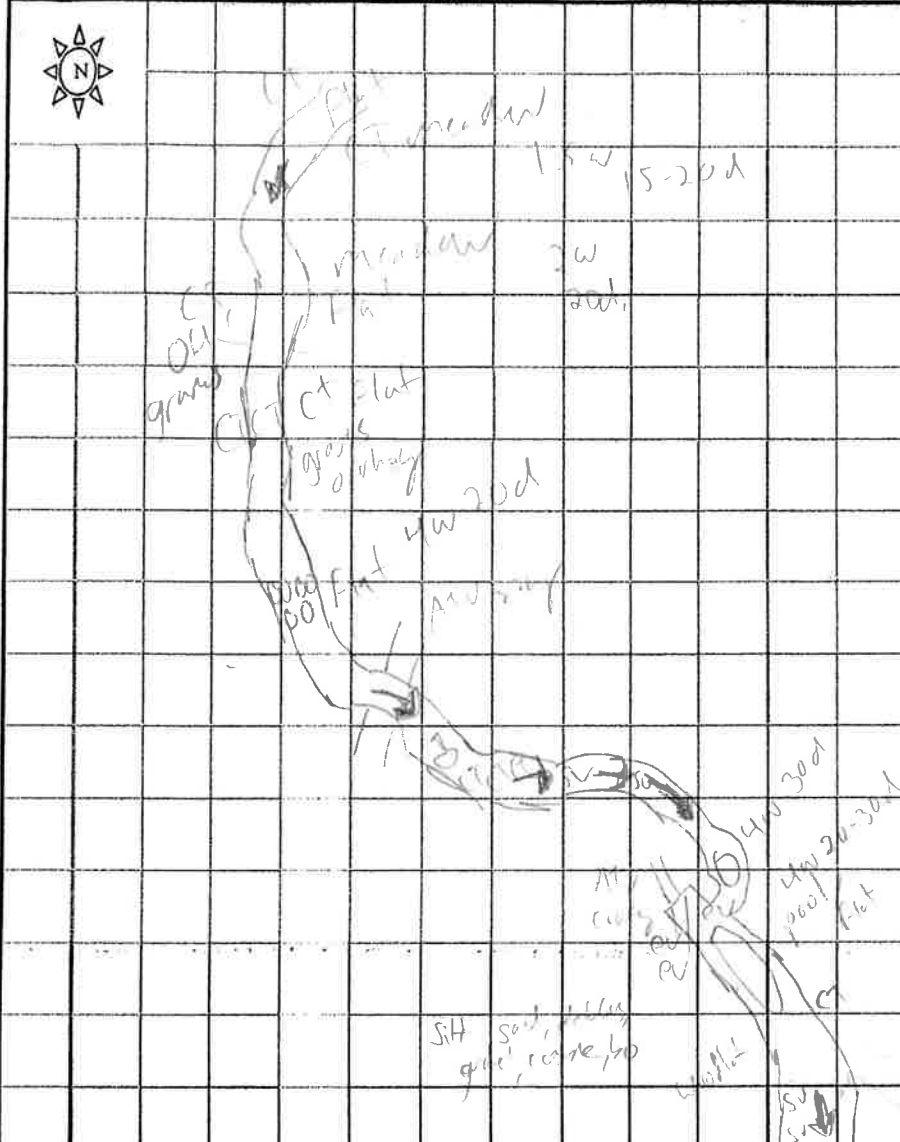
SECTION IDENTIFIER:		SECTION LOCATION:		SECTION LENGTH (m):		SCALE (cm / m):	
		D/S of Dixie 1					
		PROJECT #:					
		8558					
		MAPPER:					
		JMV					
		NAME OF WATERBODY:					
Trib of Etobicoke Creek							
CROSSING #:							
E6							
STATION #:							
DATE: DD-MMM-YY							
14-SEP-16							
LEGEND							
10d depth (cm)							
6w width							
➔ Riffle							
⇨ Run/Glide							
○ Pool							
■ Island/Bar							
▨ Fine Substrate							
### Gravel Substrate							
oOoO Cobble / Boulder							
*** Debris							
CT Cattail							
SV/FV Submerg/Float Veg							
EV Emergent Vegetation							
W Watercress							
Fe Iron Staining							
///// Eroded Bank							
XXX Riprap / Other Stabilization							
○ Instream Log/Tree							
AAA Dam/Weir/Obstruction							
⊗ Riparian Tree							
▶ Seep/Spring							
----- Undercut Bank							
— Barrier to Fish Movement							
-S- Seasonal Barrier							
-x-x- Fence line							
┌└ Culvert							
PROFILE:		Horz. Scale		Vert. Scale			
gent, gravel		cobble					
ATV Trail		thru bridge					
for		15-20 m					
Creek chub		several smaller					
DIXIE RD.							

SECTION IDENTIFIER:		SECTION LOCATION:		SECTION LENGTH (m):		SCALE (cm / m):	
		D/S of Dixie ~					
						PROJECT #: 8558	
						MAPPER: Jmu	
						NAME OF WATERBODY: Tri. of Etobicoke Creek	
						CROSSING #: E6	
						STATION #:	
						DATE: DD-MMM-YY 14 SEP 16	
						<p align="center">LEGEND</p> <p>10d depth (cm) 6w width</p> <p>➔ Riffle ⇌ Run/Glide ○ Pool ■ Island/Bar ▨ Fine Substrate ### Gravel Substrate oOooO Cobble / Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining ///// Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree AAA Dam/Weir/Obstruction ⊗ Riparian Tree ▶ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line ┌└ Culvert</p>	
PROFILE:		Horz. Scale 1		Vert. Scale			

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: 407 TRM			DAY: 20	MONTH: 09	YEAR: 2016		
Is STREAM/REALIGNMENT required for this section: Yes No Unknown									
COLLECTORS: SLC JMV		WEATHER CONDITIONS: Sunny 27°C			TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: T.M. & Sony creek		DRAINAGE SYSTEM:		CROSSING #: E7		STATION #:			
LOCATION OF CROSSING: South of 407 ETR, ~550m East of Dixie Road									
UTM EASTING & NORTHING: 17T 605683 mE 4838515 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Recreational, Urban, naturalized Valley					SOURCES OF POLLUTION: Roads, Urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: 407 ETR Box culvert						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river X	Channellized	Permanent X	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area	40	5	30	25					
mean depth wetted (m)	0.3								
mean width wetted (m)	1.0								
Mean bankfull width (m)	3.0								
Mean bankfull depth (m)	0.9								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D	
		10	20	30	40				

BANK STABILITY								
		Stable	Slightly Unstable	Moderately Unstable	Unstable			
Left Upstream Bank				X				
Right Upstream Bank				X				
HABITAT								
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris		Organic debris	Vascular plants	None
				Instream 5	Overhanging 5		Instream 10	Overhanging 10
SHORE COVER (% stream shaded):		100 – 90 %	90 – 60%	60-30%	30 – 1%	None		
VEGETATION TYPE (%)		Submergent		Floating		Emergent		None
Predominant Species		5				10		
MIGRATORY OBSTRUCTIONS:	None			Seasonal		Permanent		
POTENTIAL CRITICAL HABITAT LIMITING:		Spawning		Evidence of Groundwater		Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:								
<p>- Restrict ATV use in the area</p> <p>- Implementation of SWM techniques to reduce "flashiness"</p>								
COMMENTS :								
Additional Notes Appended? No Yes number of pages								


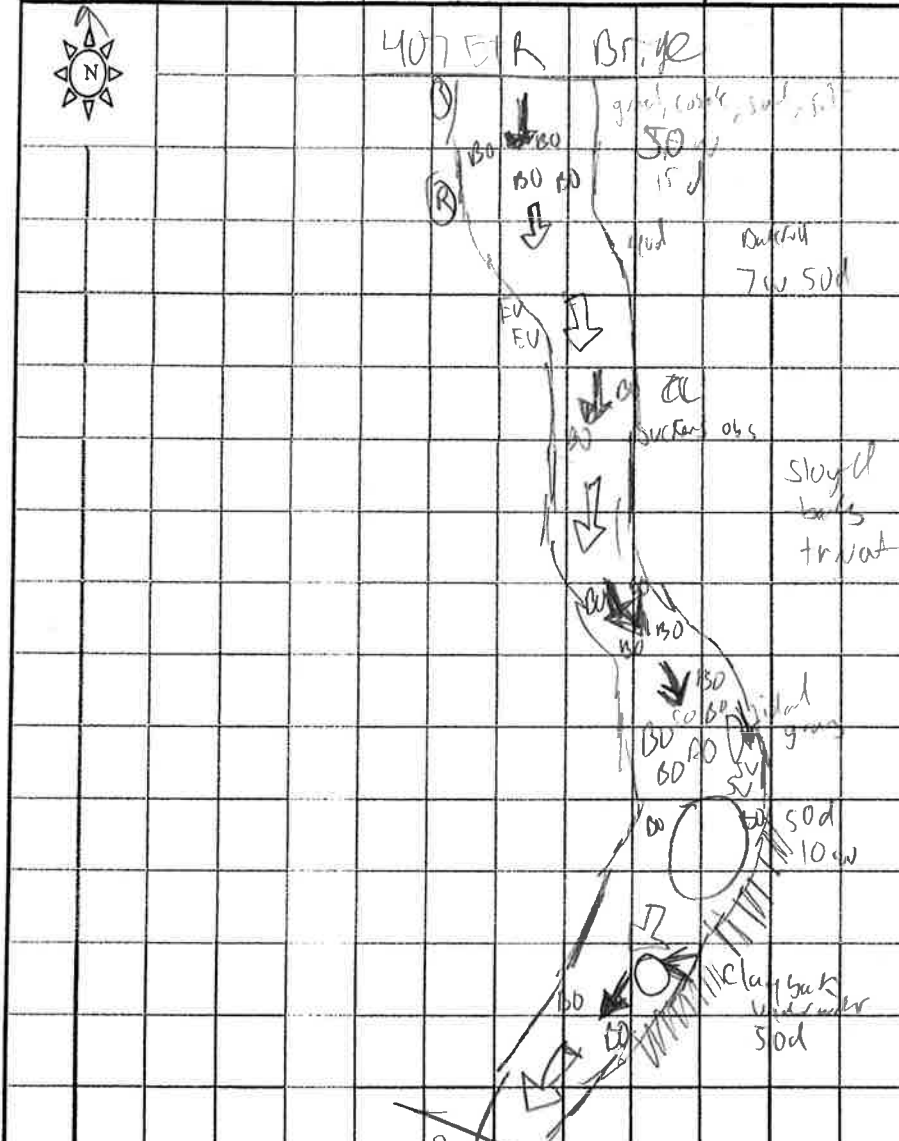
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			U/S			NS-3					
							PROJECT #:				
							8558				
							MAPPER:				
							JMV				
							NAME OF WATERBODY:				
							Trib Spring Cr				
CROSSING #:											
E7											
STATION #:											
DATE: DD-MMM-YY											
20 SEP 16											
						LEGEND					
						10d depth (cm) 6w width					
						 Riffle  Run/Glide  Pool  Island/Bar  Fine Substrate  Gravel Substrate oOooO Cobble/Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining ////// Eroded Bank XXX Riprap / Other Stabilization  Instream Log/Tree AAA Dam/Weir/Obstruction  Riparian Tree  Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line  Culvert					
PROFILE:			Horz. Scale			Vert. Scale					
BFD			2.5 - 3.5			0.86 - 1.00					


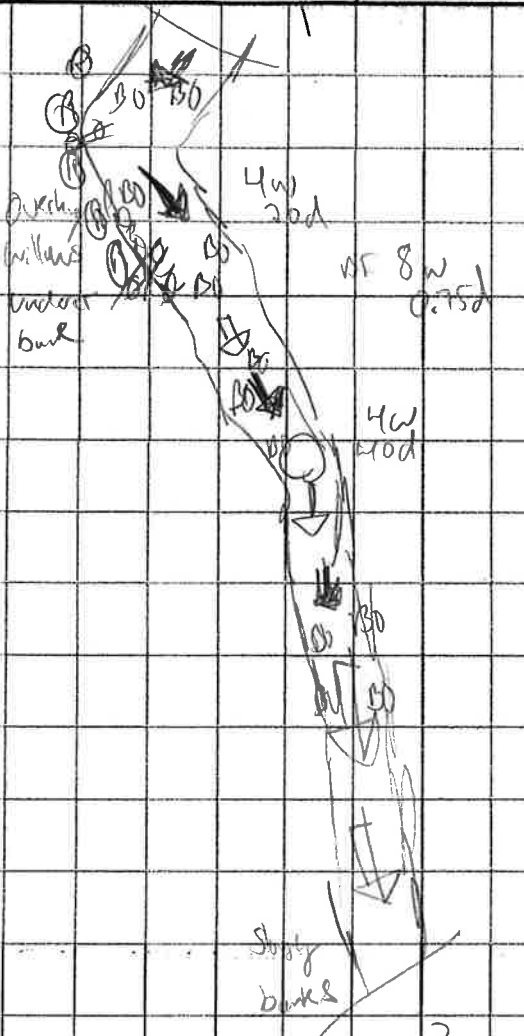
SECTION IDENTIFIER:		SECTION LOCATION:				SECTION LENGTH (m):		SCALE (cm / m):		
		D/S - 2								
									PROJECT #: 8558	
									MAPPER: SLC	
									NAME OF WATERBODY: Tr. 6 of Spring Creek	
									CROSSING #: E7	
									STATION #:	
								DATE: DD-MMM-YY 20-09-2016		
LEGEND										
10d depth (cm) 6w width										
→ Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ▨ Fine Substrate ### Gravel Substrate oOoo Cobble / Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining ///// Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree ^^^ Dam/Weir/Obstruction ⊗ Riparian Tree └ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line ┌ Culvert										
PROFILE:		Horz. Scale		Vert. Scale						
						1				

SECTION IDENTIFIER:		SECTION LOCATION:		SECTION LENGTH (m):	SCALE (cm / m):
Trib of Spring Creek		D/S @ Concession 2			
	PROJECT #:		8558		
	MAPPER:		SLL		
	NAME OF WATERBODY:		Trib of Spring Creek		
	CROSSING #:		E7		
	STATION #:				
	DATE: DD-MMM-YY		20-00-16		
	LEGEND				
	10d depth (cm)				
	6w width				
	→ Riffle				
⇒ Run/Glide					
○ Pool					
■ Island/Bar					
▨ Fine Substrate					
### Gravel Substrate					
oOooO Cobble / Boulder					
*** Debris					
CT Cattail					
SV/FV Submerg/Float Veg					
EV Emergent Vegetation					
W Watercress					
Fe Iron Staining					
///// Eroded Bank					
XXX Riprap / Other Stabilization					
○ Instream Log/Tree					
AAA Dam/Weir/Obstruction					
⊗ Riparian Tree					
└▶ Seep/Spring					
----- Undercut Bank					
— Barrier to Fish Movement					
-S- Seasonal Barrier					
-x-x- Fence line					
└┘ Culvert					
PROFILE:	Horz. Scale	Vert. Scale			

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: Transitway West			DAY: 14	MONTH: 09	YEAR: 2016		
Is STREAM REALIGNMENT required for this section: Yes No Unknown									
COLLECTORS: JLC + JmV			WEATHER CONDITIONS: Sunny 20°C		TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Spring Creek			DRAINAGE SYSTEM: Etobicoke Creek		CROSSING #: E8		STATION #:		
LOCATION OF CROSSING: South of Hw 407 ETR, 400 m west of Branford Road									
UTM EASTING & NORTHING: 17T 605861 mE 4838898 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Agricultural, Urban, naturalized Valley					SOURCES OF POLLUTION: Highway 407, urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: 407 ETR structure span bridge						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
	X		X						
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area	40	20	20	20					
mean depth wetted (m)	3.0								
mean width wetted (m)	3.5								
Mean bankfull width (m)	7.0								
Mean bankfull depth (m)	0.7								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Détritus D	
	10	20	30	20	20				

BANK STABILITY									
	Stable	Slightly Unstable	Moderately Unstable	Unstable					
Left Upstream Bank				X					
Right Upstream Bank				X					
HABITAT									
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris		Organic debris	Vascular plants	None	
	S	S	S	Instream	Overhanging S		Instream	Overhanging	X
SHORE COVER (% stream shaded):	100 – 90 %		90 – 60%		60- 30%		30 – 1%		None
							X		
VEGETATION TYPE (%) :	Submergent		Floating			Emergent		None	
Predominant Species								X	
MIGRATORY OBSTRUCTIONS:	None			Seasonal			Permanent		
	X								
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning			Evidence of Groundwater			Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:									
<p>= slope stabilization measures</p> <p>= many "plastic beads" were noted through the channel. find and stop the source</p>									
COMMENTS :									
Additional Notes Appended? No Yes number of pages _____									

SECTION IDENTIFIER:		SECTION LOCATION:		SECTION LENGTH (m):		SCALE (cm / m):	
VPS 1		Spring Creek					
		4075 R BR/12		PROJECT #:		8558	
				MAPPER:		SIC	
				NAME OF WATERBODY:		Spring Creek	
				CROSSING #:		E8	
				STATION #:			
				DATE: DD-MMM-YY		14-09-16	
				LEGEND			
				10d depth (cm)			
				6w width			
				→ Riffle			
				⇨ Run/Glide			
				○ Pool			
				■ Island/Bar			
				▨ Fine Substrate			
				### Gravel Substrate			
				oOooO Cobble / Boulder			
				*** Debris			
				CT Cattail			
				SV/FV Submerg/Float Veg			
				EV Emergent Vegetation			
				W Watercress			
				Fe Iron Staining			
				///// Eroded Bank			
				XXX Riprap / Other Stabilization			
PROFILE:		Horz. Scale		Vert. Scale		○ Instream Log/Tree	
						^ ^ ^ Dam/Weir/Obstruction	
						⊗ Riparian Tree	
						└▶ Seep/Spring	
						----- Undercut Bank	
						— Barrier to Fish Movement	
						-S- Seasonal Barrier	
						-x-x- Fence line	
						┌ Culvert	

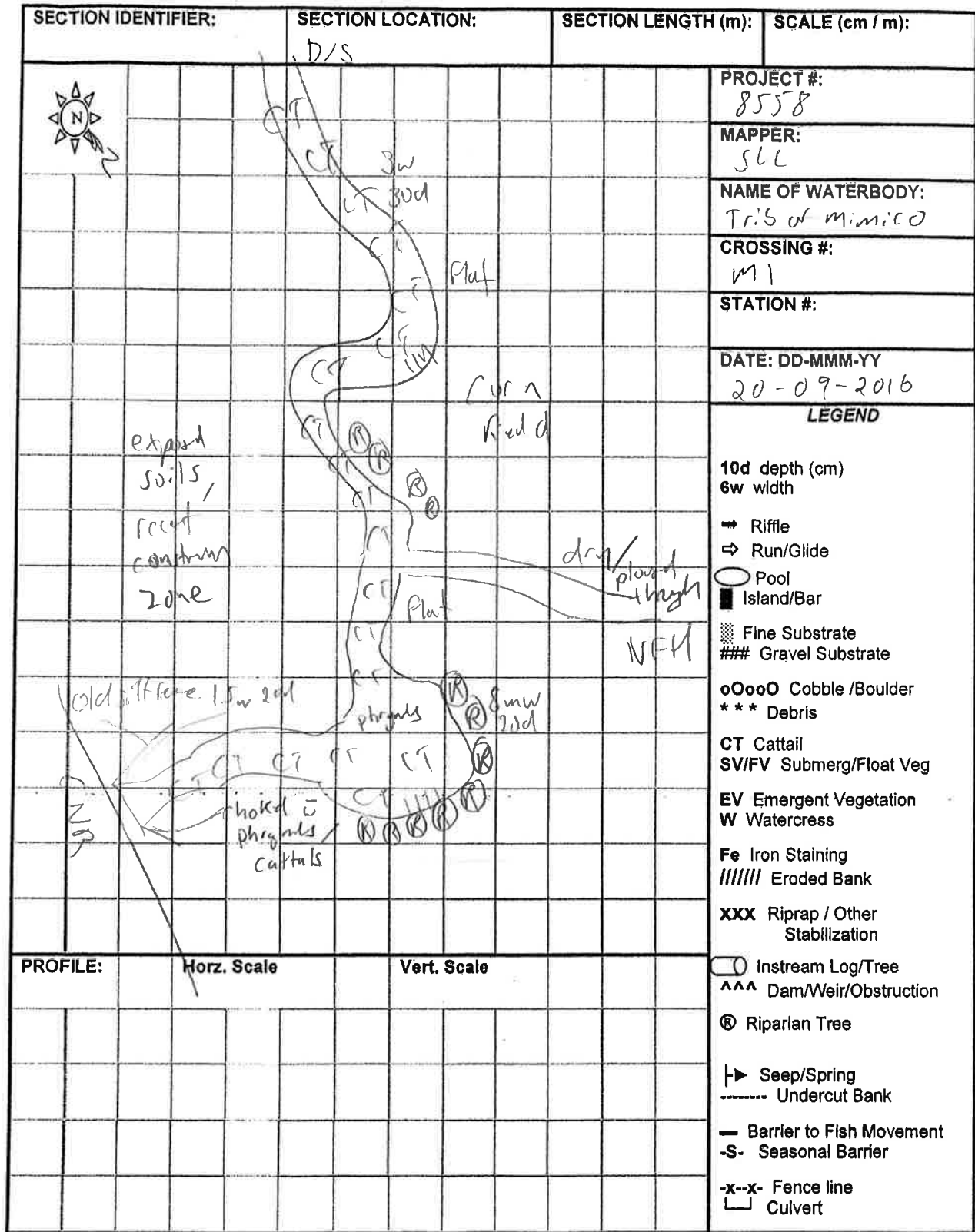
SECTION IDENTIFIER:			SECTION LOCATION:			SECTION LENGTH (m):			SCALE (cm / m):		
2									PROJECT #: 8558		
									MAPPER: JLL		
									NAME OF WATERBODY: Spring Creek		
									CROSSING #: E8		
									STATION #:		
									DATE: DD-MMM-YY 14-09-16		
									LEGEND 10d depth (cm) 6w width → Rifle ⇨ Run/Glide ○ Pool ■ Island/Bar ▨ Fine Substrate ### Gravel Substrate oOoO Cobble / Boulder * * * Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining // //// Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree AAA Dam/Weir/Obstruction ⊗ Riparian Tree ▶ Seep/Spring - - - - - Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line L Culvert		
PROFILE:		Horz. Scale		Vert. Scale							

SECTION IDENTIFIER: 1 3		SECTION LOCATION: D/S end up		SECTION LENGTH (m):		SCALE (cm / m):	
						PROJECT #: 8558	
						MAPPER: JMV	
						NAME OF WATERBODY: Spring Creek	
						CROSSING #: E8	
						STATION #:	
DATE: DD-MMM-YY 14 SEP 16						LEGEND	
						10d depth (cm) 6w width → Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ■ Fine Substrate ### Gravel Substrate ○○○ Cobble /Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining ///// Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree ^^^ Dam/Weir/Obstruction ® Riparian Tree ↳ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line □ Culvert	
PROFILE:		Horz. Scale		Vert. Scale			
Manys (Handwritten notes and symbols on the profile grid)							

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: Transitway West			DAY: 20	MONTH: 09	YEAR: 2016		
Is STREAM/REALIGNMENT required for this section: Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>									
COLLECTORS: SLC JMV			WEATHER CONDITIONS: Sunny 27°C		TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Tributary of Mimico			DRAINAGE SYSTEM:		CROSSING #: M1		STATION #:		
LOCATION OF CROSSING: South of 407 ETR, ~700 m west of Torbram Road									
UTM EASTING & NORTHING: 17T 606293 mE 4839863 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Agriculture, urban					SOURCES OF POLLUTION: Roads, urban development				
EXISTING STRUCTURE TYPE									
Bridge		<input checked="" type="checkbox"/> Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: twin cell box 407 ETR crossing						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river	Channellized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>						
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area	5		5	90					
mean depth wetted (m)	0.3								
mean width wetted (m)	3.0								
Mean bankfull width (m)	6.0								
Mean bankfull depth (m)	0.7								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Ci	Muck Mu	Détritus D	
			10	10	70			5	

BANK STABILITY							
		Stable	Slightly Unstable	Moderately Unstable	Unstable		
Left Upstream Bank				X			
Right Upstream Bank				X			
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
	2.5		2.5	Instream 2.5 Overhanging		Instream 20 Overhanging 20	
SHORE COVER (% stream shaded):	100 – 90 %		90 – 60%	60- 30%	30 – 1%	None	
				X			
VEGETATION TYPE (%):	Submergent		Floating		Emergent	None	
					20		
Predominant Species							
MIGRATORY OBSTRUCTIONS:	None			Seasonal	Permanent (NR possible barrier Rip rap south of the ETR)		
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning			Evidence of Groundwater	Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
- Remove barriers to fish passage - riprap plants to stabilize banks							
COMMENTS :							
Additional Notes Appended? No Yes number of pages _____							

SECTION IDENTIFIER:		SECTION LOCATION:		SECTION LENGTH (m):	SCALE (cm / m):
		U/S		407 ETR crossing	PROJECT #: 8558
					MAPPER: SLC
					NAME OF WATERBODY: Tributary of Mimico Cr.
					CROSSING #: M1
					STATION #:
					DATE: DD-MMM-YY 20-09-2016
LEGEND					
10d depth (cm) 6w width					
→ Riffle					
⇨ Run/Glide					
○ Pool					
■ Island/Bar					
⊞ Fine Substrate					
### Gravel Substrate					
oOooO Cobble / Boulder					
*** Debris					
CT Cattail					
SV/FV Submerg/Float Veg					
EV Emergent Vegetation					
W Watercress					
Fe Iron Staining					
///// Eroded Bank					
XXX Riprap / Other Stabilization					
○ Instream Log/Tree					
AAA Dam/Weir/Obstruction					
⊗ Riparian Tree					
▶ Seep/Spring					
----- Undercut Bank					
- Barrier to Fish Movement					
-S- Seasonal Barrier					
-x-x- Fence line					
┌└ Culvert					
PROFILE:	Horz. Scale	Vert. Scale			



GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: Transitway West			DAY: 20	MONTH: 09	YEAR: 2016		
Is STREAM REALIGNMENT required for this section: Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>									
COLLECTORS: SLL SMV			WEATHER CONDITIONS: Sunny 27°C		TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Tributary of Mimico			DRAINAGE SYSTEM:		CROSSING #: M3		STATION #:		
LOCATION OF CROSSING: South of 407 ETR, 150 m west of Tobraam									
UTM EASTING & NORTHING: 17T 606597 mE 4840544 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Agricultural, Urban					SOURCES OF POLLUTION: Roads, Urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: 4m CSPS - access road culverts						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (Include on habitat map)					
TYPE:	Stream / river	Channellized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area				100					
mean depth wetted (m)	0.1								
mean width wetted (m)	1.0								
Mean bankfull width (m)	3.0								
Mean bankfull depth (m)	0.4								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt SI	Clay CI	Muck Mu	Détritus D	
								10	80

10
 ↓
 riprap

BANK STABILITY								
	Stable	Slightly Unstable	Moderately Unstable	Unstable				
Left Upstream Bank		X						
Right Upstream Bank		X						
HABITAT								
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble 2.5 0.15%	Large Woody Debris		Organic debris	Vascular plants	None
				Instream 2.5	Overhanging 2.5			
SHORE COVER (% stream shaded):		100 - 90 %	90 - 60%	60- 30% X	30 - 1%	None		
VEGETATION TYPE (%):	Submergent		Floating		Emergent 40%		None	
Predominant Species								
MIGRATORY OBSTRUCTIONS:	None		Seasonal low flow		Permanent			
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other			
POTENTIAL ENHANCEMENT OPPORTUNITIES:								
- natural channel design instead of channelized form								
COMMENTS :								
Additional Notes Appended? No Yes number of pages								

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: Transitory West			DAY: 20	MONTH: 09	YEAR: 2016		
Is STREAM/REALIGNMENT required for this section: Yes No Unknown									
COLLECTORS: SLC JMV			WEATHER CONDITIONS: Sunny 27°C		TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Tributary of Mimico Creek			DRAINAGE SYSTEM:		CROSSING #: M4		STATION #:		
LOCATION OF CROSSING: South of 407 ETR, 600 m East of Torbram Road									
UTM EASTING & NORTHING: 17T 606698 mE 4841270 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Agricultural, Urban, naturalized valley					SOURCES OF POLLUTION: Roads, urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: Twin cell box culvert - 407 ETR Structure						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:					SECTION LOCATION: (include on habitat map)				
TYPE:	Stream / river	Channellized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area	25	10	5	60					
mean depth wetted (m)	0.25								
mean width wetted (m)	4.0								
Mean bankfull width (m)	6.0								
Mean bankfull depth (m)	1.5								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt SI	Clay CI	Muck Mu	Détritus D	
		5	10	10	55			20	

BANK STABILITY							
		Stable	Slightly Unstable	Moderately Unstable	Unstable		
Left Upstream Bank				X			
Right Upstream Bank				X			
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
	5		5	Instream 2.5 Overhanging 2.5		Instream 10 Overhanging	
SHORE COVER (% stream shaded):	100 – 90 %		90 – 60%	60- 30%	30 – 1%	None	
					X		
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None
	10				30		
Predominant Species							
MIGRATORY OBSTRUCTIONS:	None		Seasonal		Permanent		
	X						
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
- slope stabilization measures							
COMMENTS :							
Additional Notes Appended? No Yes number of pages _____							

SECTION IDENTIFIER:			SECTION LOCATION:			SECTION LENGTH (m):			SCALE (cm / m):		
U/S			U/S								
						PROJECT #: 8558					
						MAPPER: Jhu					
						NAME OF WATERBODY: Tr. Suluy of M. m. co					
						CROSSING #: M4					
						STATION #:					
						DATE: DD-MMM-YY 20 SEP 16					
						LEGEND					
						10d depth (cm) 6w width → Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ▨ Fine Substrate ### Gravel Substrate ○○○○ Cobble/Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining ///// Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree ^^^ Dam/Weir/Obstruction ® Riparian Tree ▸ Seep/Spring - - - - Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line □ Culvert					
PROFILE:			Horz. Scale			Vert. Scale					
			D&D 1.2								
			DFW 8.0								

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SECTION IDENTIFIER:		SECTION LOCATION:		SECTION LENGTH (m):		SCALE (cm / m):			
		PROJECT #:		8558		MAPPER:			
		NAME OF WATERBODY:		tributary of minico		CROSSING #:			
		STATION #:		M4		DATE: DD-MMM-YY			
		DATE: DD-MMM-YY		20-09-16		LEGEND			
		meadow riparian		apples to hore		Flora		Flora	
		Flora		Flora		Flora		Flora	
PROFILE:		Horz. Scale		Vert. Scale		10d depth (cm) 6w width → Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ■ Fine Substrate ### Gravel Substrate ○○○○ Cobble /Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining // // // Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree AAA Dam/Weir/Obstruction ⊗ Riparian Tree ↳ Seep/Spring - - - Undercut Bank - Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line □ Culvert			

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: Transitway West			DAY: 20	MONTH: 09	YEAR: 2016		
Is STREAM/REALIGNMENT required for this section: Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>									
COLLECTORS: S.L. JmV			WEATHER CONDITIONS: Sunny 27°C		TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Tr. S of Minico ck			DRAINAGE SYSTEM: Minico Creek		CROSSING #: M15		STATION #:		
LOCATION OF CROSSING: South of 407 ETR, West of the CNR									
UTM EASTING & NORTHING: 17T 607098 mE 4842796 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: urban, naturalized valley					SOURCES OF POLLUTION: Roads, urban development				
EXISTING STRUCTURE TYPE									
Bridge		<input checked="" type="checkbox"/> Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: 407 ETR Strache box culvert						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river <input checked="" type="checkbox"/>	Channellized	Permanent <input checked="" type="checkbox"/>	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area	30	5	35	30					
mean depth wetted (m)	3.0								
mean width wetted (m)	3.0								
Mean bankfull width (m)	4.0								
Mean bankfull depth (m)	0.4								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Ci	Muck Mu	Detritus D	
		30	30	20	20				

BANK STABILITY							
	Stable	Slightly Unstable	Moderately Unstable	Unstable			
Left Upstream Bank		X					
Right Upstream Bank		X					
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
			5	Instream 10 Overhanging 10		Instream 5 Overhanging	
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60-30%	30 – 1%	None		
			X				
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None
					5		
Predominant Species							
MIGRATORY OBSTRUCTIONS:	None		Seasonal		Permanent CNR CSP app- to complete work		
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
- Remove barrier @ CNR crossing							
COMMENTS :							
Additional Notes Appended? No Yes number of pages							

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: Transitory West			DAY: 20	MONTH: 09	YEAR: 2016		
Is STREAM/REALIGNMENT required for this section: Yes No Unknown									
COLLECTORS: See JMV		WEATHER CONDITIONS: Sunny 27°C			TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Trib of Mimico Ck		DRAINAGE SYSTEM: Mimico Creek		CROSSING #: M6		STATION #:			
LOCATION OF CROSSING: South of 407 ETR, west of the CNR									
UTM EASTING & NORTHING: 17T 607212 mE 4842917mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Urban, naturalized valley					SOURCES OF POLLUTION: Roads, urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: 407 ETR strike Box culvert						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river	Channelized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
	X	X	X						
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area	50		20	30					
mean depth wetted (m)	0.2								
mean width wetted (m)	0.5								
Mean bankfull width (m)	3.0								
Mean bankfull depth (m)	0.4								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Détritus D	
			40	20	30			10	

BANK STABILITY							
		Stable	Slightly Unstable	Moderately Unstable	Unstable		
Left Upstream Bank			X				
Right Upstream Bank			X				
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris Instream Overhanging	Organic debris	Vascular plants Instream Overhanging	None
						Instream 40 Overhanging	
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None		
	X						
VEGETATION TYPE (%)	Submergent		Floating		Emergent		None
					40		
Predominant Species							
MIGRATORY OBSTRUCTIONS:	None		Seasonal		Permanent CNR-CSP appears to be complete barrier to fishway		
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
- Remove barrier at CNR crossing							
COMMENTS :							
Additional Notes Appended? No Yes number of pages							

SECTION IDENTIFIER:		SECTION LOCATION:				SECTION LENGTH (m):		SCALE (cm / m):	
East Tr. S. d. m. n. c. r.									
		PROJECT #:							
		8558							
		MAPPER:							
		JMU							
		NAME OF WATERBODY:							
		East Tr. S. d. m. n. c. r.							
CROSSING #:									
M6									
STATION #:									
DATE: DD-MMM-YY									
10 SEP 16									
LEGEND									
10d depth (cm)									
6w width									
➔ Riffle									
⇨ Run/Glide									
○ Pool									
■ Island/Bar									
▨ Fine Substrate									
### Gravel Substrate									
oOooO Cobble/Boulder									
*** Debris									
CT Cattail									
SV/FV Submerg/Float Veg									
EV Emergent Vegetation									
W Watercress									
Fe Iron Staining									
///// Eroded Bank									
XXX Riprap / Other Stabilization									
PROFILE:		Horz. Scale		Vert. Scale				○ Instream Log/Tree	
								AAA Dam/Weir/Obstruction	
								⊗ Riparian Tree	
								▶ Seep/Spring	
								----- Undercut Bank	
								— Barrier to Fish Movement	
								-S- Seasonal Barrier	
								-x-x- Fence line	
								└ Culvert	

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: Transitway West			DAY: 20	MONTH: 09	YEAR: 2016		
Is STREAM/REALIGNMENT required for this section: Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown <input type="checkbox"/>									
COLLECTORS: SLLJMV			WEATHER CONDITIONS: Sunny 27°C		TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Mimico Creek		DRAINAGE SYSTEM: Mimico Creek		CROSSING #: M7		STATION #:			
LOCATION OF CROSSING: South of 407 ETR, 50 m east of the CNR line									
UTM EASTING & NORTHING: 17T 607388 mE 4843051 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Agricultural, urban, natural valley					SOURCES OF POLLUTION: Roads, urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: 407 ETR Structure Bridge						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (Include on habitat map)					
TYPE:	Stream / river	Channellized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
	X		X						
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area	20	30	30	20					
mean depth wetted (m)	0.3								
mean width wetted (m)	4.0								
Mean bankfull width (m)	10.0								
Mean bankfull depth (m)	0.7								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt SI	Clay CI	Muck Mu	Détritus D	
		10	40	25	25				


BANK STABILITY								
	Stable	Slightly Unstable	Moderately Unstable	Unstable				
Left Upstream Bank			X					
Right Upstream Bank			X					
HABITAT								
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris		Organic debris	Vascular plants	None
	5		5	Instream 5	Overhanging 5		Instream 5	Overhanging
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60 %	60-30%	30 – 1%	None			
VEGETATION TYPE (%)	Submergent		Floating		Emergent		None	
Predominant Species	5							
MIGRATORY OBSTRUCTIONS:	None		Seasonal			Permanent		
X								
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater			Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:								
<p>- implementation of SWM techniques to reduce "flashiness"</p> <p>- bank stabilization measures</p>								
COMMENTS :								
Additional Notes Appended? No Yes number of pages _____								

SECTION IDENTIFIER:		SECTION LOCATION:		SECTION LENGTH (m):		SCALE (cm / m):	
W: mico U/S						PROJECT #: 8558	
↑ ETR		- cobble 5w 20d				MAPPER: SLC	
N		6w 40d				NAME OF WATERBODY: Mimico Cr	
		gravel bar				CROSSING #: M7	
		5w 30d				STATION #:	
		5w 30d				DATE: DD-MMM-YY 20-09-16	
		4w 30d				LEGEND 10d depth (cm) 6w width → Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ▒ Fine Substrate ### Gravel Substrate oOoO Cobble /Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining ///// Eroded Bank XXX Riprap / Other Stablization ○ Instream Log/Tree AAA Dam/Weir/Obstruction ⊗ Riparian Tree ▶ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line └┘ Culvert	
black gravel through		rocks					
		5w 40d					
		gravel bar					
		5w 30d					
		gravel bar					
		roots 0.4H 3w 10d					
PROFILE:		Horz. Scale		Vert. Scale			

SECTION IDENTIFIER: Mm107 0/5		SECTION LOCATION:			SECTION LENGTH (m):		SCALE (cm / m):	
							PROJECT #: 8558	
							MAPPER: SLL	
							NAME OF WATERBODY: Mm107 Creek	
							CROSSING #: M7	
							STATION #:	
DATE: DD-MMM-YY 20-09-16							LEGEND	
							10d depth (cm) 6w width → Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ■ Fine Substrate ### Gravel Substrate oOooO Cobble /Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining ///// Eroded Bank xxx Riprap / Other Stabilization ○ Instream Log/Tree AAA Dam/Weir/Obstruction ⊗ Riparian Tree ↳ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line □ Culvert	
PROFILE:		Horz. Scale		Vert. Scale				

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: 401 Hwy West			DAY: 15	MONTH: 08	YEAR: 2016		
Is STREAM REALIGNMENT required for this section: Yes No Unknown									
COLLECTORS: SU JMV			WEATHER CONDITIONS: Sunny 25°C		TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: West Humber River			DRAINAGE SYSTEM: Humber		CROSSING #: 111		STATION #:		
LOCATION OF CROSSING: 407 ETR to 200 m south of proposed abutment									
UTM EASTING & NORTHING: 17T 609243 mE 4844845 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Urban, natural					SOURCES OF POLLUTION: development, adjacent Roads				
EXISTING STRUCTURE TYPE									
<input checked="" type="checkbox"/> Bridge		<input type="checkbox"/> Box Culvert		<input type="checkbox"/> Open Foot Culvert		<input type="checkbox"/> CSP		<input type="checkbox"/> N/A	
Other Describe: 407 ETR + Steeles Ave						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river <input checked="" type="checkbox"/>	Channelized <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	ASSOCIATED WETLAND:			
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	inside culvert	Other			
Percentage of area				100					
mean depth wetted (m)				0.4					
mean width wetted (m)				30					
Mean bankfull width (m)				35					
Mean bankfull depth (m)				0.6					
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Ci	Muck Mu	Detritus D	
	5				90			5	

BANK STABILITY							
	Stable	Slightly Unstable	Moderately Unstable	Unstable			
Left Upstream Bank		X					
Right Upstream Bank		X					
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
		1		Instream 2.5 Overhanging 2.5		Instream 2.5 Overhanging 2.5	
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None		
				X			
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None
	5				5		
Predominant Species							
MIGRATORY OBSTRUCTIONS:	None		Seasonal		Permanent		
	X						
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
- protect from stormwater impacts, urban develop - Attempt to establish more riparian vegetation underneath Steeles Avenue bridge							
COMMENTS :							
Additional Notes Appended? No Yes number of pages _____							

SECTION IDENTIFIER: U/S		SECTION LOCATION: 407 FTR			SECTION LENGTH (m): 200	SCALE (cm / m):
	407 FTR					PROJECT #: 8558
	Silt / riprap					MAPPER: SLC
	West Main R. Ver					NAME OF WATERBODY:
	H1					CROSSING #:
	30w 40d?					STATION #:
	15-08-16					DATE: DD-MMM-YY
	LEGEND					
	10d depth (cm) 6w width					
	→ Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ■ Fine Substrate ### Gravel Substrate oOooO Cobble / Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining // // // Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree ^^^ Dam/Weir/Obstruction ⊗ Riparian Tree ▶ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line └┘ Culvert					
	PROFILE:		Horz. Scale		Vert. Scale	

SECTION IDENTIFIER:			SECTION LOCATION: D/s			SECTION LENGTH (m): 200			SCALE (cm / m):		
									PROJECT #: 8558		
									MAPPER: JMU		
									NAME OF WATERBODY: West Humber		
									CROSSING #: H1		
									STATION #:		
									DATE: DD-MMM-YY 15-AUG-16		
<p style="text-align: center;">LEGEND</p> <p>10d depth (cm) 6w width</p> <p>→ Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar</p> <p>▨ Fine Substrate ### Gravel Substrate ○○○○ Cobble / Boulder *** Debris</p> <p>CT Cattail SV/FV Submerg/Float Veg</p> <p>EV Emergent Vegetation W Watercress</p> <p>Fe Iron Staining ///// Eroded Bank</p> <p>XXX Riprap / Other Stabilization</p> <p>○ Instream Log/Tree ^^^ Dam/Weir/Obstruction</p> <p>⊗ Riparian Tree</p> <p>└▶ Seep/Spring ----- Undercut Bank</p> <p>— Barrier to Fish Movement -S- Seasonal Barrier</p> <p>-x-x- Fence line ┌└ Culvert</p>											
PROFILE:			Horz. Scale			Vert. Scale					

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: Transitway West			DAY: 14	MONTH: 09	YEAR: 2016		
Is STREAM/REALIGNMENT required for this section: Yes No Unknown									
COLLECTORS: SLC JMV		WEATHER CONDITIONS: Sunny, 20°C			TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Albion creek			DRAINAGE SYSTEM: Humber R.W.		CROSSING #: H2		STATION #:		
LOCATION OF CROSSING: South of 407 ETR, 310 m west of Highway 27									
UTM EASTING & NORTHING: 17T 610713 mE 4845720 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Urban, agricultural					SOURCES OF POLLUTION: Roads, urban development				
EXISTING STRUCTURE TYPE									
Bridge		<input checked="" type="checkbox"/> Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: <i>Stokes Avenue structure box culvert</i> Size (w x h) m2									
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (Include on habitat map)					
TYPE:	<input checked="" type="checkbox"/> Stream / river	<input type="checkbox"/> Channelized	<input type="checkbox"/> Permanent	<input checked="" type="checkbox"/> Intermittent	<input type="checkbox"/> Ephemeral	ASSOCIATED WETLAND:			
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area				100 spring - dry in summer					
mean depth wetted (m)									
mean width wetted (m)									
Mean bankfull width (m)									
Mean bankfull depth (m)									
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Sl	Clay Cl	Muck Mu	Détritus D	
			5		85			10	

BANK STABILITY							
	Stable	Slightly Unstable	Moderately Unstable	Unstable			
Left Upstream Bank	X						
Right Upstream Bank	X						
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris Instream Overhanging	Organic debris	Vascular plants Instream 10 Overhanging 10	None
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None		
				X			
VEGETATION TYPE (%):	Submergent		Floating		Emergent 10		None
Predominant Species							
MIGRATORY OBSTRUCTIONS:	None		Seasonal		Permanent piped d/s of Steeles Ave		
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
- "Daylight" the channel downstream of Steeles Ave							
COMMENTS :							
Additional Notes Appended? No Yes number of pages							

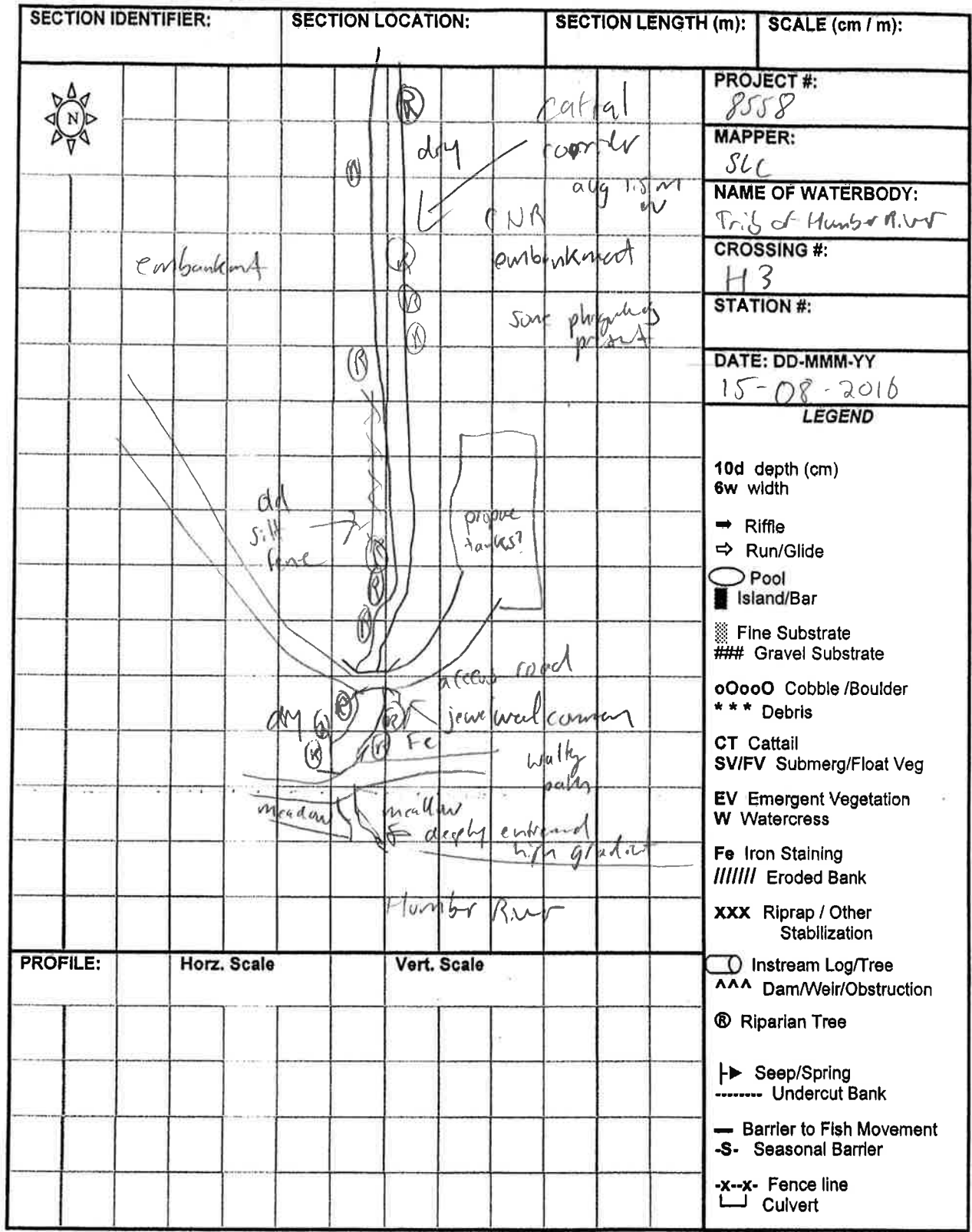
SECTION IDENTIFIER:		SECTION LOCATION:		SECTION LENGTH (m):		SCALE (cm / m):	
						PROJECT #: 8558	
						MAPPER: JLL	
						NAME OF WATERBODY: Albin Creek	
						CROSSING #: H2	
						STATION #:	
						DATE: DD-MMM-YY 14-09-2016	
						LEGEND	
						10d depth (cm) 6w width	
						→ Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ■ Fine Substrate ### Gravel Substrate oOooO Cobble /Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining ///// Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree ^^^ Dam/Weir/Obstruction ⊗ Riparian Tree ▶ Seep/Spring - - - - Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line ┌└ Culvert	
						PROFILE: Horz. Scale Vert. Scale	

GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: Transitway West			DAY: 15	MONTH: 08	YEAR: 2016		
Is STREAM REALIGNMENT required for this section: Yes No Unknown									
COLLECTORS: SUC JMV			WEATHER CONDITIONS: Sunny 25°C		TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Tr. Spring of Humber Riv			DRAINAGE SYSTEM: Humber		CROSSING #: H3		STATION #:		
LOCATION OF CROSSING: south of the CNR, East of Martin Grove Road									
UTM EASTING & NORTHING: 17T 611629 mE 4846030 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: Urban, naturalized valley					SOURCES OF POLLUTION: Roads, urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe:						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river <input checked="" type="checkbox"/>	Channellized <input checked="" type="checkbox"/>	Permanent	Intermittent <input checked="" type="checkbox"/>	Ephemeral	ASSOCIATED WETLAND:			
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area				100 - spring dry in summer					
mean depth wetted (m)									
mean width wetted (m)									
Mean bankfull width (m)									
Mean bankfull depth (m)									
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Sl	Clay Cl	Muck Mu	Detritus D	

90

10

BANK STABILITY							
	Stable	Slightly Unstable	Moderately Unstable	Unstable			
Left Upstream Bank		X					
Right Upstream Bank		X					
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
	1			Instream 1 Overhanging 1		Instream 30 Overhanging 30	
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60 %	60- 30%	30 – 1%	None		
		X					
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None
					30		
Predominant Species							
MIGRATORY OBSTRUCTIONS:	None		Seasonal		Permanent pool connects to Humboldt River - high gradient		
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
- utilize natural channel design instead of channelized structure - reduce gradient at outlet to Humboldt River to allow for fish passage							
COMMENTS :							
Additional Notes Appended? No Yes number of pages							



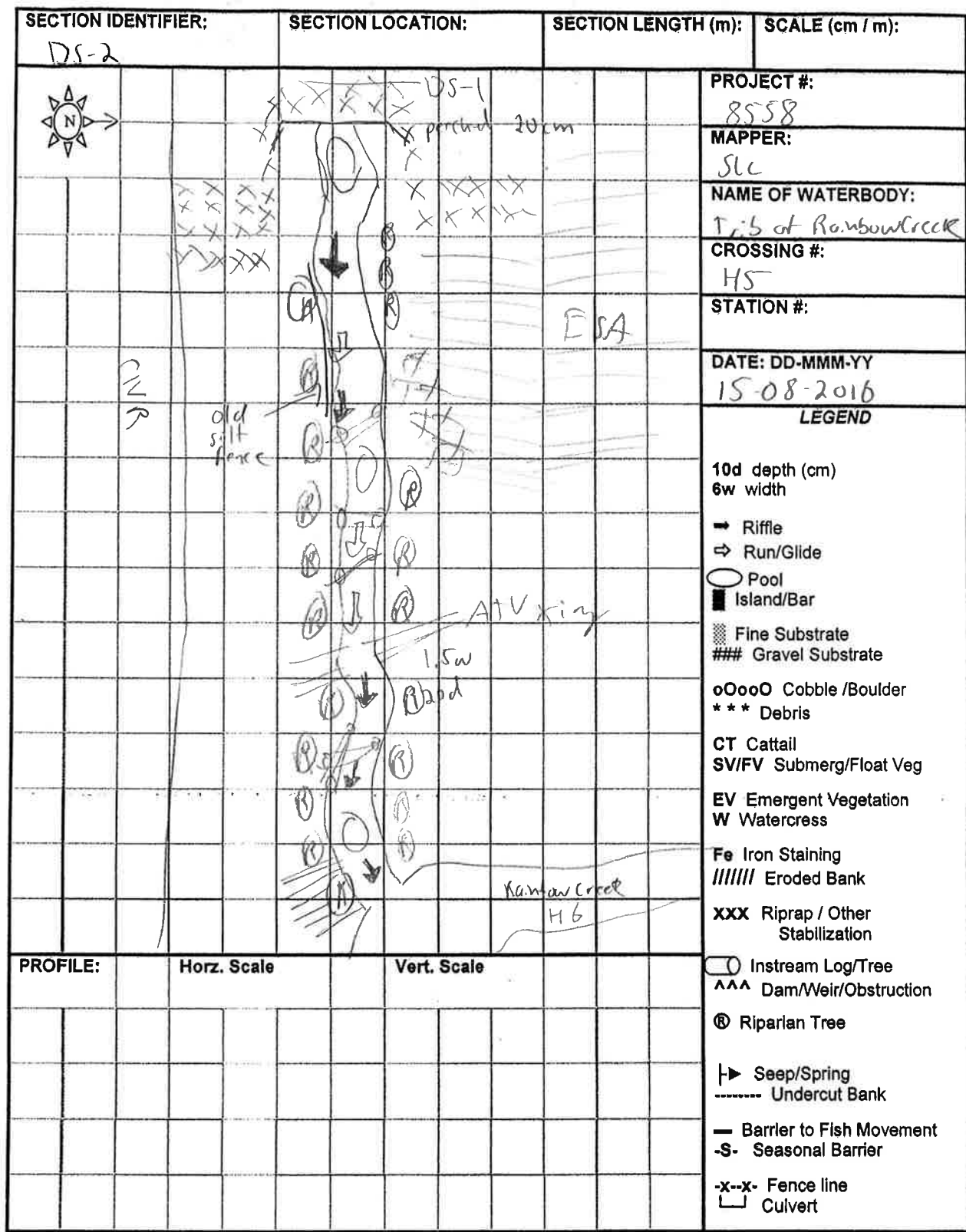
GENERAL INFORMATION									
PROJECT #: 8558		PROJECT DESCRIPTION: Transitory W/F			DAY: 15	MONTH: 08	YEAR: 2016		
Is STREAM REALIGNMENT required for this section: Yes No Unknown									
COLLECTORS: SLC JMV		WEATHER CONDITIONS: Sunny 25°C			TIME STARTED:		TIME FINISHED:		
PHOTOS NUMBERS AND DESCRIPTIONS:									
LOCATION									
NAME OF WATERBODY: Trib of Rainbow Creek		DRAINAGE SYSTEM:		CROSSING #: H5		STATION #:			
LOCATION OF CROSSING: South of 407 ETR, 750 m East of Martin Grove Road									
UTM EASTING & NORTHING: 17T 612893 mE 4846579 mN					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurore				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: urban, naturalized valley					SOURCES OF POLLUTION: Roads, urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: 407 ETR cross CSP						Size (w x h) m2			
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (Include on habitat map)					
TYPE:	Stream / river X	Channellized	Permanent X	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area	50	10	30	10					
mean depth wetted (m)	0.3								
mean width wetted (m)	1.0								
Mean bankfull width (m)	1.5-30								
Mean bankfull depth (m)	0.6								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt SI	Clay CI	Muck Mu	Detritus D	
		5	10	20	60			5	

↓
riprap

BANK STABILITY							
	Stable	Slightly Unstable	Moderately Unstable	Unstable			
Left Upstream Bank			X				
Right Upstream Bank			X				
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
	5		25	Instream 5 Overhanging 5		Instream 5 Overhanging 5	
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60 %	60- 30%	30 – 1%	None		
			X				
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None
	5				10		
Predominant Species							
MIGRATORY OBSTRUCTIONS:	None		Seasonal		Permanent		
					407 ETR crossing channel grad. w/ drop by the CSA @ downstream of channel		
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other		
					CSA @ downstream of channel		
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
- remove barriers to fish movement. - remove old silt fence left along creek							
COMMENTS :							
Additional Notes Appended? No Yes number of pages _____							

SECTION IDENTIFIER:		SECTION LOCATION:		SECTION LENGTH (m):	SCALE (cm / m):
US-1		407 ETR			
					PROJECT #: 8558
					MAPPER: SLC
					NAME OF WATERBODY: Trib of Rainbow creek
					CROSSING #: H5
					STATION #:
DATE: DD-MMM-YY 15-08-2016					LEGEND 10d depth (cm) 6w width → Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar x Fine Substrate ### Gravel Substrate oOooO Cobble /Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining // // // Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree ^^^ Dam/Weir/Obstruction ® Riparian Tree ↳ Seep/Spring - - - - Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line □ Culvert
PROFILE:	Horz. Scale	Vert. Scale			

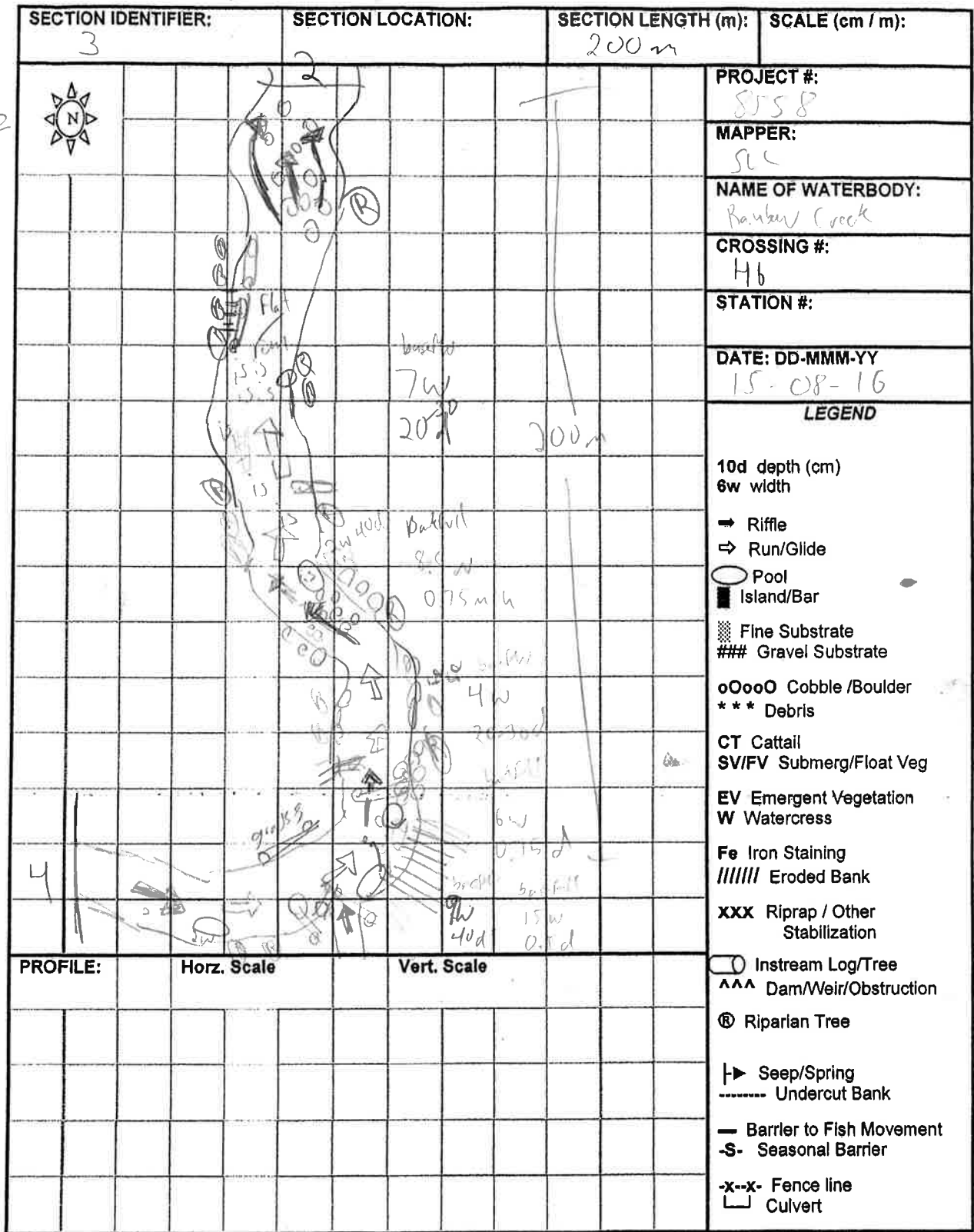
SECTION IDENTIFIER: US-2	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):
			PROJECT #: 8558
			MAPPER: SLC
			NAME OF WATERBODY: Tri'b of Rainbow Creek
			CROSSING #: 45
			STATION #:
DATE: DD-MMM-YY 15-08-2016			
			<p align="center">LEGEND</p> <p>10d depth (cm) 6w width</p> <p>→ Riffle ⇒ Run/Glide ○ Pool ■ Island/Bar</p> <p>• Fine Substrate ### Gravel Substrate o Cobble /Boulder *** Debris</p> <p>CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress</p> <p>Fe Iron Staining ///// Eroded Bank</p> <p>XXX Riprap / Other Stabilization</p> <p>○ Instream Log/Tree ▲▲▲ Dam/Weir/Obstruction ⊗ Riparian Tree</p> <p>└▶ Seep/Spring ----- Undercut Bank</p> <p>— Barrier to Fish Movement -S- Seasonal Barrier</p> <p>-x-x- Fence line ┌└ Culvert</p>
PROFILE:	Horz. Scale	Vert. Scale	



GENERAL INFORMATION									
PROJECT #:	8558	PROJECT DESCRIPTION:	764 West	DAY:	15	MONTH:	Aug	YEAR:	2015
Is STREAM REALIGNMENT required for this section:									
Yes No Unknown									
COLLECTORS:	SLL + JMV			WEATHER CONDITIONS:	Sunny 25°C		TIME STARTED:	TIME FINISHED:	
PHOTOS NUMBERS AND DESCRIPTIONS: 8210 -									
LOCATION									
NAME OF WATERBODY:	Rainbow Creek	DRAINAGE SYSTEM:	Humber	CROSSING #:	H16	STATION #:			
LOCATION OF CROSSING: 407 EIR to Confluence w R. Humber River									
UTM EASTING & NORTHING:					MTO CHAINAGE:				
TOWNSHIP:					MNR DISTRICT: Aurora				
LAND USE AND POLLUTION									
SURROUNDING LAND USE: urban - water table in valley					SOURCES OF POLLUTION: Highway 407, urban development				
EXISTING STRUCTURE TYPE									
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A	
Other Describe: 407 Stream, banks rip rap							Size (w x h) m2		
SECTION TYPE AND MORPHOLOGY									
SECTION IDENTIFIER:				SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river	Channellized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:			
TOTAL SECTION LENGTH (m): 1000m					CURRENT VELOCITY (m/s):				
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other			
Percentage of area	40	10	30	20					
mean depth wetted (m)	40								
mean width wetted (m)	7								
Mean bankfull width (m)	8.5								
Mean bankfull depth (m)	0.75								
Substrate									
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Ci	Muck Mu	Détritus D	
	5	10	30	20	30			5	

BANK STABILITY							
	Stable	Slightly Unstable	Moderately Unstable	Unstable			
Left Upstream Bank			X				
Right Upstream Bank			X				
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
15	2.5	2.5	2.5	Instream 5 Overhanging		Instream Overhanging	
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%	30 – 1%	None		
				X			
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None
Predominant Species	2.5						
MIGRATORY OBSTRUCTIONS:	None		Seasonal		Permanent		
	X						
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other		
	Some in riffles						
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
- Realign away from ETR - plantings along steeper slope adjacent to the ETR							
COMMENTS :							
Additional Notes Appended? No Yes number of pages _____							

SECTION IDENTIFIER: 1		SECTION LOCATION:		SECTION LENGTH (m): 200m	SCALE (cm / m):
					PROJECT #: 2558
					MAPPER: SLL
					NAME OF WATERBODY: Kambour Creek
					CROSSING #: H6
					STATION #:
					DATE: DD-MMM-YY 15-08-16
					LEGEND
					10d depth (cm) 6w width
					→ Riffle
					⇨ Run/Glide
					○ Pool
					■ Island/Bar
					⊞ Fine Substrate
					### Gravel Substrate
					oOooO Cobble /Boulder
					* * * Debris
					CT Cattail
					SV/FV Submerg/Float Veg
					EV Emergent Vegetation
					W Watercress
					Fe Iron Staining
					///// Eroded Bank
					xxx Riprap / Other Stabilization
					○ Instream Log/Tree
					^^^ Dam/Weir/Obstruction
					Ⓡ Riparian Tree
					└▶ Seep/Spring
					----- Undercut Bank
					— Barrier to Fish Movement
					-S- Seasonal Barrier
					-x-x- Fence line
					┌└ Culvert
PROFILE:	Horz. Scale		Vert. Scale		



SECTION IDENTIFIER: <i>14</i>	SECTION LOCATION:	SECTION LENGTH (m):	SCALE (cm / m):
		PROJECT #: <i>8558</i>	
		MAPPER: <i>SCC</i>	
		NAME OF WATERBODY: <i>Ramsaw Creek</i>	
		CROSSING #: <i>M6</i>	
		STATION #:	
		DATE: DD-MMM-YY <i>15-08-16</i>	
PROFILE: Horz. Scale Vert. Scale		<p align="center">LEGEND</p> <p>10d depth (cm) 6w width</p> <p>→ Riffle ⇒ Run/Glide ○ Pool ■ Island/Bar ▒ Fine Substrate ### Gravel Substrate oOoo Cobble /Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining ///// Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree AAA Dam/Weir/Obstruction ⊗ Riparian Tree └▶ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line ┌└ Culvert</p>	

GENERAL INFORMATION										
PROJECT #:	8558		PROJECT DESCRIPTION:	Transboundary West		DAY:	15	MONTH:	Aug	
YEAR: 2016										
Is STREAM/REALIGNMENT required for this section:										
Yes: No: Unknown:										
COLLECTORS:			WEATHER CONDITIONS:			TIME STARTED:		TIME FINISHED:		
SLL + JMU			Sunny 25°C							
PHOTOS NUMBERS AND DESCRIPTIONS:										
8193-8204										
LOCATION										
NAME OF WATERBODY:			DRAINAGE SYSTEM:		CROSSING #:		STATION #:			
E. Humber R.			Humber		H7					
LOCATION OF CROSSING:										
407 to 200m south of CAO crossing, W. of Irlington, N. of Steeles										
UTM EASTING & NORTHING:					MTO CHAINAGE:					
12E 614038mE 4847166mN										
TOWNSHIP:					MNR DISTRICT:					
York Region					Aurora					
LAND USE AND POLLUTION										
SURROUNDING LAND USE:					SOURCES OF POLLUTION:					
Urban - Naturalized in Valley					High, Cellulose, urban development					
EXISTING STRUCTURE TYPE										
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A		
Other Describe: 459 steel reinforced concrete banks on shoreline						Size (w x h) m2				
SECTION TYPE AND MORPHOLOGY										
SECTION IDENTIFIER:					SECTION LOCATION: (include on habitat map)					
TYPE:	Stream / river	Channellized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:				
	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			No				
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):					
350m										
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other				
Percentage of area	70		30							
mean depth wetted (m)	50		20							
mean width wetted (m)	12		12							
Mean bankfull width (m)	14		14							
Mean bankfull depth (m)	2		1.7							
Substrate	S, Gr, B, S		S, Gr, B, S							
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Si	Clay Cl	Muck Mu	Detritus D		

BANK STABILITY							
	Stable	Slightly Unstable	Moderately Unstable	Unstable			
Left Upstream Bank		70	30				
Right Upstream Bank		80	20				
HABITAT							
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris	Organic debris	Vascular plants	None
10		1	5	Instream 5 Overhanging		Instream Overhanging	89
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60-30%	30 – 1%	None		
				✓			
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None
Predominant Species							✓
MIGRATORY OBSTRUCTIONS:	None ✓		Seasonal		Permanent		
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning some in riffles		Evidence of Groundwater		Other		
POTENTIAL ENHANCEMENT OPPORTUNITIES:							
COMMENTS :							
Additional Notes Appended? No Yes number of pages _____							

SECTION IDENTIFIER:		SECTION LOCATION:				SECTION LENGTH (m):	SCALE (cm / m):
UPST		407 ETR nois pass Aimurine				PROJECT #: 8558	
		MAPPER: SLL		NAME OF WATERBODY: Humber River		CROSSING #: M7	
		STATION #:		DATE: DD-MMM-YY 15-08-16		LEGEND 10d depth (cm) 6w width → Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ● Fine Substrate ### Gravel Substrate oOooO Cobble /Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining // // // Eroded Bank xxx Riprap / Other Stabilization ○ Instream Log/Tree ^^^ Dam/Weir/Obstruction ⊗ Riparian Tree ↳ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line ┌┐ Culvert	
		150m		15-20m			
		shallow/grass		SCNR nois pass			
		one/m		slow 10-30			
Sand bank (near Sphagnum)							
PROFILE:	Horz. Scale	Vert. Scale					

SECTION IDENTIFIER: 200m d/s of railway		SECTION LOCATION: E. Humber		SECTION LENGTH (m): 200m		SCALE (cm / m):	
						PROJECT #: 8388	
						MAPPER: J. [unclear]	
						NAME OF WATERBODY: E. Humber	
						CROSSING #: H7	
						STATION #:	
						DATE: DD-MMM-YY 15-Aug-16	
						LEGEND	
10d depth (cm) 6w width							
→ Riffle							
⇨ Run/Glide							
○ Pool							
■ Island/Bar							
▨ Fine Substrate							
### Gravel Substrate							
oOooO Cobble /Boulder							
*** Debris							
CT Cattail							
SV/FV Submerg/Float Veg							
EV Emergent Vegetation							
W Watercress							
Fe Iron Staining							
///// Eroded Bank							
xxx Riprap / Other Stabilization							
○ Instream Log/Tree							
^^^ Dam/Weir/Obstruction							
⊗ Riparian Tree							
└▶ Seep/Spring							
----- Undercut Bank							
— Barrier to Fish Movement							
-S- Seasonal Barrier							
-x-x- Fence line							
┌└ Culvert							
PROFILE:	Horz. Scale	Vert. Scale					

GENERAL INFORMATION										
PROJECT #: 8558	PROJECT DESCRIPTION: Transition West			DAY: 20	MONTH: 09	YEAR: 2016				
Is STREAM/REALIGNMENT required for this section: Yes No Unknown										
COLLECTORS: SLC Gmv		WEATHER CONDITIONS: Sunny 27°C			TIME STARTED:	TIME FINISHED:				
PHOTOS NUMBERS AND DESCRIPTIONS:										
LOCATION										
NAME OF WATERBODY: Tributary of Mc Humber MNR Humber		DRAINAGE SYSTEM: Humber		CROSSING #: H8	STATION #:					
LOCATION OF CROSSING: South of 407 ETR, 500 m east of Phe Valley Drive										
UTM EASTING & NORTHING: 17T 614281mE 4847069mN				MTO CHAINAGE:						
TOWNSHIP:				MNR DISTRICT: Aurora						
LAND USE AND POLLUTION										
SURROUNDING LAND USE: Urban, naturalized valley				SOURCES OF POLLUTION: Roads, Urban development						
EXISTING STRUCTURE TYPE										
Bridge		Box Culvert		Open Foot Culvert		CSP		N/A		
Other Describe:						Size (w x h) m2				
SECTION TYPE AND MORPHOLOGY										
SECTION IDENTIFIER:				SECTION LOCATION: (Include on habitat map)						
TYPE:	Stream / river	Channellized	Permanent	Intermittent	Ephemeral	ASSOCIATED WETLAND:				
TOTAL SECTION LENGTH (m):					CURRENT VELOCITY (m/s):					
SUB-SECTION(S)	Run	Pool	Riffle	Flats	Inside culvert	Other				
Percentage of area	2.5		2.5	95						
mean depth wetted (m)	0.1									
mean width wetted (m)	1.5									
Mean bankfull width (m)	2.5-50									
Mean bankfull depth(m)	0.4									
Substrate										
Bedrock Br	Boulder Bo	Cobble Co	Gravel Gr	Sand Sa	Silt Sl	Clay Cl	Muck Mu	Détritus D		
		5	5	5	80			5		

BANK STABILITY								
	Stable	Slightly Unstable	Moderately Unstable	Unstable				
Left Upstream Bank		X						
Right Upstream Bank		X						
HABITAT								
IN-STREAM COVER (% surface area):	Undercut banks	Boulders	Cobble	Large Woody Debris		Organic debris	Vascular plants	None
	1		2.5	Instream 1			Instream 30	
				Overhanging 1			Overhanging 30	
SHORE COVER (% stream shaded):	100 – 90 %	90 – 60%	60- 30%		30 – 1%	None		
			X					
VEGETATION TYPE (%):	Submergent		Floating		Emergent		None	
	25				30			
Predominant Species								
MIGRATORY OBSTRUCTIONS:	None		Seasonal		Permanent			
					p.pct d/s of CNR			
					- barrier between channel + pond			
POTENTIAL CRITICAL HABITAT LIMITING:	Spawning		Evidence of Groundwater		Other			
POTENTIAL ENHANCEMENT OPPORTUNITIES:								
- daylight "A" the channel downstream of the study area								
COMMENTS :								
Additional Notes Appended? No Yes number of pages								

SECTION IDENTIFIER:		SECTION LOCATION:				SECTION LENGTH (m):		SCALE (cm / m):	
D/S									
						PROJECT #:		8558	
						MAPPER:		JL	
						NAME OF WATERBODY:		Trib of the Humboldt River	
						CROSSING #:		H8	
						STATION #:			
						DATE: DD-MMM-YY		20-09-2016	
PROFILE:		Horz. Scale		Vert. Scale		<p align="center">LEGEND</p> <p>10d depth (cm) 6w width</p> <p>→ Riffle ⇨ Run/Glide ○ Pool ■ Island/Bar ● Fine Substrate ### Gravel Substrate oOooO Cobble / Boulder *** Debris CT Cattail SV/FV Submerg/Float Veg EV Emergent Vegetation W Watercress Fe Iron Staining ///// Eroded Bank XXX Riprap / Other Stabilization ○ Instream Log/Tree ^^^ Dam/Weir/Obstruction ⊗ Riparian Tree ▸ Seep/Spring ----- Undercut Bank — Barrier to Fish Movement -S- Seasonal Barrier -x-x- Fence line ┌ Culvert</p>			

SECTION IDENTIFIER:		SECTION LOCATION:		SECTION LENGTH (m):		SCALE (cm / m):	
UIS							
						PROJECT #: 8558	
						MAPPER: JLL	
						NAME OF WATERBODY: Trib of the Hunter River	
						CROSSING #: H8	
						STATION #:	
						DATE: DD-MMM-YY 20-09-2016	
<p style="text-align: center;">LEGEND</p> <p>10d depth (cm) 6w width</p> <p>→ Riffle ⇌ Run/Glide ○ Pool ■ Island/Bar</p> <p>▨ Fine Substrate ### Gravel Substrate</p> <p>oOooO Cobble /Boulder *** Debris</p> <p>CT Cattail SV/FV Submerg/Float Veg</p> <p>EV Emergent Vegetation W Watercress</p> <p>Fe Iron Staining ///// Eroded Bank</p> <p>xxx Riprap / Other Stabilization</p> <p>○ Instream Log/Tree ^^^ Dam/Weir/Obstruction</p> <p>Ⓡ Riparian Tree</p> <p>↳ Seep/Spring ----- Undercut Bank</p> <p>— Barrier to Fish Movement -S- Seasonal Barrier</p> <p>-x-x- Fence line ┌└ Culvert</p>							
PROFILE:		Horz. Scale		Vert. Scale			