NATURAL SCIENCES REPORT

HIGHWAY 7 CORRIDOR AND VAUGHAN NORTH-SOUTH LINK
PUBLIC TRANSIT IMPROVEMENTS
INDIVIDUAL ENVIRONMENTAL ASSESSMENT

prepared for:

YRTP
YORK RAPID TRANSIT PLAN
Making the Right Connections!

prepared by:

LGL

with

JAGGER HIMS LIMITED
Environmental Consulting Engineers

August 2005

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HIGHWAY 7 CORRIDOR AND VAUGHAN NORTH-SOUTH LINK PUBLIC TRANSIT IMPROVEMENTS INDIVIDUAL ENVIRONMENTAL ASSESSMENT

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August 2005

LGL Project # TA2818

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1.0 INTRODUCTION

The York Rapid Transit Plan (YRTP) was developed out of the Regional Municipality of York's Transportation Master Plan which identified the need to implement a rapid transit network that would reduce the rate of traffic congestion and support economic and residential growth. The YRTP recommends a phased approach to implement rapid transit in York Region over the next 10 years. The plan proposes four rapid transit corridors to connect urban centres along Yonge Street and Highway 7. Connections with the Toronto Transit Commission (TTC) Spadina, Sheppard and Yonge subway lines and with Durham Region and Peel Region are planned. New stations and terminals with commuter parking lots will be located at key locations along the rapid transit corridors.

The YRTP is a municipal undertaking and is subject to the requirements of the Ontario *Environmental Assessment Act*, and in certain circumstances, the Canadian *Environmental Assessment Act*. An Individual Environmental Assessment is being prepared for each rapid transit corridor within the YRTP.

A Terms of Reference was prepared and approved by the Ministry of the Environment (MOE) to guide the conduct of the Individual Environmental Assessment (McCormick Rankin Corporation 2002). A Needs and Justification Report was also prepared in support of the Terms of Reference (McCormick Rankin Corporation 2002). These Terms of Reference were subsequently revised by the Region of York and submitted to MOE in March 2004. The revised Terms of Reference was approved by MOE in June 2004.

LGL Limited was retained by the York Consortium and the Regional Municipality of York, a public-private partnership formed to implement the YRTP, to conduct a natural sciences investigation in support of the Individual Environmental Assessment for the Highway 7 Corridor and Vaughan North-South Link Transitway. Jagger Hims Limited, as a sub-consultant to LGL, conducted the groundwater investigation, a component of the natural sciences investigation.

This report documents the results of the natural sciences investigation including a description of existing conditions within the primary and secondary study areas, description of the project, the assessment of environmental impacts, and identification of environmental protection measures and monitoring requirements. The generation and evaluation of alternative modes, routes and preliminary designs is described in the Highway 7 Corridor and Vaughan North-South Link Public Transit Improvements Environmental Assessment Report.

2.0 EXISTING CONDITIONS

This section describes the existing conditions in the study area related to natural sciences, including physiography and soils, geology/hydrogeology, aquatic habitat and communities, vegetation and vegetation communities, wildlife and wildlife habitat and designated natural areas.

Two study areas were identified for the natural sciences investigations: primary study area and secondary study area. The primary study area includes an approximately 200 m wide corridor along Highway 7 from Highway 50 to the York-Durham Townline and along Jane Street from Highway 7 to Steeles Avenue. Several local deviations north and south of Highway 7 are also included in the primary study area. Widening of Highway 7 from five to seven lanes from Montgomery Court/Fairburn Drive to just west of the Stouffville GO rail line is also included in the primary study area. Detailed field investigations were conducted within the primary study area over several seasons.

The secondary study area extends to Major Mackenzie Drive to the north and Steeles Avenue to the south. The secondary study area is located in the City of Vaughan, the Town of Richmond Hill, and the Town of Markham. Information on natural heritage conditions within the secondary study area was collected from secondary sources and updated through field reconnaissance. A key plan of the study areas is presented in Figure 1.

2.1 Physiography and Soils

The study area is located within the Peel Plain physiographic region, which extends through the central portions of the Regions of Halton, Peel and York. The Peel Plain is a level to undulating tract of clay soils with imperfect drainage, through which the Credit, Humber, Don and Rouge Rivers have carved deep valleys (Chapman and Putnam 1984).

The soils surrounding Highway 7 in the study area are classified as Peel clay, Fox sandy loam, Berrien sandy loam, Malton clay, Chinguacousey clay loam, Jeddo clay loam, Oneida clay loam, Cashel clay, Bookton sandy loam, Brady sandy loam, Brighton sandy loam, Milliken loam, Woburn loam, Lyons loam and Bottom Lands. Between Highway 50 and Weston Road soils are predominantly Peel clay, with some Fox sandy loam and Bottom Lands surrounding three watercourses. Between Weston Road and Highway 400 soils are predominantly Malton Clay. Between Highway 400 and midway between Keele and Dufferin Streets soils are predominantly Chinguacousey clay loam with Bottom Lands surrounding one watercourse. From midway between Keele and Dufferin Streets to Dufferin Street where Highway 7 jogs north, soils are predominantly Peel clay with Jeddo clay loam and Bottom Lands surrounding one watercourse. Between Dufferin Street and Bathurst Street soils are predominantly Chinguacousey clay loam and Oneida clay loam. Between Bathurst Street and Yonge Street soils are predominantly Cashel clay with Peel clay and Bottom Lands surrounding two watercourses. Between Yonge Street and Bayview Avenue soils are predominantly Chinguacousey clay loam. Between Bayview Avenue and Warden Avenue soils are predominantly Peel clay with Bookton sandy loam, Cashel clay, Malton clay, Brady sandy loam, Berrien sandy loam and Bottom Lands surrounding four watercourses. Between Warden Avenue and McCowan Road soils are predominantly Berrien sandy loam with Malton clay, Peel clay and Bottom Lands surrounding two watercourses. Between McCowan Road and Markham Road soils are predominantly Peel clay with Brighton sandy loam and Bottom Lands surrounding two watercourses. Between Markham Road and the York-Durham Townline soils are predominantly Milliken loam with two areas of Woburn loam between Markham Road and 9th Line and between 10th Line and York-Durham Townline.

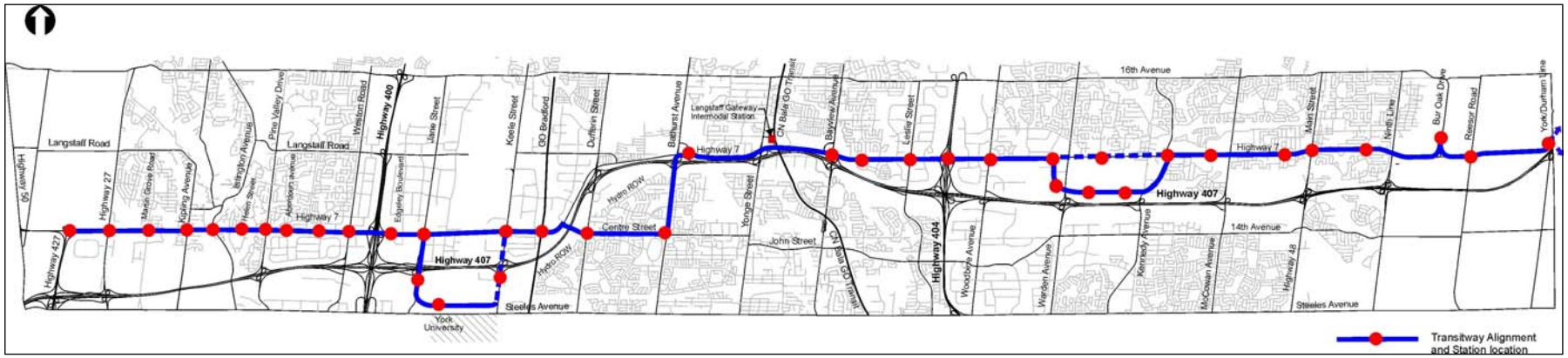


FIGURE 1. KEY PLAN OF STUDY AREA

2.1.1 Peel clay

Peel clay soils are imperfectly drained and exhibit a smooth, gently sloping topography. This soil type consists of lacustrine clay over gritty clay, which can be up to one metre deep. Erosion is slight with this soil type.

2.1.2 Fox Sandy Loam

Fox sandy loam soils are well drained and exhibit a smooth, gently sloping topography. This soil type consists of stonefree lacustrine material and is erosion prone, though run-off is low.

2.1.3 Berrien sandy loam

Berrien sandy loam soils are imperfectly drained with a smooth, gently sloping topography. This soil type is composed of sandy outwash over calcareous clay till, which can be up to one metre deep. This soil is very friable and erosion prone though run-off is low.

2.1.4 Malton clay

Malton clay soils are poorly drained with a smooth, very gently sloping topography. This soil type is composed of lacustrine clay over gritty clay, which can be up to one metre deep. This soil type is friable, but poor drainage causes erosion to be slight under natural conditions.

2.1.5 Chinguacousey clay loam

Chinguacousey clay loam soils are imperfectly drained with a smooth, gently sloping topography. This soil type consists of shaly, calcareous clay till. Erosion is slight with this soil type as a result of the combination of gently sloping topography and low friability.

2.1.6 Jeddo clay loam

Jeddo clay loam soils are poorly drained with a smooth, gently sloping topography. This soil type consists of lacustrine material, intermixed with till in some areas. Erosion is slight with this soil type as a result of the combination of gently sloping topography and low friability.

2.1.7 Oneida clay loam

Oneida clay loam soils exhibit good drainage with a smooth, moderately sloping topography. This soil type consists of shaly, calcareous clay till. This soil type is susceptible to erosion.

2.1.8 Cashel clay

Cashel clay soils exhibit good drainage with a smooth, moderately sloping topography. This soil type consists of lacustrine clay over gritty clay, which can be up to one metre deep. This soil is highly prone to sheet and gully erosion.

2.1.9 Bookton sandy loam

Bookton sandy loam soils are well drained with smooth, gently to moderately sloping topography. This soil type is composed of sand and sandy loam over calcareous clay till. This soil is friable and semi-prone to erosion.

2.1.10 Brady sandy loam

Brady sandy loam soils are imperfectly drained with smooth, gently sloping topography. This soil type is composed of stonefree sandy loam over coarse sandy outwash material. This soil type is friable and semi-prone to erosion.

2.1.11 Brighton sandy loam

Brighton sandy loam soils exhibit good drainage with a smooth gently sloping topography. This soil type is composed of stonefree sandy loam over coarse sandy outwash material. This soil type is very friable and prone to erosion.

2.1.12 Milliken loam

Milliken loam soils are imperfectly to moderately well drained, with a smooth gently to moderately sloping topography. This soil type is composed of clay loam over stony, calcareous loam till. This soil type is friable with low susceptibility to erosion except where moderate slopes cause rapid runoff.

2.1.13 Woburn loam

Woburn loam soils exhibit good drainage with a smooth, moderately sloping topography. This soil type consists of stonefree loam over calcareous, stony loam till. This soil is susceptible to sheet erosion particularly on steep slopes.

2.1.14 Lyons loam

Lyons loam soils exhibit poor drainage with a smooth, very gently sloping topography. This soil type is composed of loam over calcareous, stony till. This soil is friable and not prone to erosion due to the gently sloping topography.

2.1.15 Bottom Lands

Bottom Land alluvial soils are comprised of recent alluvial deposits. They have variable drainage, variable to level topography and erosion is variable. This soil type surrounds the watercourses throughout the study area.

2.2 Geology/Hydrogeology

Hydrogeologic conditions were reviewed for the Highway 7 corridor and the Vaughan North South Link. The study area included 500 metres on either side of Highway 7 and the route alternatives under consideration. This review provides a general interpretation of the existing physical setting, based upon information obtained from the MOE Water Well Database, published geological maps, aerial photography, surface topography, and field reconnaissance.

2.2.1 Surficial Geology

Surficial geologic mapping indicates that the study area is underlain by the following types of soil units:

- Glacial till deposits (Unit 3f), that are comprised of sandy silt to sand, known as Newmarket Till;
- Glacial lake deposits (Unit 7) that are comprised of silt and clay;
- Glacial lake deposits (Unit 8a) that are primarily comprised of sand and gravel;
- Glacial till deposits that are primarily comprised of clayey silt to silt , known as Wildfield Till (Unit 4a) and Halton Till (Unit 4b); and,
- Alluvial deposits (Unit 10), primarily along existing surface water courses, which are comprised of silt, sand and gravel.

The distribution of those soil types within the study area is shown in Appendix A on Figures 1 through 13. These five soil types underlie spans of 17.9, 15.4, 3.5, 3.3, and 1.6 km of the approximate 41.7 km length of Highway 7 transitway, respectively. The lengths indicate that about 80% of the Highway 7 transitway is underlain by the permeable sandy silt to sand glacial till (Unit 3f) and by the silty and clayey glacial lake deposits (Unit 7), with the remaining 20% underlain by the three other soil types. Deposits that are comprised of relatively coarser grained materials will provide a relatively greater opportunity for groundwater recharge.

2.2.2 Distribution of Aquifers

Hydrogeologic cross sections along Highway 7 were provided by Earthfx Inc., and are based on information from the MOE water well database. These cross-sections are presented in Appendix B, and indicate that the geology of the study areas consists of relatively thick overburden (soil) resting upon bedrock. The thickness of overburden along the Highway 7 transitway ranges from about 4 metres at a location (13+900) in the Rainbow Creek valley that is located west of Kipling Avenue, to over 130 metres at a location (27+600) west of Bathurst Street. The vertical profile of overburden materials, as described by the well drilling contractors, indicates variable soil conditions ranging from clay to gravel. There does not appear to be a strong consistent correlation of the soils into coherent strata, as described in the well records, as one borehole reporting sand may be situated adjacent to a borehole reporting clay at the same elevation. Clayey materials appear to predominate in the subsurface, with some local groundwater aquifers provided by lenses or localized layers of granular materials within the finer grained deposits. Some sections of the transitway do not have water well records that would provide information for interpretation of subsurface conditions, or in other areas water wells located are relatively shallow compared to the thickness of overburden.

2.2.3 Horizontal Groundwater Movement

Given the physical setting in the study area, the water table surface is interpreted to be a subtle reflection of the ground surface topography. As such, shallow groundwater movement will generally mimic surface topography gradients, although the presence of underground service trenches can result in complex flow patterns, at least locally. For the study area, shallow groundwater flow is thus interpreted to be predominantly southward, with some exceptions. In areas relatively close to surface watercourses, within 100 to 200 m of the watercourse, shallow groundwater flow will be directed more toward the surface watercourse.

The probable direction of groundwater movement was interpreted along the proposed transitway, as shown on Figures 1 to 13 (Appendix A), based on topographic contours of 1:10,000 scale OBM mapping of the study area. The direction of groundwater movement as indicated on the figures may change with distance away from the proposed transitway, depending on localized conditions.

2.2.4 Groundwater Recharge and Discharge Areas

Groundwater recharge areas and discharge areas were interpreted for the study area based on local topographic conditions. Discharge areas are interpreted to occur at surface watercourses, and in floodplain areas adjacent to them. There are approximately 35 locations where a surface watercourse is crossed by Highway 7 within the study area. Water wells with static water levels that are above or close to ground surface are located in the study area and may indicate the presence of discharge areas. The MOE records indicate two clusters of wells with a water level either located above or within 1 m of ground surface: Along Highway 7 between Highway 400 and Jane Street, and along Highway 7 between Leslie Steet and McCowan Road. Other areas with shallow water tables are possible, depending on local conditions. Wetlands sometimes are indicators of groundwater discharge areas, but none were identified on published mapping within the study area.

Groundwater recharge will occur to varying degrees (depending on soil type and other factors) over the majority of the study area that is located away from floodplains and between discharge areas along surface watercourses. Recharge areas provide a pathway for anthropogenic effects to shallow groundwater quality, such as from surface water containing diluted winter road de-icing salt that can infiltrate in such areas. Areas substantially covered by impervious surfaces, such as buildings, roads, and parking areas, will not contribute significant groundwater recharge. Recharge will mostly occur in recharge areas that have exposed soil, or vegetation covered soils, including parks, lawns, golf courses, school yards, undeveloped lots, open fields, and grassed-medians in roads.

2.2.5 Water Supply Wells

An inventory of the water supply wells that historically have been present in the study area was compiled, based on the MOE database of water supply wells, and verbal reports from municipal public works staff. The MOE database records indicate the historic presence of about 1,200 water supply wells within the study area. Additional water supply wells may be located in the study area, but their records are not included in the MOE database.

There is no information available to confirm which, if any, of the listed wells are still in operation. Based on discussions with Regional staff, it is considered likely that the majority of the wells are no longer active, and have been demolished, buried over, or decommissioned following urbanization. Most residential, commercial, and industrial sites are fully serviced by municipal water supplies. Discussions with municipal public works staff indicate that some individual residents continue to obtain their water supplies from private water wells in the areas along Highway 7 between Highway 50 and Highway 27, between Yonge Street and Bayview Avenue, and between Ninth Line and the York-Durham Line. There are no municipal water supply wells in the study area.

The construction details of supply wells that are still in use are not known from available data. Water wells obtaining water from shallow groundwater, such as dug wells, will be more susceptible to changes in shallow groundwater quality, whereas drilled wells that tap deeper aquifers will be less susceptible. There are at least 110 wells listed as historically located in the study area that are of shallow/dug well construction.

2.3 Aquatic Habitat and Communities

A field investigation of aquatic habitat was undertaken on July 3, 4, 8, 9, 10, 14, 15, 17 and 18, 2003 to document the characteristics of aquatic habitats within the primary study area.

The primary study area is located within the Humber River, Don River, Rouge River, Petticoat Creek, and Duffins Creek watersheds. There are a total of 44 watercourse crossings along the Highway 7 transitway alignment: 15 of the Humber River; 13 of the Don River; 14 of the Rouge River; and, two of Petticoat Creek. There are no crossings of Duffins Creek or its tributaries within the study limits. A summary of habitat conditions at the watercourses located in the primary study area is presented in Table 1. The location of the watercourses is presented in Figure 2. Representative photos of watercourse crossings are presented in Appendix C.

TABLE 1.
FISH HABITAT ASSESSMENT SUMMARY

Reference Number	Waterbody Name	GPS Location	Type of Crossing	Fish Community	Habitat Summary		Habitat Type (I, II, III)	Flow Conditions	Waterbody Sensitivity	Drainage Connectivity	Comments
					Upstream	Downstream					
H1	Albion Creek, Tributary of the Lower Humber River	0609659 4847180	concrete box culvert	warmwater	• open field depression to the north; inflow channels east and west of culvert • riparian vegetation – grasses and cattail • no shade • little instream cover • substrate – vegetation and muck • little erosion	• re-routed parallel to Hwy 7 (drainage ditches east and west of culvert) • riparian vegetation – grasses and cattails • no shade • instream cover – emergent plants and garbage • substrate - muck • no erosion	Marginal	none	low	good	• seasonal flow • presently dry • natural gas pipeline approx. 5 m north west of culvert
H2	Tributary of the Main Humber River	0609946 4847223	open	coolwater	• open field depression to the north of Hwy 427 on-ramp then channelized parallel alongside on-ramp to south side of Hwy 7 • riparian vegetation - mainly grasses, some cattails • no shade • instream cover – cattails • substrate – muck • no erosion	• stream runs alongside Hwy 427 on ramp • riparian vegetation – grasses and cattails • no shade • instream cover – cattails • substrate – muck • no erosion	Marginal	none	low	good	• seasonal flow • presently dry
H3	Tributary of the Main Humber River	0610196 4847315	corrugated steel pipe	coolwater	• depression in cultivated field • riparian vegetation – grasses • no shade • instream cover – none • substrate – cobble, gravel, muck, garbage • no erosion	• channelized • riparian vegetation – grasses, cattails, Phragmites • no shade • instream cover – vegetation and cobble • substrate – cobble, gravel, muck, garbage • no erosion	Marginal	none	low	good	• seasonal flow • presently dry
H4	Tributary of the Main Humber River	0610864 4847601	concrete box culvert	coolwater	• channelized • riparian vegetation – grasses and Phragmites • little shade – Phragmites • instream cover – cobble • substrate – cobble, silt and muck • little erosion	• channelized • riparian vegetation – grasses, cattails and Phragmites • little shade – Phragmites • instream cover – vegetation and cobble • substrate – muck and cobble • no erosion	Marginal	none	low	good	• seasonal flow • presently dry • intentionally blocked off to fish movement (sediment barrier blocking culvert access on north side of Hwy 7)
H5	Tributary of Rainbow Creek	0612498 4848095	bridge	upstream: warmwater downstream: coolwater	• channelized with brick energy control floor • poor morphology – large run • riparian vegetation – manicured grass (sport fields on both sides of river) • no bank shade • instream cover – cobble, emergent vegetation, long strand algae on bricks • substrate – cobble, gravel (at bridge) plus brick energy control floor • little erosion	• natural channel • poor morphology – mainly a run • riparian vegetation – grasses and few trees • some bank shading further downstream • instream cover – cobble, undercut banks • substrate – mainly cobble, some gravel • lots of erosion – up to 2m high on west bank	Important	slow	low	good	• lots of fish present in river on both sides of crossing
H6	Rainbow Creek, Tributary of the Main Humber River	0612371 4848039	downstream: concrete pipe with concrete retaining wall	coolwater	• piped underground	• natural channel • poor morphology – all run • riparian vegetation – grasses, Phragmites, cattails • little shade – cattails, Phragmites • instream cover – emergent vegetation • substrate – cobble and muck • some minor erosion	None - upstream Important - downstream	slow	low	good	• year round flow • no visible signs of stream north of Hwy 7 • downstream branches and feeds into large cattail marsh

TABLE 1.
FISH HABITAT ASSESSMENT SUMMARY

Reference Number	Waterbody Name	GPS Location	Type of Crossing	Fish Community	Habitat Summary		Habitat Type (I, II, III)	Flow Conditions	Waterbody Sensitivity	Drainage Connectivity	Comments
					Upstream	Downstream					
H7	Main channel of the Humber River (R.G. Henderson Floodway)	0613356 4848446	bridge	coldwater	• channelized • poor morphology – long run • riparian vegetation – grasses • no shade • instream cover – cobble, undercut banks • substrate – cobble, gravel, muck	• channelized • poor morphology – mainly a run • riparian vegetation – grasses and trees • some tree shade • instream cover – cobble, undercut banks • substrate – cobble, gravel, muck	Important	slow	low	good	• year round flow • upstream is next to Woodbridge Park Pool and Arena (east side)
H8	Tributary of the Main Humber River	0614457 4848768	concrete box culvert	warmwater	• natural channel • poor morphology – all run • riparian vegetation – grasses and trees • lots of tree and grass shade • instream cover – cobble, logs, heavily undercut banks (east side), emergent vegetation • substrate – cobble, gravel and sand • erosion – high on west side	• natural channel • poor morphology – one riffle then all run • riparian vegetation – grasses and trees • lots of tree shade • instream cover – cobble, undercut banks • substrate – cobble and sand • erosion – high on west bank	Important	slow	low	good	• year round flow
H9	Emery Creek, Tributary of the Lower Humber River	-	piped	warmwater	-	-	-	-	-	-	• no visual evidence of stream • area totally urbanised
H10	Tributary of Black Creek	0617198 4849654	concrete box culvert	warmwater	• channelized • poor morphology – run • riparian vegetation – cattail and grasses over gabion baskets and riprap • little shade – plants and one tree • instream cover – cobble, emergent vegetation • substrate – cobble to sand • limited erosion	• channelized • poor morphology – run • riparian vegetation – cattails and grasses over riprap and gabion baskets • little shade – cattails • instream cover – cobble, emergent vegetation and garbage (tires, boards) • substrate – cobble to gravel • limited erosion	Important	slow	low	good	• year round flow
H11	Tributary of Black Creek	-	piped	warmwater	-	-	-	-	-	-	• no visual evidence of stream • stream flow diverted to east side of Hwy 400
H12	Main channel of Black Creek, Tributary of the Humber River	0618728 4850108	concrete box culvert	warmwater	• channelized • poor morphology – all run • riparian vegetation – grasses, some cattail • little shade – tall grasses • minimal instream cover – some cobble • substrate – cobble and gravel • limited erosion – gabion baskets, riprap and concrete headwall and culvert outlets on west side	• channelized • poor morphology – all run • riparian vegetation – grasses, some cattail • little shade – one or two trees • instream cover – cobble, emergent vegetation	Important	slow	low	good	• year round flow • storm water management pond at north end • rocks covered in algae
H13	Main channel of Black Creek, Tributary of the Humber River	0618958 4848881	concrete box culvert	warmwater	• channelized • morphology – runs and riffles • riparian vegetation – grasses, willow trees • some shade • instream cover – cobbles, submerged grasses • substrate – cobble • some erosion	• natural channel • poor morphology – mainly run, one riffle • riparian vegetation – grasses and trees • little shade • instream cover – large cobble • substrate – cobble and gravel • little erosion – vegetation and cobble stabilised	Important	slow	low	good	• year round flow • lots of algae on cobbles • banks stabilised with cobble and boulders • upstream has man-made swimming reservoir on south side, 10 m from culvert

TABLE 1.
FISH HABITAT ASSESSMENT SUMMARY

Reference Number	Waterbody Name	GPS Location	Type of Crossing	Fish Community	Habitat Summary		Habitat Type (I, II, III)	Flow Conditions	Waterbody Sensitivity	Drainage Connectivity	Comments
					Upstream	Downstream					
H14	Tributary of Black Creek	0619013 4848639	concrete box culvert	warmwater	• natural channel • poor morphology – all run • riparian vegetation – grasses and trees • well shaded with trees • instream cover – cobble, logs, emergent vegetation • substrate – cobble • little erosion – riprap banks • instream flow at culvert from storm water management pond	• channelized – south bank rock protected • poor morphology – all run • riparian vegetation – grasses and cattails • some shading – tree • instream cover – cobble and cattails • substrate – cobble	Marginal	slow	low	good	• year round flow from storm water management pond on south side of upstream channel • upstream channel presently dry
H15	Main channel of Black Creek, Tributary of the Humber River	0618937 4848004	bridge	warmwater	• channelized • poor morphology – all run • riparian vegetation – mature trees on both banks plus bushes • well shaded (80%) • instream cover – cobble, undercut banks • substrate – cobble, gravel • erosion on both banks	• channelized (riprap on west bank) • morphology – run, riffles, pool • riparian vegetation – grasses , small trees • well shaded • instream cover – cobble, undercut banks • substrate – large cobble, gravel • some erosion (east bank)	Important	slow	low	good	• year round flow • heavy rock protection on both banks under the bridge • walking path under bridge and parallel to stream on east side
D1	Tributary of the West Don River	0620844 4850818	double open bottom concrete culverts	warmwater	• channelized • poor morphology – all run • riparian vegetation – grasses and cattails • shade at culvert; none upstream • instream cover – cobble • substrate – cobble and gravel • some emergent vegetation • very little erosion	• channelized • poor morphology – mainly a run, odd riffle • riparian vegetation – grasses • no shade • some instream cover – cobbles plus undercut banks further downstream • substrate – cobble, gravel, sand • some erosion	Important	slow	low	good	• year round flow
D3	Main channel of the West Don River	0621972 4851300	bridge	warmwater	• channelized • poor morphology – all run • riparian vegetation – grasses and willow trees • some shade from trees • instream cover – cobbles • substrate – cobble and gravel • little erosion – lots of vegetation support	• channelized • poor morphology – all run • riparian vegetation – grasses • little shade • instream cover – emergent vegetation, cobble and undercut banks • substrate – mainly gravel, some cobble • little erosion – stabilised by vegetation	Important	slow	low	good	• year round flow • banks under the bridge are supported by boulders • asphalt pedestrian walkway runs alongside stream on east side • good mammal and bird migration corridor
D6	Tributary of the East Don River	0624721 4854200	concrete box culvert	warmwater	• channelized • riparian vegetation – grasses • no shade • instream cover – cobbles • substrate – large cobble • no erosion – riprap for banks	• channelized • poor morphology – run and large pond • riparian vegetation – grasses and cattails • little shade – cattails • instream cover – cobbles, emergent vegetation /submergent vegetation • substrate – cobble, muck, detritus • little erosion	Important	slow to none	low	good	• potential seasonal flow • upstream nearly dry • upstream re-routed around golf course • downstream runs into storm water management pond • lots of minnows in pond

TABLE 1.
FISH HABITAT ASSESSMENT SUMMARY

Reference Number	Waterbody Name	GPS Location	Type of Crossing	Fish Community	Habitat Summary		Habitat Type (I, II, III)	Flow Conditions	Waterbody Sensitivity	Drainage Connectivity	Comments
					Upstream	Downstream					
D7	Main channel of the East Don River	0625223 4854326	twin culvert	coldwater	• channelized • poor morphology – all run • riparian vegetation – grasses and willow trees • 40% shade • instream cover – large cobble • substrate – cobble • little erosion – banks supported with large boulders	• channelized • morphology – runs and riffles (50:50) • riparian vegetation – grasses • no shade • instream cover – cobbles • substrate – cobbles • no erosion	Important	slow	low	good	• year round flow • upstream re-routed around golf course greens • minnows instream • rough-winged swallows nesting in drains on east wall of bridge
D8	Tributary of the East Don River	0626246 4854907	concrete box culvert	coldwater	• channelized • poor morphology – all run • riparian vegetation – grasses and trees • 30% shade - more dense upstream of right-of-way • instream cover – cobbles, emergent vegetation • substrate – cobble, gravel and muck • little erosion – vegetated banks plus riprap and gabion baskets	• channelized • morphology – mainly runs, 2 riffles , 1 pool • riparian vegetation – grasses • no shade • instream cover – cobbles, emergent vegetation • substrate – cobble, gravel and muck • little erosion – lots of rock protection	Important	slow	low	good	• year round flow • concrete culvert runs approx. 175 m under Yonge Street and Hwy 7
D11	Tributary of the East Don River	0626732 4855103	new crossing in right-of-way of Hwy 7	none	• no channel • upland plant species present	• no channel	None	none	none	seasonal	• upland meadow species present • no channel present, small drainage ditch
D12	German Mills Creek, Tributary of the East Don River	0628419 4855369	large CSP under Hwy 7	coolwater	• natural channel • good morphology - riffles • riparian vegetation - trees and shrubs of maple, willow, sumac and poplar • well shaded with mature trees and shrubs • substrate - cobble, concrete rubble and debris • flood debris and bank erosion	• natural channel • good morphology - riffles and runs • riparian vegetation - grasses, willow and lilac shrubs • moderate shading - trees • substrate - silt, fine gravel and cobble • no erosion - banks stabilised with boulders/rock protection	Important	moderate	low	good	• fish visible
D13	Tributary of German Mills Creek	0628767 4855406	none	coolwater	• no watercourse	• no watercourse	None	none	none	none	
D14	Tributary of German Mills Creek	0629536 4855662	open bottom concrete culvert; backfilled	warmwater	• channelized • riparian vegetation - grasses and cattails • no shade • substrate - cobble and gravel • no erosion - banks stabilised	• channelized • riparian vegetation - grasses, cattail and young maples • some shade • substrate - gravel and cobble • some erosion	Important	moderate	low	good	• stable and resistant to erosion
D15	Tributary of German Mills Creek	0630557 4856061	concrete box culvert	warmwater	• channelized • poor morphology - pool • riparian vegetation - cattails and willow • poor shading • instream cover - cattails • substrate - muck • water 25 cm from top of culvert	• channelized • poor morphology - pool • riparian vegetation - cattails and Phragmites • poor shading • instream cover - cattails • substrate - muck • water 25 cm from top of culvert	Marginal	slow	low	good	• channel is choked with cattails upstream and downstream

TABLE 1.
FISH HABITAT ASSESSMENT SUMMARY

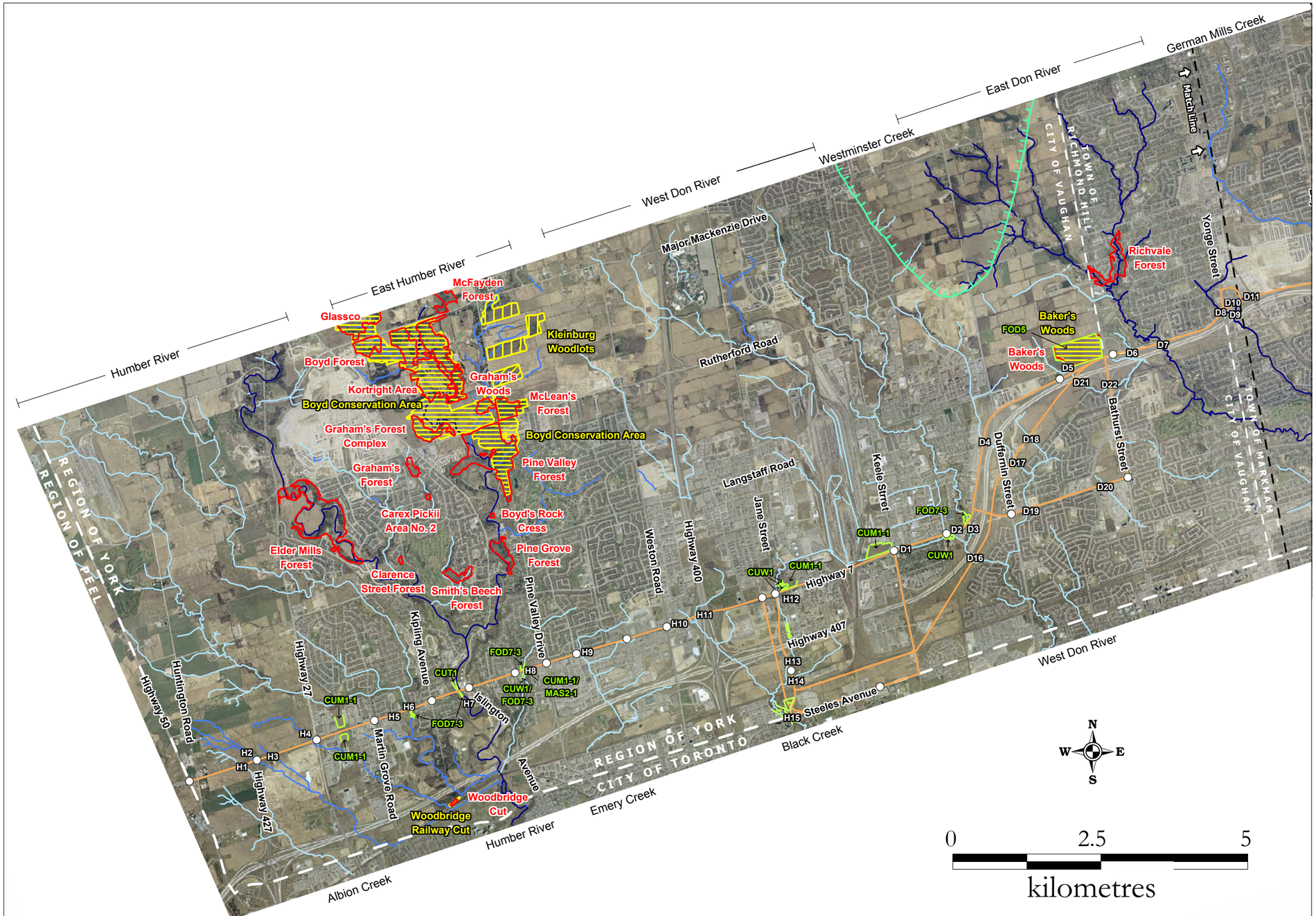
Reference Number	Waterbody Name	GPS Location	Type of Crossing	Fish Community	Habitat Summary		Habitat Type (I, II, III)	Flow Conditions	Waterbody Sensitivity	Drainage Connectivity	Comments
					Upstream	Downstream					
D19	Westminster Creek, Tributary of the West Don River	0622971 4851517	concrete box culvert (north side)	warmwater	• channelized • poor morphology – all run • riparian vegetation – cattails, Phragmites, two small willow trees • little shade – cattails and willows • instream cover – emergent vegetation, cobble • substrate – concrete, gravel, cobble, muck • little erosion – banks rock protected	• piped underground	Marginal	none	low	good	• seasonal flow
D20	Tributary of the East Don River	0624243 4851930	culvert	warmwater	• tiny stream in grassy swale and marshy field • poor morphology – all run • riparian vegetation – grasses and cattails • little shade – emergent vegetation • instream cover – emergent vegetation • substrate – cobble, muck • no erosion	• piped underground	Marginal	none	low	good	• seasonal flow
D22	Tributary of the East Don River	0624406 4853612	upstream: concrete box culvert downstream: concrete box culvert next to a concrete pipe inside a retaining wall	warmwater	• natural channel • poor morphology – mostly runs • riparian vegetation – bush and mature trees • 85% shaded • instream cover – cobble and logs • substrate – cobble and gravel • north bank highly eroded (up to 2 m)	• partly channelized • poor morphology – all run • riparian vegetation – willow trees (further downstream), cattail, grasses (at culverts) • some shade (15%) • instream cover – cobble, emergent plants and long strand algae • substrate – cobble, gravel, muck • little erosion (riprap banks for 30 m)	Important	slow	low	good	• upstream dry • downstream has year round flow, incoming from 2nd drain pipe (concrete pipe in retaining wall) from the north side of Hwy 407
R1	Tributary of Beaver Creek	0631542 4856395	1m CSP with beaver grate on downstream end	upstream: none downstream: coolwater	• piped underground	• channelized with deeply incised banks • poor morphology - runs • riparian vegetation - grasses • no shade • instream cover - some rubble • substrate - silt, gravel, cobble and rubble • some erosion	Marginal	low - upstream moderate - downstream	low	good	• 40 m downstream is joining to Ref. no. R2 watercourse
R2	Beaver Creek, Tributary of the Lower Rouge River	0631809 4856478	open bottom concrete culvert	coolwater	• channelized • poor morphology - runs • little to no riparian vegetation - manicured grasses • poor shading • little instream cover • substrate - cobble and fine sediment • little erosion	• channelized • poor morphology - runs and riffles • riprap on both banks with additional sediment traps and manicured grass (west bank) • riparian habitat – cattails (east bank) • no shading • some instream cover • substrate - mostly fine sediment with some cobble • some bank erosion	Important	moderate	low	good	
R3	Main channel of the Upper Rouge River	0632672 4856756	bridge	upstream: coldwater downstream: warmwater	• channelized • poor morphology - all runs • riparian vegetation - grasses and willows • some shade • very little instream cover • substrate mostly fine sediment with some cobble • very little erosion	• channelized • morphology - riffles and runs • riparian vegetation - grasses, willows, sumac • good shading - willow trees • some instream cover - cobble and fallen trees • substrate - mostly silt, some gravel and cobble • some minor erosion	Important	moderate	low	good	

TABLE 1.
FISH HABITAT ASSESSMENT SUMMARY

Reference Number	Waterbody Name	GPS Location	Type of Crossing	Fish Community	Habitat Summary		Habitat Type (I, II, III)	Flow Conditions	Waterbody Sensitivity	Drainage Connectivity	Comments
					Upstream	Downstream					
R6	Main channel of the Lower Rouge River	0636994 4858239	bridge	coldwater	• natural channel • morphology - pools, runs • riparian vegetation - shrubs and trees • well shaded • substrate - cobble and rock protection • no erosion	• natural channel • morphology - broad riffles, runs and pools • riparian vegetation - shrubs and trees • well shaded with maples and buckthorns • substrate - cobble and rock protection • no erosion	Important	moderate	low	good	
R7	Tributary of the Lower Rouge River	0638821 4859268	piped	warmwater	-	-	-	-	-	-	
R8	Robinson Creek, Tributary of the Lower Rouge River	0639671 4859268	CSP with upstream wing walls	coldwater	• natural channel • good morphology - riffles • riparian vegetation - herbs, shrubs and trees • well shaded by willow, poplar and sumac • substrate - gravel, cobble and boulders • some erosion	• natural channel • good morphology - riffles • riparian vegetation - herbs, shrubs and trees • well shaded by willow, poplar and sumac • substrate - gravel, cobble and boulders	Important	moderate	low	good	• spill over sanitary sewer box to deep pool and geotextile on north side of Hwy 7 • isolated from Hwy 7 by Old Wellington Street
R9	Exhibition Creek, Tributary of the Lower Rouge River	0640885 4853513	concrete box culvert	coldwater	• natural channel • good morphology - riffles • riparian vegetation - shrubs and trees • very well shaded - dogwood, maple and willow • instream cover - boulders • substrate - cobble and boulders • no erosion	• channelized • good morphology - riffles, runs • riparian vegetation - shrubs and trees • some shading - walnut, beech and ornamental trees • wooded on east side • substrate - cobble, boulders and rock protection • no erosion – heavy rock protection	Important	low to moderate	not sensitive	good	
R10	Tributary of the Little Rouge River	0642214 4859969	concrete rectangular culvert with gabion retaining wall	warmwater	• channelized • poor morphology • riparian vegetation - grasses, cattails, shrubs and walnut grove • good shading • substrate - muck • tilled crop fields on either side • pool at culvert • flows from spring upstream of culvert; dry beyond	• channelized • poor morphology - marsh along channel • riparian vegetation - grasses, bulrush and cattails • poor shading • substrate - muck • heavily congested with vegetation	Marginal	low	low	good	• Short-tailed Weasel (*Mustella ermina)* family upstream in gabion baskets, and Meadow Vole (*Microtus pennsylvanicus*) found swimming in water
R11	Tributary of the Little Rouge River	0642534 4860075	CSP with gabion retaining walls parallel to road	warmwater	• channelized • poor morphology - open water • riparian vegetation - cattails and grasses • no shade • instream cover - *Potomogeton* • substrate - sand and silt • no erosion - rock protection • small pond downstream of rock protection	• channelized • poor morphology - pool • riparian vegetation - grasses and cattails • no shade • substrate - sand and silt	Marginal	low	very low	good	• low gradient, turbid standing water • pond upstream at Ref. no. R26
R12	Tributary of the Little Rouge River	0643471 4860374	concrete box culvert	coolwater	• channelized • poor morphology • riparian vegetation - grasses • no shade • irregular, narrow meandering channel	• channelized • poor morphology • riparian vegetation - cattail, reed canary grass swale • no shade	None	none	not sensitive	seasonal	• seasonal flow

TABLE 1.
FISH HABITAT ASSESSMENT SUMMARY

Reference Number	Waterbody Name	GPS Location	Type of Crossing	Fish Community	Habitat Summary		Habitat Type (I, II, III)	Flow Conditions	Waterbody Sensitivity	Drainage Connectivity	Comments
					Upstream	Downstream					
R13	Tributary of the Little Rouge River	0643915 4860596	concrete box culvert	none	• no defined channel • poor morphology • riparian vegetation - cattails, reed canary grass swale	• no defined channel • poor morphology • riparian vegetation - Phragmites swale	None	none	not sensitive	seasonal	• no fish habitat
R19	Main channel of the Upper Rouge River	0633910 4856376	none	coolwater	• natural channel • morphology - deep runs • riparian vegetation - dense trees (maple, poplar, buckthorn, willow, pine), vines, herbs and scrub • moderate shading • considerable erosion - 1.5 m banks	• natural channel • morphology - deep runs • riparian vegetation - dense trees (maple, poplar, buckthorn, willow, pine), vines, herbs and scrub • moderate shading • considerable erosion - 1.5 m banks	Important	slow	low	good	• muskrat holes on banks
R20	Tributary of the Lower Rouge River	0634839 4856682	none	coolwater	• channelized; municipal drain • poor morphology • riparian vegetation - sparse grasses and herbs • no shade substrate - muck • draining cattail and Phragmites marsh between hedgerow (east) and soybean crop (west)	• channelized; municipal drain • poor morphology • riparian vegetation - sparse grasses and herbs • no shade substrate - muck • cattail and Phragmites marsh downstream	Marginal	low	very low	seasonal	• area slated for development along Enterprise Blvd. (not yet complete)
R21	Tributary of the Lower Rouge River	0635902 4856995	none	coolwater	• channelized • poor morphology • riparian vegetation - sparse grasses and cattails • no shade • industrial setting	• channelized • poor morphology • riparian vegetation - sparse grasses and cattails • no shade • industrial parking lot adjacent to top of north bank	Marginal	none	very low	good	• may not be in alignment • GO Transit route immediately south of waterbody
P1	Tributary of Petticoat Creek	0644782 4860940	CSP	warmwater	• natural channel • poor morphology • riparian vegetation - dense herbs (goldenrod, Virginia creeper and Queen Anne's Lace), some shrubs and trees • some shade • substrate - dry, muck	• agricultural swale • poor morphology • riparian vegetation - cattails, reed canary grass • no shade • substrate - dry, muck	None	none	very low	seasonal	
P2	Main channel of Petticoat Creek	0644927 4860999	CSP	warmwater	• no defined channel • poor morphology • riparian vegetation - grass and cattail • no shade • ditch flow from roadway contributes to flow • sediment trap across culvert inlet	• no defined channel • poor morphology • riparian vegetation - grasses and cattail • no shade	None	none	very low	poor	• no fish habitat



LEGEND

- Proposed Transit Stop
- Route Alternatives
- Municipal Boundary
- Cold Watercourse
- Cool Watercourse
- Warm Watercourse
- Vegetation Community Boundary
- Oak Ridges Moraine
- Wetland
- Environmentally Significant Area
- Provincially Significant Life Science ANSI
- Regionally Significant Life Science ANSI
- H1 — Location of Fish Habitat Investigation

VEGETATION COMMUNITIES

CUM1-1	Dry-Moist Old Field Meadow Type
CUT1	Mineral Cultural Thicket Ecosite
CUW1	Mineral Cultural Woodland Ecosite
FOD5	Dry-Fresh Sugar Maple Deciduous Forest Ecosite
FOD7-3	Fresh-Moist Willow Lowland Deciduous Forest Type
MAS2-1	Cattail Mineral Shallow Marsh Type

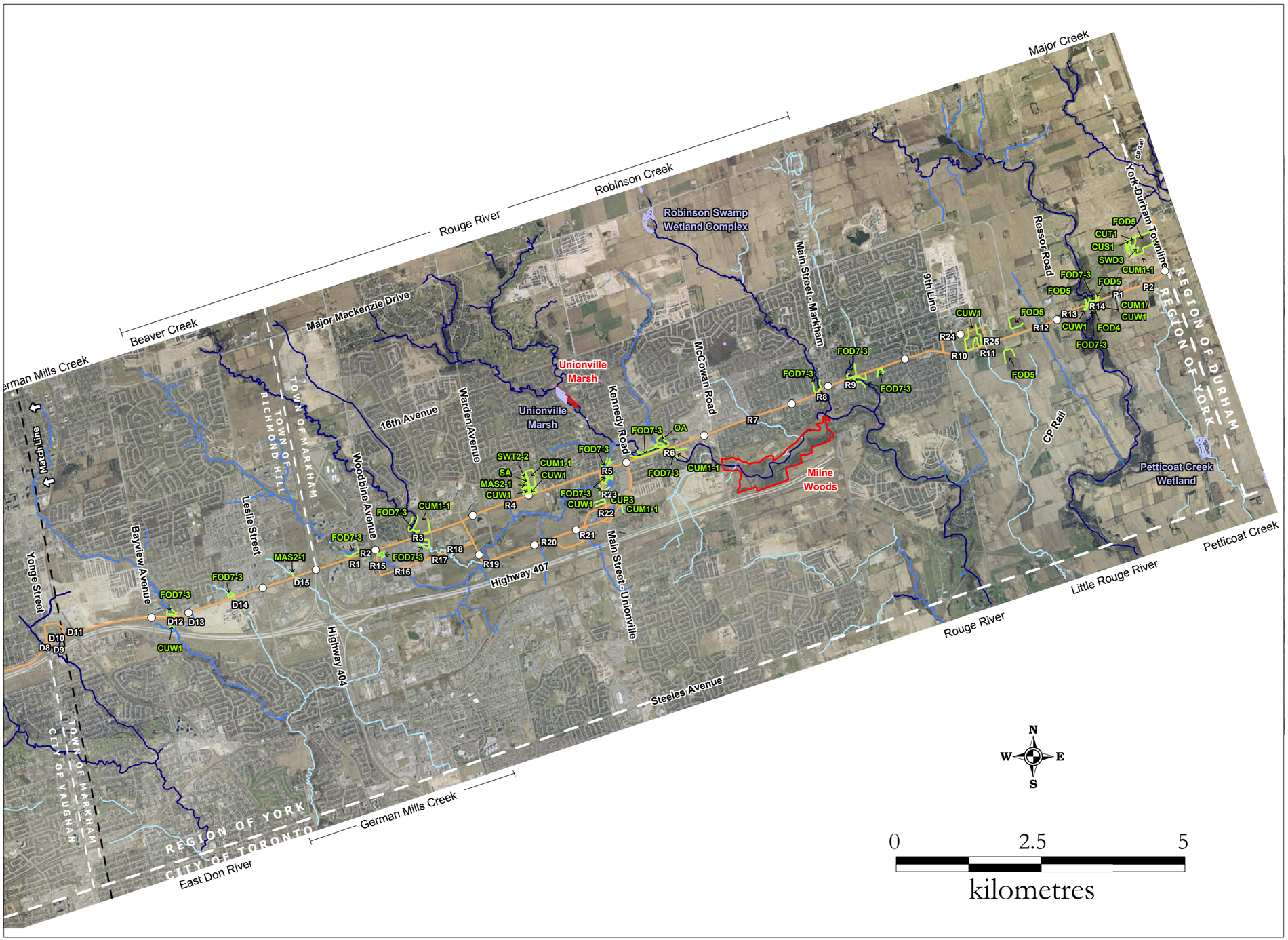
Data Sources: Toronto and Region Conservation Authority, Ministry of Natural Resources, LGL Limited field surveys.

HIGHWAY 7 CORRIDOR TRANSITWAY (WEST END)

EXISTING CONDITIONS

LGL Limited
environmental research associates

Project:	TA2818	**Figure:**	2
Date:	September 2003	**Prepared By:**	MWF
Scale:	1 : 70,000	**Checked By:**	GNK



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L E G E N D

- Proposed Transit Stop
- Route Alternatives
- Municipal Boundary
- Cold Watercourse
- Cool Watercourse
- Warm Watercourse
- Vegetation Community Boundary
- Wetland
- Environmentally Significant Area
- D8-R25 Location of Fish Habitat Investigation

VEGETATION COMMUNITIES

CUM1-1	Dry-Moist Old Field Meadow Type
CUS1	Mineral Cultural Savannah Ecosite
CUT1	Mineral Cultural Thicket Ecosite
CUW1	Mineral Cultural Woodland Ecosite
FOD4	Dry-Fresh Deciduous Forest Ecosite
FOD5	Dry-Fresh Sugar Maple Deciduous Forest Ecosite
FOD7-3	Fresh-Moist Willow Lowland Deciduous Forest Type
MAS2-1	Cattail Mineral Shallow Marsh Type
OA	Open Water
SA	Shallow Water
SWD3	Maple Mineral Deciduous Swamp Ecosite
SWT2-2	Willow Mineral Thicket Swamp Type

Data Sources: Toronto and Region Conservation Authority, Ministry of Natural Resourses, LGL Limited field surveys.

HIGHWAY 7 CORRIDOR TRANSITWAY (EAST END)

EXISTING CONDITIONS

LGL Limited
environmental research associates

Project:	TA2818	**Figure:**	2
Date:	September 2003	**Prepared By:**	MWF
Scale:	1 : 70,000	**Checked By:**	GNK

A review of fisheries information provided by the TRCA within the secondary study area was completed to determine the presence/absence of a fish community, its composition and thermal regime. A summary of fish recorded within the secondary study area is presented in Table 2. The locations of TRCA sampling stations are presented in Figure 3. Fisheries information provided by TRCA was determined to be sufficient for the purposes of the natural sciences investigation; therefore, the fish community located at each watercourse was not sampled.

2.3.1 Humber River

The western portion of the primary study area, from Highway 50 to immediately east of Weston Road passes through the Humber River watershed. Tributary systems of the Humber River watershed crossed by proposed alignments of the transitway include Albion Creek, Rainbow Creek, West, Main, and Lower Branches of the Humber River, Emery Creek and Black Creek.

Albion Creek (Station H1), designated as a warmwater system by the Toronto and Region Conservation Authority (TRCA), crosses Highway 7 west of the Highway 7/Highway 427 interchange. Stations H2 and H3 are tributaries of the Main Humber River, designated as coolwater systems by the TRCA and cross Highway 7 between Huntington Road and Regional Road 27. Station H4 is a tributary of the Main Humber River, designated as a coolwater system by the TRCA and crosses Highway 7 immediately west of Regional Road 27. Station H5, a tributary of Rainbow Creek, is designated as a coolwater system by the TRCA, crosses Highway 7 between Martin Grove Road and Kipling Avenue. Rainbow Creek (H6) is designated as a coolwater system by the TRCA and crosses Highway 7 between Martin Grove Road and Kipling Avenue. The main branch of the Main Humber River (Station H7) is designated as a coldwater system by the TRCA, and crosses Highway 7 immediately west of Islington Avenue. Station H8, a tributary of the Main Humber River, designated as a warmwater system by the TRCA, crosses Highway 7 between Islington Avenue and Pine Valley Drive. Emery Creek (Station H9), is designated as a warmwater system by the TRCA and crosses Highway 7 between Pine Valley Drive and Weston Road. Stations H10 and H11 are tributaries of Black Creek, designated as warm water systems by the TRCA and cross Highway 7 between Weston Road and Highway 400. Black Creek (Station H12), is designated as a warmwater system by the TRCA and crosses Highway 7 immediately east of Jane Street. Black Creek (Station H13) and a tributary of Black Creek (Station H14) are designated as warmwater systems by the TRCA and cross Jane Street between Highway 407 and Steeles Avenue. Black Creek (Station H15), designated as a warmwater system by the TRCA, crosses Jane Street at the intersection with Steeles Avenue.

2.3.2 Don River

The central portion of the study area, from immediately east of Jane Street to Highway 404, passes through the Don River watershed. Tributary systems of the Don River watershed crossed by proposed alignments of the transitway include West Don River, Westminster Creek, East Don River and German Mills Creek.

TABLE 2A.
FISH COLLECTED BY TRCA AT INVENTORIED STREAMS IN THE HUMBER RIVER WATERSHED

Species			Watercourse Sampling Stations		
Scientific Name	**Common Name**	**Status**	**Humber River**	**East Humber River**	**Black Creek**
Lampetra appendix	American Brook Lamprey	S3	10, 304, HUM02	94, 95, 176, 188, 208,	
Fundulus diaphanus	Banded Killifish		197		
Notropis heterodon	Blackchin Shiner		10, 12, 87, 252	94, 95, 176	
Rhinichthys atratulus	Blacknose Dace		10, 12, 85, 87, 88, 205, 252, 366, HU011WM, HU019WM	94, 95, 96, 176, 188, 193, 198, 208, HU001WM	42
Notropis heterolepis	Blacknose Shiner			176	
Percina maculata	Blackside Darter		HU019WM		
Lepomis macrochirus	Bluegill			208	
Pimephales notatus	Bluntnose Minnow		10, 12, 85, 87, 196, 197, 199, 205, 304, 366, HUM02	94, 95, 96, 176, 208	
Hybognathus hankinsoni	Brassy Minnow		10, 205		
Culaea inconstans	Brook Stickleback		196, HU011WM		42, 225
Ameiurus nebulosus	Brown Bullhead			208	
Salmo trutta	Brown Trout		10, HU012WM	94, 188, 208, HU001WM	
Campostoma anomalum	Central Stoneroller	S3	HU011WM		
Cyprinus carpio	Common Carp				42
Luxilus cornutus	Common Shiner		10, 12, 85, 87, 88, 196, 197, 199, 205, 304, HUM02	94, 95, 96, 176, 188, 208, HU001WM	42, 225, 226
Semotilus atromaculatus	Creek Chub		10, 12, 85, 88, 196, 197, 199, 205, 304, 366, HU001WM, HU019WM, HUM02	94, 95, 96, 176, 188, 193, 208, HU001WM	42, 224, 225, 226
	Cyprinidae sp.		HU011WM		
Notropis atherinoides	Emerald Shiner		10, 12, HUM02		
Etheostoma flabellare	Fantail Darter		10, 197, 199, 205, HU011WM, HU012WM, HUM02	94, 95, 96, 176, 188, 208	
Pimephales promelas	Fathead Minnow		12, 85, 88, 196, 197, 304, 366, HU019WM	94, 96, 176, 208	42
Notemigonus crysoleucas	Golden Shiner		HU011WM, HU012WM, HU019WM		
Carassius auratus	Goldfish				42
Nocomis biguttatus	Hornyhead Chub		197, 304	96, 176	
Etheostoma exile	Iowa Darter		10	95, 96	
Etheostoma nigrum	Johnny Darter		10, 12, 88, 196, 199, 205, 304, HU011WM, HU012WM, HU019WM, HUM02	94, 95, 96, 176, 188, 193, 208, HU001WM	
	Lamprey family		HU012WM		
Micropterus salmoides	Largemouth Bass		197, 199, 304, HU019WM		

TABLE 2A.
FISH COLLECTED BY TRCA AT INVENTORIED STREAMS IN THE HUMBER RIVER WATERSHED

Species			Watercourse Sampling Stations		
Scientific Name	**Common Name**	**Status**	**Humber River**	**East Humber River**	**Black Creek**
Rhinichthys cataractae	Longnose Dace		10, 12, 87, 197, 199, 205, 304, HU011WM, HU012WM	94, 95, 96, 176, 188, 208	
Notropis volucellus	Mimic Shiner		HUM02		
Cottus bairdi	Mottled Sculpin		196	208, HU001WM	
Ichthyomyzon fossor	Northern Brook Lamprey	S3, VUL, SC		188	
Hypentelium nigricans	Northern Hog Sucker		10, 12, 87, 197, 199, 205, 208, HUM02	94, 95, 96, 176, 188, 208	
Lepomis gibbosus	Pumpkinseed		10, 197, 199, 304, HU011WM, HU012WM, HU019WM, HUM02	193, 208	42
Etheostoma caeruleum	Rainbow Darter		10, 87, 197, 199, HU012WM	94, 95, 96, 176, 188, 208, HU001WM	
Oncorhynchus mykiss	Rainbow Trout			94, 95, 208, HU001WM	
Clinostomus elongatus	Redside Dace	S3, THR, SC	10, 12, 87, HU011WM	94, 95, 96, 188, 193, 208, HU011WM	
Nocomis micropogon	River Chub		10, 12, 87, 197, 199, 205, HU012WM	94, 95, 96, 176, 188, 208, HU001WM	
Ambloplites rupestris	Rock Bass		10, 12, 197, 199, 205, 304, HUM02	94, 95, 96, 188, 208	
Notropis rubellus	Rosyface Shiner		10, 197, 199	95, 176, 188, 208	
Notropis stramineus	Sand Shiner		87		
Notropis hudsonius	Spottail Shiner		10, HU019WM		
Noturus flavus	Stonecat		10, 197, 199, 205, HUM02		
Catostomus commersoni	White Sucker		10, 12, 85, 87, 196, 197, 199, 205, 304, 366, HO011WM, HU019WM, HUM02	94, 95, 96, 176, 188, 208, HU001WM	42, 226
Ameiurus natalis	Yellow Bullhead		12, 197	96	
Perca flavescens	Yellow Perch		HU019WM		

Source: Toronto and Region Conservation Authority (TRCA) fisheries data from fish collection stations; Received 2003.

TABLE 2B.
FISH COLLECTED BY TRCA AT INVENTORIED STREAMS IN THE DON RIVER WATERSHED

Species			Watercourse Sampling Stations		
Scientific Name	**Common Name**	**Status**	**West Don River**	**East Don River**	**German Mills Creek**
Lampetra appendix	American Brook Lamprey	S3		24, DN022WM	
Rhinichthys atratulus	Blacknose Dace		13, 21, 22, 40, 49, DN016WM, DN017WM, DN018WM	24, '32, 41, 58, 59, 60, DN021WM, DN023WM	14, 15, 50, DN009WM, DN010WM
Pimephales notatus	Bluntnose Minnow		21	24	
Culaea inconstans	Brook Stickleback			32, 41, 58	
Salmo trutta	Brown Trout			24, 58, 59, 60, DN023WM	
Cyprinus carpio	Common Carp		DN018WM		
Luxilus cornutus	Common Shiner		13, 21, 22, 40, DN018WM	24, 41, 58	
Semotilus atromaculatus	Creek Chub		21, 22, 27, 37, 40, 49, DN016WM, DN018WM	24, 32, 41, 58, 59, 60, DN022WM, DN023WM	14, 15, 23, 50, DN009WM, DN010WM, DN011WM
	Etheostoma sp.		DN018WM	DN022WM	
Pimephales promelas	Fathead Minnow		13, 22, 40, 49, DN016WM, DN017WM, DN018WM	32, 41, 58, 59, DN011WM, DW022WM	14, 15, 23, DN009WM, DN011WM
Carassius auratus	Goldfish			32	
Etheostoma nigrum	Johnny Darter		13, 21, 22, 37, 40, 49	32, 41, 58, 59	
Micropterus salmoides	Largemouth Bass		22	58	
Rhinichthys cataractae	Longnose Dace			24, 32, 41, 58, 59, 60, DN021WM, DN022WM	50, DN010WM
Cottus bairdi	Mottled Sculpin			24, 32, 41, 58, DN021WM, DN022WM	15
Phoxinus eos	Northern Redbelly Dace			24, 59	
	Pimephales sp.		DN016WM		
Lepomis gibbosus	Pumpkinseed			24, 58	14
Oncorhynchus mykiss	Rainbow Trout			24, 58, 59, 60	
Clinostomus elongatus	Redside Dace	S3, THR, SC	22, 40	24, 58	
Catostomus commersoni	White Sucker		13, 21, 22, 27, 37, 40, 49, DN016WM, DN018WM	24, 32, 41, 58, 59, 60, DN022WM	14, 50, DN009WM, DN010WM

Source: Toronto and Region Conservation Authority (TRCA) fisheries data from fish collection stations; Received 2003.

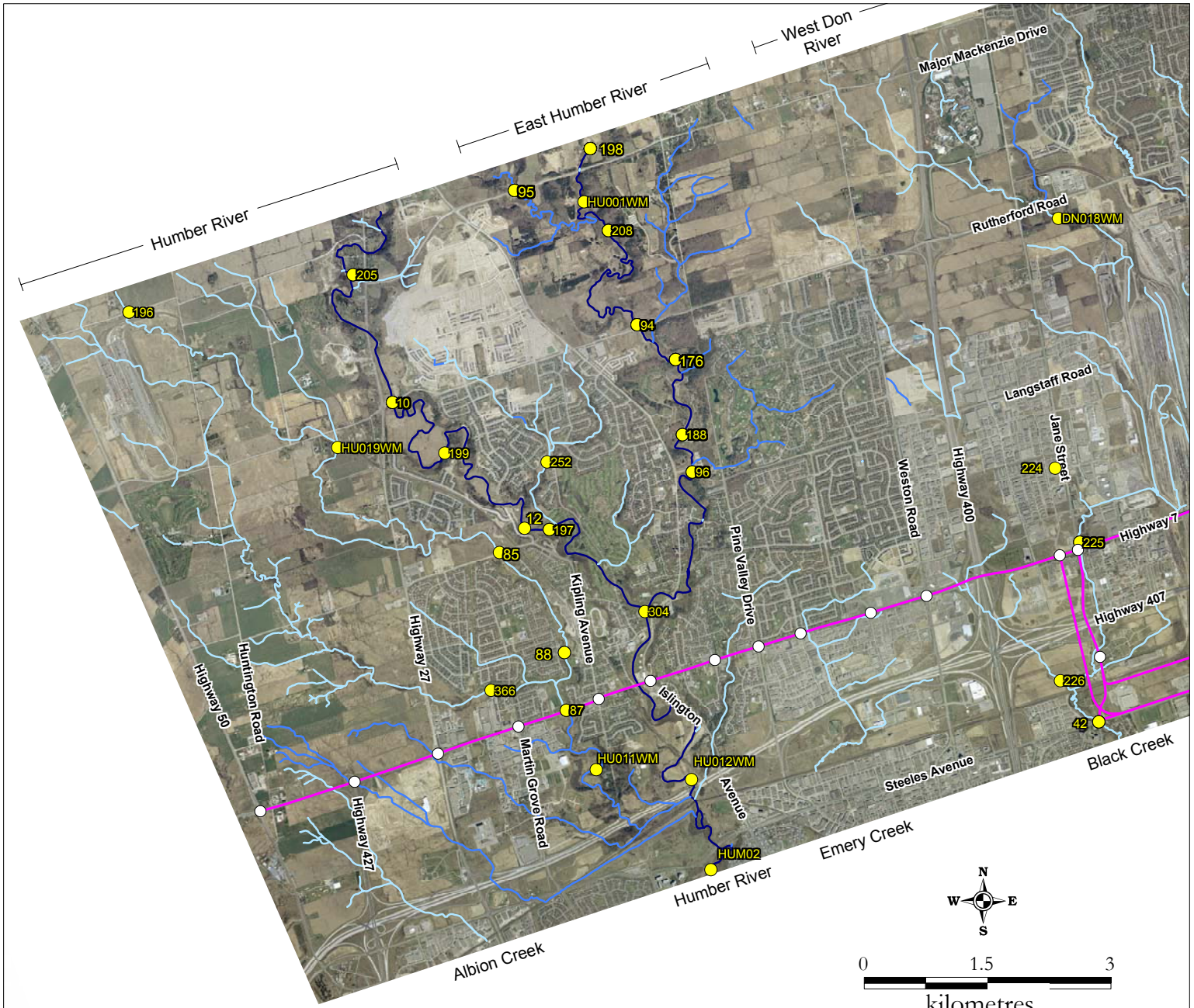
TABLE 2C.
FISH COLLECTED BY TRCA AT INVENTORIED STREAMS IN THE ROUGE RIVER WATERSHED

Species			Watercourse Sampling Stations							
Scientific Name	**Common Name**	**Status**	**Beaver Creek**	**Upper Rouge River**	**Berczy Creek**	**Bruce Creek**	**Burndenet Creek**	**Robinson Creek**	**Lower Rouge River**	**Little Rouge River**
Lampetra appendix	American Brook Lamprey	S3			27	26, BRU02				
Pomoxis nigromaculatus	Black Crappie			38					RR06	
Rhinichthys atratulus	Blacknose Dace		18, BEA01	29, 56, RR03, RR04, RR05	27, 33, BE02	26, BRU02	BUR01	RC03	28, 36, RR06	23, 30, 52, 55, LR04, LR05
Pimephales notatus	Bluntnose Minnow		18	29, 56, RR03	27, 33	26			28, 36, 37, RR06	23, 30, 44, 52, LR05
Hybognathus hankinsoni	Brassy Minnow				27					
Culaea inconstans	Brook Stickleback		BEA01		33					
Ameiurus nebulosus	Brown Bullhead			38						23, 30, 50
Salmo trutta	Brown Trout			RR03	BE02		BUR01			LR06
Campostoma anomalum	Central Stoneroller	S3		RR03						50, 52, 55, LR04
Oncorhynchus kisutch	Coho Salmon									
Cyprinus carpio	Common Carp			29, 38, 56					28, 36, 37	
Luxilus cornutus	Common Shiner			29, 56, RR03, RR04, RR05	27, 33	26			28, 36, 37	23, 30, 44, 50, 52, 55, LR04, LR05, RR06
Semotilus atromaculatus	Creek Chub		18, BEA01	29, 56, RR03, RR04, RR05	27, 33, BE02	26, BRU02	BUR01		36, 37, RR06	23, 30, 44, 50, 52, LR04, LR05
Notropis atherinoides	Emerald Shiner			38						
Pimephales promelas	Fathead Minnow		18, BEA01	29	27, 33				28, 36, 37	23, 44
Dorosoma cepedianum	Gizzard Shad			38						
Notemigonus crysoleucas	Golden Shiner			38						
Carassius auratus	Goldfish								28, 36, RR06	
Nocomis biguttatus	Hornyhead Chub									23, 30, 50, 52, 55
Etheostoma nigrum	Johnny Darter			29, 56, RR03	27, 33, BE02	26, BRU02	BUR01		28, 36, 37, RR06	23, 30, 44, 50, 52, LR04, LR05, LR06
Micropterus salmoides	Largemouth Bass			38, RR03		26			28, 36, 37, RR06	
Rhinichthys cataractae	Longnose Dace			29, 56, RR03, RR04, RR05	27, 33	26		RC03	28, 36, 37, RR06	23, 30, 50, 52, 55, LR05, LR06
Notropis volucellus	Mimic Shiner			38						
	Nocomis sp.									52
Esox lucius	Northern Pike			38						

TABLE 2C.
FISH COLLECTED BY TRCA AT INVENTORIED STREAMS IN THE ROUGE RIVER WATERSHED

Species			Watercourse Sampling Stations							
Scientific Name	**Common Name**	**Status**	**Beaver Creek**	**Upper Rouge River**	**Berczy Creek**	**Bruce Creek**	**Burndenet Creek**	**Robinson Creek**	**Lower Rouge River**	**Little Rouge River**
Lepomis gibbosus	Pumpkinseed			38, 56, RR03		26		RC03	28, 36, 37, RR06	52, 55, LR06
Etheostoma caeruleum	Rainbow Darter			29, 56, RR03, RR04, RR05	27, 33	26, BRU02			28, RR06	23, 30, 50, 52, 55, LR04, LR05, LR06
Oncorhynchus mykiss	Rainbow Trout			RR03, RR05	BE02	BRU02			37	30
Clinostomus elongatus	Redside Dace	S3, THR, SC		RR03	27, 33	26				
Ambloplites rupestris	Rock Bass			29, 38, 56, RR05	27	26			28, 36, 37, RR06	23, 30, 50, 52
	Semotilus sp.								37	
Micropterus dolomieu	Smallmouth Bass								37	55
Notropis hudsonius	Spottail Shiner			38						
	Stickleback sp.		18		27					
Noturus flavus	Stonecat			RR04	33	26			28, 37, RR06	23, 30, 50, LR05
	Stoneroller sp.									23
Noturus gyrinus	Tadpole MadTom			38						
Etheostoma olmstedi	Tesselated Darter			38						
Catostomus commersoni	White Sucker		18, BEA01	29, 56, RR03, RR04, RR05	27, 33, BE02	26, BRU02			28, 36, 37, RR06	23, 30, 50, 52, 55
Perca flavescens	Yellow Perch			38						

Source: Toronto and Region Conservation Authority (TRCA) fisheries data from fish collection stations; Received 2003.



L E G E N D

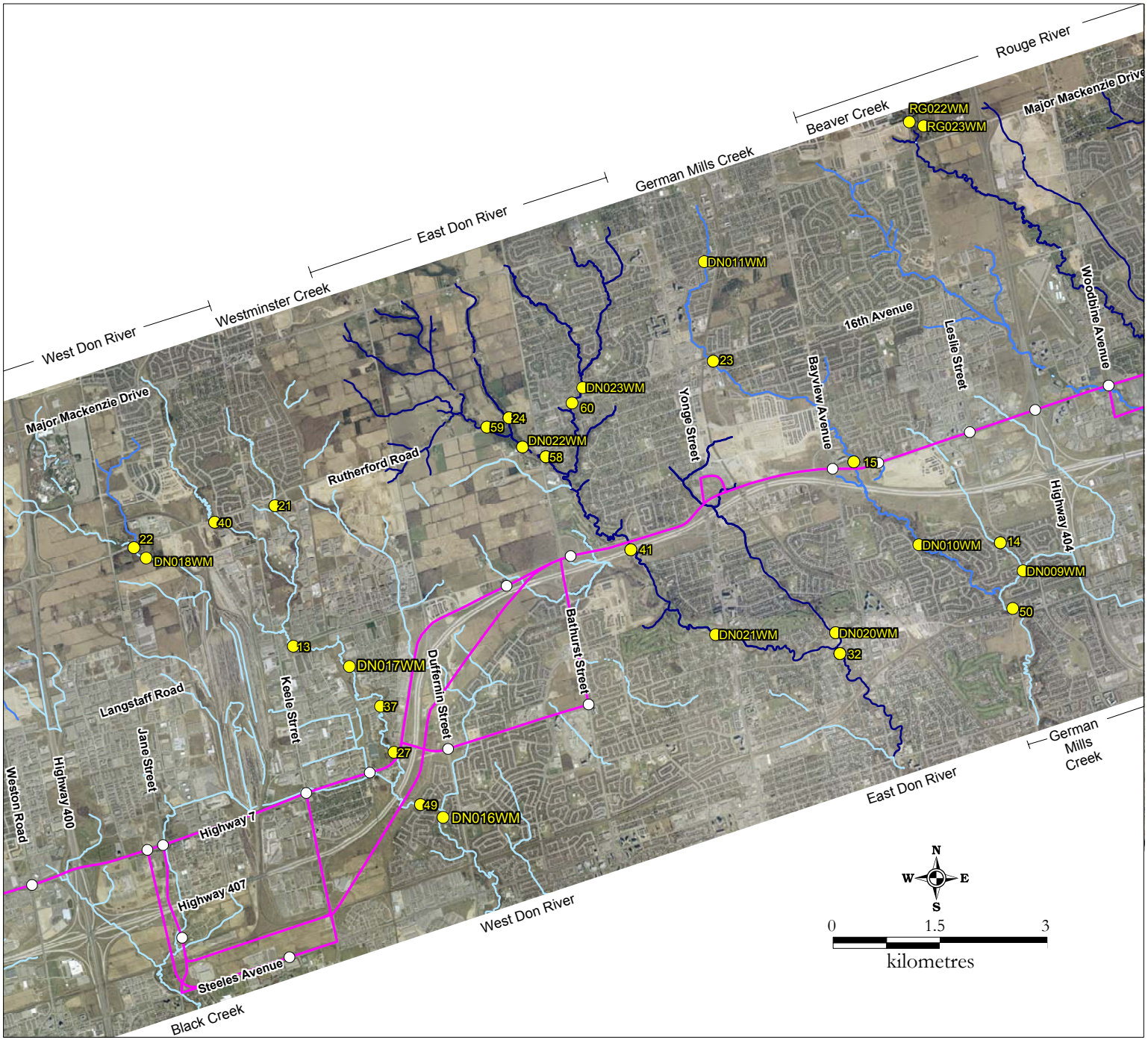
- Fish Dot
- Cold Watercourse
- Cool Watercourse
- Warm Watercourse
- Proposed Transit Stop
- Route Alternative

Data Source: Toronto and Region Conservation Authority.

HUMBER RIVER WATERSHED

LGL Limited
environmental research associates

PROJECT:	TA2818	**FIGURE:**	3A
DATE:	September 2003	**PREPARED BY:**	MWF
SCALE:	1 : 71,240	**CHECKED BY:**	GNK



L E G E N D

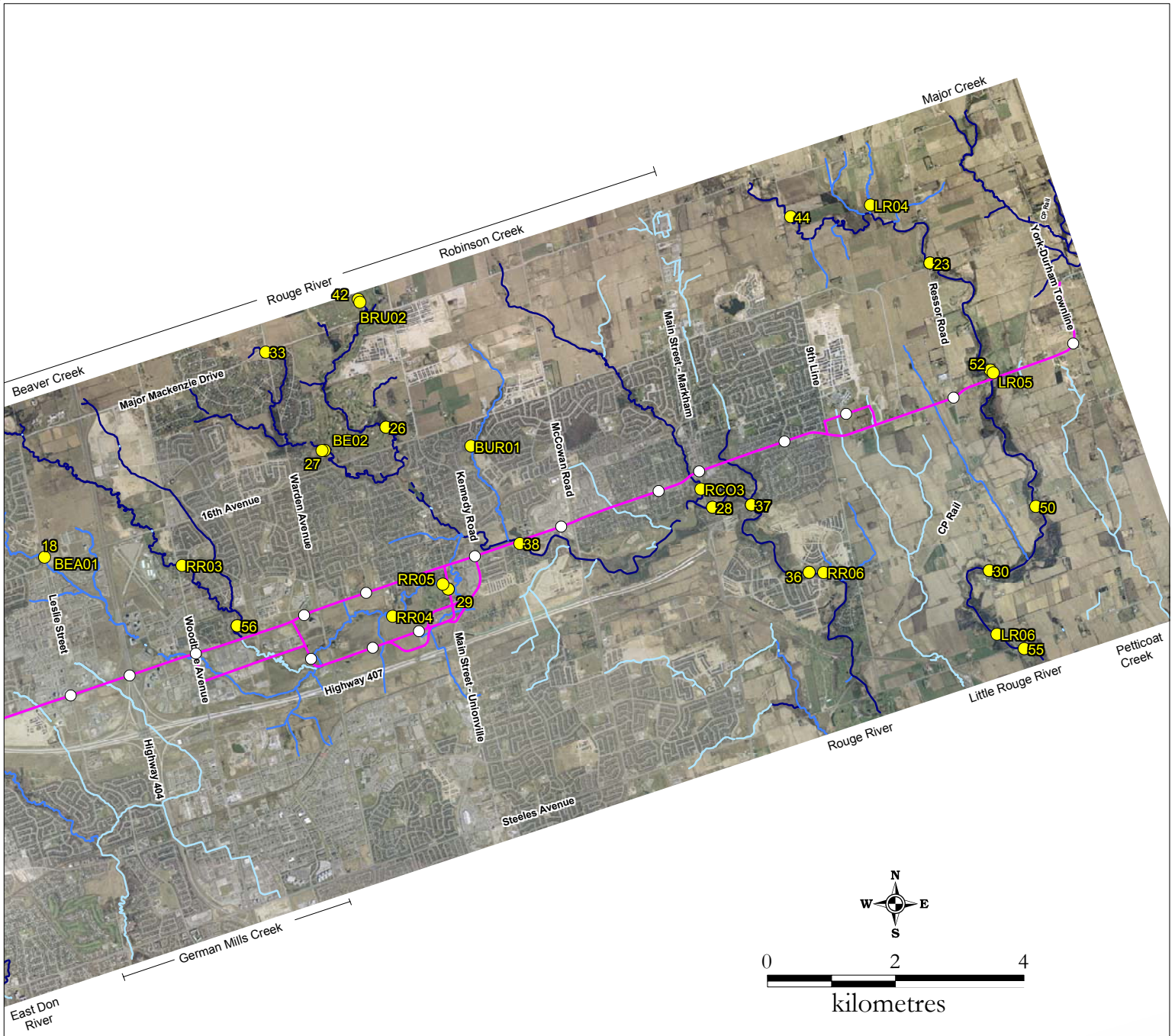
- Fish Dot
- Cold Watercourse
- Cool Watercourse
- Warm Watercourse
- Proposed Transit Stop
- Route Alternatives

Data Source: Toronto and Region Conservation Authority.

DON RIVER WATERSHED

LGL Limited
environmental research associates

PROJECT:	TA2818	**FIGURE:**	3B
DATE:	September 2003	**PREPARED BY:**	MWF
SCALE:	1 : 79,160	**CHECKED BY:**	GNK



L E G E N D

- Fish Dot
- Cold Watercourse
- Cool Watercourse
- Warm Watercourse
- Proposed Transit Stop
- Route Alternatives

Data Source: Toronto and Region Conservation Authority.

ROUGE RIVER WATERSHED

LGL Limited
environmental research associates

PROJECT:	TA2818	**FIGURE:**	3C
DATE:	September 2003	**PREPARED BY:**	MWF
SCALE:	1 : 89,810	**CHECKED BY:**	GNK

Station D1, a tributary of the West Don River, is designated as a warmwater system by the TRCA and crosses Highway 7 immediately east of Keele Street. The West Don River (Station D3) is designated as a warmwater system by the TRCA and crosses Highway 7 between Bowes Road and Rivermede Road. Station D6, a tributary of the East Don River, is designated as a warmwater system by the TRCA and crosses Highway 7 approximately 0.48 km east of Bathurst Street. The East Don River (Station D7) is designated as a coldwater system by the TRCA, crossing Highway 7 approximately 1 km east of Bathurst Street. Station D8, a tributary of the East Don River, is designated as a coldwater system by the TRCA and crosses Highway 7 at Yonge Street. Station D11, a tributary of the East Don River, was previously designated as a coldwater system by TRCA, and crosses Highway 7 between the Highway 7/Yonge Street East-North/South ramp and the CN Rail line. German Mills Creek (Station D12) is designated as a coolwater system by the TRCA and crosses Highway 7 between Bayview Avenue and Chalmers Road. Station D13, a tributary of German Mills Creek, is designated as a coolwater system by the TRCA but is piped upstream and is a grassy swale downstream of Highway 7, crossing between Bayview Avenue and Chalmers Road. Station D14, a tributary of German Mills Creek, is designated as a warmwater system by the TRCA and crosses Highway 7 at Chalmers Road. Station D15, a tributary of German Mills Creek, is designated as a warmwater system by the TRCA and crosses Highway 7 between West Commerce Drive and Highway 404. Westminster Creek (Station D19) is designated as a warmwater system by the TRCA, and crosses Centre Street between Dufferin Street and Concord Road. Station D20, a tributary of the East Don River, is designated as a warmwater system by the TRCA, and crosses Centre Street between New Westminster Drive and Bathurst Street. Station D22, a tributary of the East Don River, was previously designated as a warmwater system by the TRCA and crosses Bathurst Street between Highway 407 and Worth Boulevard.

2.3.3 Rouge River

The middle and eastern portions of the primary study area, between Highway 404 and the CP Rail crossing at Locust Hill, passes through the Rouge River watershed (both Upper and Lower Rouge). Tributary systems of the Rouge River watershed crossed by proposed alignments of the transitway include Beaver Creek, Rouge River, Robinson Creek, Exhibition Creek and Little Rouge River.

Station R1, a tributary of Beaver Creek, is designated as a coolwater system by the TRCA and crosses Highway 7 between Allstate Parkway and Frontenac Drive. Beaver Creek (Station R2) is designated as a coolwater system by the TRCA and crosses Highway 7 between Frontenac Drive and Woodbine Avenue. The main branch of the Upper Rouge River (Station R3) is designated as a coldwater system upstream of Highway 7 and a warmwater system downstream of Highway 7 by the TRCA, crossing Highway 7 between Montgomery Court and Rodick Road. The main branch of the Lower Rouge River (Station R6) is designated as a coldwater system at this location by the TRCA and crosses Highway 7 between Oakcrest Avenue and Bullock Drive. Station R7, a tributary of the Lower Rouge River, is designated as a warm water system by TRCA but has been piped at Highway 7 and crosses Highway 7 between Bakerdale Road and Thatcher's Mill Way. Robinson Creek (Station R8) is designated as a coldwater system by the TRCA and crosses Highway 7 between McPhillips Avenue and Main Street Markham. Exhibition Creek (Station R9) is designated as a coldwater system at this location by the TRCA and crosses Highway 7 between Albert Street and Savannah Court. Station R10, a tributary of Little Rouge River, is designated as a warmwater system by the TRCA and crosses Highway 7 approximately 0.4 km east of 9th Line. Station R11, a tributary of Little Rouge River, is designated as a warmwater system by the TRCA and crosses Highway 7 approximately 0.4 km west of the Markham Bypass. Station R12, a tributary of Little Rouge River is designated as a coolwater system by the TRCA and crosses Highway 7 approximately 0.3 km west of Reesor Road. Station R13, a tributary of Little Rouge River is designated as a coldwater system by the TRCA and crosses Highway 7 approximately 0.3 km east of Reesor Road. The main branch of the Upper Rouge River (Station R19) is designated as a coolwater system at this location by the TRCA and is located west of Warden Avenue within the IBM complex. Station R20, a

tributary of the Lower Rouge River, is designated as a coolwater system by the TRCA at this location and is situated 100 m north of the proposed Enterprise Boulevard within the proposed Markham Centre area, approximately 840 m east of Warden Avenue. Station R21, a tributary of the Lower Rouge River, is designated as a coolwater system by the TRCA at this location and is situated 150 m west of the south end of Main Street Unionville.

2.3.4 Petticoat Creek

The far eastern portion of the primary study area, between the CP Rail crossing at Locust Hill and the York-Durham Townline, passes through the headwater area of the Petticoat Creek watershed.

Station P1, a tributary of Petticoat Creek, is designated as a warmwater system by the TRCA and crosses Highway 7 approximately 0.2 km east of the CP Rail crossing at Locust Hill. The main branch of Petticoat Creek (Station P2) is designated as a warmwater system by the TRCA and crosses Highway 7 immediately west of the south intersection of Highway 7/York-Durham Townline.

2.3.5 Rare, Threatened or Endangered Species

Humber River
Three rare species were collected by the TRCA in the Main Humber River in the study area: redside dace (*Clinostomus elongates*), American brook lamprey (*Lamptera lomottei*), and central stoneroller (*Campostoma anomalum*). Redside dace is designated Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), designated Threatened by the Ministry of Natural Resources (MNR) and has a Provincial Rank (SRank) of Rare to Uncommon (S3). American brook lamprey and central stoneroller have SRanks of S3 (Rare to Uncommon).

Don River
One rare species, was collected by the TRCA in the main branch of the West Don River within the study limits. Redside dace is designated Special Concern by COSEWIC, designated Threatened by the MNR and has a SRank of S3 (Rare to Uncommon). Two rare species were collected by the TRCA in the main branch of the East Don River within the study limits. Redside dace is designated Special Concern by COSEWIC, designated Threatened by the MNR and has a SRank of S3. American brook lamprey has a SRank of S3 (Rare to Uncommon).

Rouge River
Two rare species were collected by the TRCA in the main branch of Upper Rouge River within the study limits. Redside dace is designated Special Concern by COSEWIC, designated Threatened by the (MNR) and has a SRank of S3 (Rare to Uncommon). American brook lamprey has a SRank of S3 (Rare to Uncommon. One rare species was collected by the TRCA in the Little Rouge River within the study limits. Central stoneroller is has a SRank of S3 (Rare to Uncommon).

2.4 Vegetation and Vegetation Communities

The geographical extent, composition, structure and function of vegetation communities were identified through air photo interpretation and field investigations. Air photos were interpreted to determine the limits and characteristics of communities. A reconnaissance level field investigation of natural/semi-natural vegetation was conducted within the primary and secondary study areas on May 15, 22, 28, September 16 and 26, 2004 to ground truth the boundaries of vegetation communities and to conduct a botanical survey. Vegetation communities were identified within the primary and secondary study area, while botanical inventories were completed within the primary study area.

Vegetation communities were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee *et al*. 1998). The community was sampled using a plotless method for the purpose of determining general composition of the vegetation. Plant species status was reviewed for Toronto, the Region of York, the Greater Toronto Area (Varga *et al*. 2000) and Ontario (Oldham 1999). Vascular plant nomenclature follows Morton and Venn (1990), with a few exceptions.

2.4.1 Vegetation Communities

Much of the vegetation in the secondary study area is of anthropogenic origin, resulting from past/present land use. Land use is predominantly medium- and high-density residential, commercial and industrial, with the exception of areas east of the 9th Line, which are predominantly agricultural. Development of new residential, commercial and industrial areas is taking place in several locations in the secondary study area.

A total of 12 vegetation communities have been identified within the primary study area. These communities include cultural plantations, cultural meadows, cultural thickets, cultural woodlands, deciduous forests, deciduous swamps, thicket swamps, shallow marshes, shallow aquatic and open aquatic communities. These communities are delineated in Figure 2 and described in Table 3.

2.4.2 Flora

To date, a total of 321 vascular plant taxa have been recorded within the primary study area. One-hundred-and-nine (109) taxa, 34 percent of the recorded flora, are considered introduced and non-native to southern Ontario. A list of vascular plants identified within the primary study area is presented in Table 4.

2.4.3 Species at Risk

Plant species status was reviewed for the Greater Toronto Area, the Region of York (Varga *et al.* 2000), TRCA's jurisdiction (TRCA 2001) and Ontario (Oldham 1999). No plant species considered rare, threatened or endangered (R, T, E) in Ontario were noted during field investigations. Several species considered regionally or locally uncommon or rare were noted during field investigations, as well as species of concern listed by the TRCA. The status of these species and a description of their locations within the study area are presented in Section 4.4.

Vegetation community status was reviewed for Ontario (NHIC 1997) and within the jurisdiction of the TRCA (TRCA 2001). The vegetation communities identified within the primary and secondary study areas are considered widespread and common in Ontario and secure globally (NHIC 1997) and locally (TRCA 2001).

2.5 Wildlife and Wildlife Habitat

Field investigations within the primary study area were conduced on March 6, April 9 and 10, June 18-20, and 24, July 2-4, 8-10, and 14, 2003 to document wildlife habitat and wildlife occupation and to characterize the nature, extent and significance of animal usage within the project limits. Wildlife was recorded through direct observation, vocalizations or other evidence including tracks, scat, odours or browse. Wildlife surveys were conducted at dawn and dusk to capture the period when species are most vocal and active and background noise is at a minimum. Inventory methods included breeding bird surveys using the five minute point-count method, amphibian road call counts and incidental observations. Wildlife habitat was characterized using the Significant Wildlife Habitat Technical Guide (MNR 2000).

TABLE 3.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Comments
Terrestrial – Natural/Semi-natural			
FOD	DECIDUOUS FOREST		
FOD4	Dry-Fresh Deciduous Forest Ecosite	Black Locust (*Robinia pseudo-acacia*), White Ash (*Fraxinus americana*), Sugar Maple (*Acer saccharum saccharum*), Manitoba Maple (*A. negundo*), White Cedar (*Thuja occidentalis*), Basswood (*Tilia americana*), Common Lilac (*Syringa vulgaris*), Choke Cherry (*Prunus virginiana*)	This community composition is the result of past management/disturbance. This community is located toward the east end of the study area behind a residential property. Reference Number: R14
FOD5	Dry-Fresh Sugar Maple Deciduous Forest Ecosite	Sugar Maple, Beech (*Fagus grandifolia*), Red Oak (*Quercus rubra*), Ironwood (*Ostrya virginiana*), Basswood, White Ash (*Fraxinus americana*), Trembling Aspen (*Populus tremuloides*), White Pine (*Pinus strobus*), Red-osier Dogwood (*Cornus stolonifera*), Choke Cherry, Common Buckthorn (*Rhamnus cathartica*)	This community type includes Baker's Woods, a managed sugar bush, at the corner of Bathurst Street and Highway 7 and a number of small woodlots at the east end of the study area. In one location this community type is only 8 metres from the Highway 7 edge of pavement. Reference Numbers: D5, R14
FOD7-3	Fresh-Moist Willow Lowland Deciduous Forest Type	Manitoba Maple, Crack Willow (*Salix X rubens*), Weeping Willow (*S. X sepulcralis*), White Elm (*Ulmus americana*), Black Walnut (*Juglans nigra*), Green Ash (*Fraxinus pennsylvanica*), Red-osier Dogwood, Alternate-leaved Dogwood (*Cornus alternifolia*), Riverbank Grape (*Vitis riparia*), Spotted Touch-me-not (*Impatiens capensis*)	This community type surrounds watercourses throughout the study area. In some locations there is a greater concentration of introduced species and the canopy is more open. Reference Numbers: H5, H6, H7, H8, H13, H14, H15, D3, D12, D14, D22, R1, R3, R5, R6, R8, R9, R14, R16, R18, R19, R20, R23, R24
Terrestrial – Cultural			
CUP	CULTURAL PLANTATION		
CUP3	Coniferous Plantations	Norway Spruce (*Picea abies*), Red Pine (*Pinus resinosa*), Scots Pine (*P. sylvestris*), Eastern White Cedar (*Thuja occidentalis*), Smooth Brome (*Bromus inermis inermis*), Canada Bluegrass (*Poa compressa*), Kentucky Bluegrass (*P. pratensis pratensis*), Wild Carrot (*Daucus carota*), Common Milkweed (*Asclepias syriaca*)	Reference Number: R23

TABLE 3.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Comments
CUM	CULTURAL MEADOW		
CUM1-1	Dry-Moist Old Field Meadow Type	Smooth Brome, Wild Carrot, Common Teasel (*Dipsacus fullonum sylvestris*), Common St. John's-wort (*Hypericum perforatum*), White Sweet Clover (*Melilotus alba*), Canada Bluegrass, Kentucky Bluegrass, Rough-fruited Cinquefoil (*Potentilla recta*), Tall Goldenrod (*Solidago altissima*), Canada Goldenrod (*S. canadensis*), Gray Goldenrod (*S. nemoralis*), Garden Tansy (*Tanacetum vulgare*), Common Dandelion (*Taraxacum officinale*), Red Clover (*Trifolium pratense*), Stinging Nettle (*Urtica dioica*), Bird Vetch (*Vicia cracca*), Riverbank Grape in varying mixtures	This community type has established on vacant lots and abandoned fields in several locations along Highway 7. Species composition varies from site to site. Reference Numbers: H8, H12, R3, R4, R6, R14, D20
CUT	CULTURAL THICKET		
CUT1	Mineral Cultural Thicket Ecosite	Common Buckthorn, Tartarian Honeysuckle (*Lonicera tatarica*), Hawthorns (*Crataegus spp.*), Choke Cherry, Riverbank Grape, Virginia Creeper (*Parthenocissus inserta*), Red Raspberry (*Rubus idaeus melanolasius*)	This community is characterized by the dominance of shrubs. This community type is located at the east end of the study area. Reference Numbers: H7
CUW	CULTURAL WOODLAND		
CUW1	Mineral Cultural Woodland Ecosite	Species composition varies and includes species listed in FOD5, FOD7-3 and species such as Norway Maple (*Acer platanoides*), Little-leaf Linden (*Tilia cordata*), Hawthorns, Carolina Poplar (*Populus X canadensis*), Tartarian Honeysuckle, Norway Spruce (*Picea abies*), Cherries (*Prunus spp.*)	A number of communities throughout the study area have a canopy cover of 35 to 60 percent with a great proportion of non-native species. This community type often develops on abandoned residential sites. Reference Numbers: H8, H12, H15, D2, D12, D20, R4, R11, R14, R26
Wetland			
SWD	DECIDUOUS SWAMP		
SWD3	Maple Mineral Deciduous Swamp Ecosite	Silver Maple (*Acer saccharinum*), Swamp Maple (*A. freemani*)	This community is located within the FOD5 community at the eastern end of the study area.

TABLE 3.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

ELC Code	Vegetation Type	Species Association	Comments
SWT	THICKET SWAMP		
SWT2-2	Willow Mineral Thicket Swamp Type	Pussy Willow (*Salix discolor*), Bebb's Willow (*S. bebbiana*), Basket-leaf Willow (*S. eriocephala*), Slender Willow (*S. petiolaris*)	This community is located on the west side of Village Parkway, north of Highway 7 in the Town of Markham. Reference Number: R4
MAS	SHALLOW MARSH		
MAS2-1	Cattail Mineral Shallow Marsh Type	Common Cattail (*Typha latifolia*), Narrow-leaved Cattail (*T. angustifolia*), Common Reed (*Phragmites australis*), Reed-canary Grass (*Phalaris arundinacea*)	This community type occurs in a number of locations throughout the study area. Species composition varies from site to site. Reference Numbers: H5, H6, H8, D15, R4
SA	SHALLOW WATER	Common Cattail, Narrow-leaved Cattail, Common Reed, Reed-canary Grass surrounding open water	This community is located on the west side of Village Parkway, north of Highway 7 in the Town of Markham. Reference Number: R4
OAO	OPEN AQUATIC	N/A	This small lake is located north of Highway 7 between Kennedy and McCowan Roads. Reference Number: R6

TABLE 4.
WORKING VASCULAR PLANT CHECKLIST

Scientific Name	Common Name	COSEWIC	MNR	Local Status	Legal Status	ELC Community											
						CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
Acer X freemani	Swamp maple													X			
Acer negundo	Manitoba maple						X			X		X					
* *Acer platanoides*	Norway maple						X			X							
Acer rubrum	red maple										X			X			
Acer saccharinum	silver maple											X		X			
Acer saccharum ssp. *saccharum*	sugar maple						X			X	X	X					
* *Achillea millefolium* ssp *Millefolium*	Yarrow					X	X										
Actaea rubra	red baneberry										X						
* *Aesculus hippocastanum*	horse-chestnut						X										
* *Agrostis gigantean*	Redtop					X	X										
Agrostis stolonifera	creeping bent grass					X	X										
Ailanthus altissima	tree-of-heaven						X										
* *Alisma plantago-aquatica*	water-plantain											X	X			X	X
* *Alliaria petiolata*	garlic mustard						X			X	X	X					
Allium tricoccum	wild leek										X						
* *Amaranthus retroflexus*	green amaranth					X	X										
Ambrosia artemisiifolia	common ragweed					X	X										
Amelanchier arborea	Juneberry						X		X	X							
Amphicarpaea bracteata	hog-peanut											X					
Anemone Canadensis	Canada anemone						X			X	X	X					
Anemone virginiana	Thimbleweed										X						
Angelica atropurpurea	purple-stemmed angelica			R[1, 2]								X					
Antennaria neglecta	cat's foot			U[1]		X											
Apios Americana	Groundnut			R[1, 2]								X					
Apocynum androsaemifolium ssp. *Androsaemifolium*	spreading dogbane					X	X		X								

TABLE 4.
WORKING VASCULAR PLANT CHECKLIST

Scientific Name	Common Name	COSEWIC	MNR	Local Status	Legal Status	ELC Community											
						CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
Aralia nudicaulis	wild sarsaparilla										X						
* *Arctium lappa*	great burdock					X	X					X					
* *Arctium minus*	common burdock					X	X			X							
Arisaema triphyllum ssp. *Triphyllum*	jack-in-the-pulpit										X						
* *Artemisia vulgaris*	Mugwort					X	X										
Asarum canadense	wild-ginger										X						
Asclepias incarnate	Swamp milkweed											X					
Asclepias syriaca	common milkweed					X	X	X									
Aster cordifolius	heart-leaved aster										X						
Aster ericoides	heath aster					X	X										
Aster lanceolatus ssp. *Lanceolatus*	Eastern lined aster					X	X			X	X	X					
Aster lateriflorus	side-flowering aster											X					
Aster novae-angliae	New England aster					X	X										
Aster puniceus	Swamp aster											X		X	X		
Athyrium filix-femina ssp. *Angustum*	lady fern										X						
* *Barbarea vulgaris*	Yellow rocket					X	X										
Betula alleghaniensis	Yellow birch											X		X			
Betula papyrifera	white birch									X	X						
* *Betula pendula*	European white birch						X										
Bidens cernua	nodding bur-marigold											X	X	X	X	X	
Bidens frondosa	common beggar-ticks											X		X	X		
Bidens tripartite	Swamp tickseed			U[1]								X		X	X		
Bidens vulgate	tall beggar-ticks			U[1], R[2]								X		X	X		
Boehmeria cylindrical	false nettle											X		X	X		
* *Bromus inermis* ssp. *Inermis*	Smooth brome					X	X	X				X					

TABLE 4.
WORKING VASCULAR PLANT CHECKLIST

	Scientific Name	Common Name	COSEWIC	MNR	Local Status	Legal Status	ELC Community											
							CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
*	*Campanula rapunculoides*	European bellflower					X	X										
*	*Capsella bursa-pastoris*	shepherd's purse					X	X										
	Cardamine concatenate	cut-leaved toothwort			R[1], C[3]							X						
	Cardamine diphylla	two-leaved toothwort										X						
	Carex arctata	drooping wood sedge										X						
	Carex aurea	golden-fruited sedge			U[2]								X		X	X		
	Carex blanda	woodland sedge										X	X					
	Carex deweyana	Dewey's sedge										X						
	Carex gracillima	graceful sedge										X						
	Carex granularis	meadow sedge											X		X	X		
	Carex hirtifolia	pubescent sedge			U[1, 2]							X						
	Carex hitchcockiana	Hitchcock's sedge			U[1, 2], C[3]							X						
	Carex intumescens	Bladder sedge													X	X		
	Carex lacustris	lake-bank sedge											X		X	X		
	Carex laxiflora	loose-flowered sedge			U[1, 2]								X					
	Carex lupulina	hop sedge											X		X	X		
	Carex pedunculata	long-stalked sedge										X						
	Carex pensylvanica	Pennsylvania sedge										X						
	Carex radiate	Radiate sedge										X						
	Carex rosea	wood sedge										X						
*	*Carex spicata*	spiked sedge						X		X		X						
	Carex stipata	awl-fruited sedge											X		X	X		
	Carex stricta	Tussock sedge											X		X	X		
	Carex vulpinoidea	fox sedge											X		X	X		
	Carya cordiformis	bitternut hickory										X						
	Caulophyllum thalictroides	blue cohosh										X						
*	*Chelidonium majus*	Celandine									X	X	X					

TABLE 4.
WORKING VASCULAR PLANT CHECKLIST

Scientific Name	Common Name	COSEWIC	MNR	Local Status	Legal Status	ELC Community											
						CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
Chelone glabra	Turtlehead			U[1, 2]								X					
* *Chenopodium album*	lamb's quarters					X	X										
* *Chrysanthemum leucanthemum*	ox-eye daisy					X	X										
* *Cichorium intybus*	Chickory					X	X										
Cicuta maculate	Spotted water hemlock			U[1]										X	X		
Circaea lutetiana ssp. *canadensis*	enchanter's-nightshade									X	X	X					
* *Cirsium arvense*	Canada thistle					X	X										
* *Cirsium vulgare*	bull-thistle					X	X										
Claytonia virginica	spring-beauty			R[2], C[3]								X					
* *Convallaria majalis*	lily-of-the-valley						X			X		X					
* *Convolvulus arvensis*	field bindweed					X	X										
Cornus alternifolia	alternate-leaved dogwood										X						
Cornus foemina ssp. *racemosa*	gray dogwood			U[2]		X	X		X								
Cornus rugosa	round-leaved dogwood										X						
Cornus stolonifera	red-osier dogwood								X	X	X	X		X	X		
* *Coronilla varia*	crown-vetch					X	X										
Crataegus punctata	dotted hawthorn						X		X								
* *Cynanchum nigrum*	dog strangling vine						X		X	X		X					
Cypripedium calceolus	Yellow lady's-slipper			R[1, 2], C[3]											X		
Cystopteris bulbifera	Bulblet fern											X					
* *Dactylis glomerata*	Orchard grass					X	X										
Danthonia spicata	poverty oat grass										X						
* *Daucus carota*	wild carrot					X	X	X									
Desmodium canadense	showy tick-trefoil			U[1], R[2]								X					
* *Dianthus armeria*	deptford pink					X											
* *Dipsacus fullonum* ssp. *sylvestris*	common teasel					X	X										
Dryopteris carthusiana	spinulose woodfern										X	X					

TABLE 4.
WORKING VASCULAR PLANT CHECKLIST

Scientific Name	Common Name	COSEWIC	MNR	Local Status	Legal Status	ELC Community											
						CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
* *Echinochloa crusgalli*	barnyard grass					X	X										
Echinocystis lobata	wild cucumber						X			X		X		X			
* *Echium vulgare*	viper's bugloss					X											
Eleocharis erythropoda	red-footed spike-rush													X	X		
Eleocharis smallii	spike-rush			U[1]										X	X		
* *Elymus repens*	quack grass					X	X					X					
Elymus virginicus	Virginia wild-rye			U[2]								X					
Epilobium ciliatum ssp. *ciliatum*	ciliate willow-herb											X					
* *Epilobium hirsutum*	great hairy willow-herb											X					
* *Epilobium parviflorum*	sparse-flowered willow-herb					X	X										
* *Epipactis helleborine*	Helleborine										X	X					
Equisetum arvense	field horsetail						X			X	X	X					
Equisetum hyemale ssp. *affine*	scouring rush										X						
Erigeron annuus	annual fleabane					X											
Erigeron philadelphicus ssp. *Philadelphicus*	marsh fleabane											X		X	X		
* *Erysimum cheiranthoides* ssp. *Cheiranthoides*	wormseed mustard					X	X										
Erythronium americanum spp. *Americanum*	Yellow trout lily										X						
Euonymus obovata	running strawberry bush			R[2], C[3]							X						
Eupatorium maculatum	joe-pye weed											X		X	X		
Eupatorium perfoliatum	common boneset											X		X	X		
Eupatorium rugosum	white snakeroot											X		X	X		
Euthamia graminifolia	grass-leaved goldenrod					X	X										
Fagus grandifolia	American beech									X	X						
* *Festuca arundinacea*	tall fescue					X	X										
* *Festuca pratensis*	meadow fescue					X	X										

TABLE 4.
WORKING VASCULAR PLANT CHECKLIST

Scientific Name	Common Name	COSEWIC	MNR	Local Status	Legal Status	ELC Community											
						CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
* *Festuca rubra* ssp. *Rubra*	red fescue					X	X										
Fragaria vesca ssp. *americana*	woodland strawberry										X	X					
Fragaria virginiana	wild strawberry					X	X		X	X		X					
Fraxinus Americana	white ash									X	X						
Fraxinus nigra	black ash											X		X	X		
Fraxinus pennsylvanica	green/red ash											X		X			
* *Galium verum*	Yellow bedstraw						X			X	X						
Geranium maculatum	wild geranium			U[1], R[2]							X						
* *Geranium robertianum*	herb Robert									X	X	X					
Geum aleppicum	Yellow avens									X	X	X					
Geum canadense	white avens										X						
* *Geum urbanum*	urban avens						X		X	X	X	X					
* *Glechoma hederacea*	Ground ivy						X			X	X	X					
Glyceria striata	fowl manna grass												X	X	X	X	
Hackelia virginiana	Stickseed			U[1], R[2]								X					
* *Helianthus tuberosus*	Jerusalem artichoke											X					
* *Hemerocallis fulva*	orange day-lily						X			X		X					
* *Hesperis matronalis*	dame's rocket					X	X			X	X	X					
* *Hordeum jubatum* ssp. *Jubatum*	squirrel-tail grass					X	X										
Hydrophyllum virginianum	Virginia waterleaf											X					
* *Hypericum perforatum*	common st. john's-wort					X	X					X					
Ilex verticillata	Winterberry											X					
Impatiens capensis	Spotted touch-me-not											X		X	X		
* *Impatiens glandulifera*	touch-me-not											X					
* *Inula helenium*	Elecampane					X	X										
* *Iris pseudacorus*	Yellow flag						X			X		X					

TABLE 4.
WORKING VASCULAR PLANT CHECKLIST

Scientific Name	Common Name	COSEWIC	MNR	Local Status	Legal Status	ELC Community											
						CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
Iris versicolor	wild blue flag											X					
Juglans cinerea	Butternut											X					
Juglans nigra	black walnut			R[2]			X					X					
Juncus dudleyi	Dudley's rush										X	X					
Juncus tenuis	path rush										X	X					
Juncus torreyi	Torrey's rush											X		X	X		
Juniperus virginiana	red cedar			U[1, 2]			X										
* *Lactuca serriola*	Prickly lettuce					X	X										
Laportea Canadensis	wood nettle											X					
Leersia oryzoides	cut grass											X	X	X	X		
* *Leonurus cardiaca* ssp. *Cardiaca*	Motherwort						X			X	X	X					
Lilium michiganense	Michigan lily			U[1, 2]								X					
* *Linaria vulgaris*	butter-and-eggs					X	X										
* *Lolium perenne*	perennial rye grass					X	X										
* *Lonicera tatarica*	Tartarian honeysuckle								X	X	X	X					
* *Lotus corniculatus*	birdsfoot trefoil					X	X										
Lycopus americanus	common water horehound											X		X	X		
Lycopus uniflorus	northern bugle weed											X		X	X		
Lysimachia ciliate	Fringed loosestrife											X		X			
* *Lysimachia nummularia*	Moneywort											X		X			
* *Lythrum salicaria*	purple loosestrife											X	X	X	X		
Maianthemum canadense	Canada mayflower										X	X					
Maianthemum racemosum ssp. R*acemosum*	false spikenard										X						
Maianthemum stellatum	starry false solomon's seal										X						
* *Malus pumila*	Apple								X								

TABLE 4.
WORKING VASCULAR PLANT CHECKLIST

Scientific Name	Common Name	COSEWIC	MNR	Local Status	Legal Status	ELC Community											
						CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
Matteuccia struthiopteris	Ostrich fern											X					
* *Medicago lupulina*	black medick					X	X										
* *Melilotus alba*	white sweet clover					X	X										
* *Melilotus officinalis*	Yellow sweet clover					X	X										
Mentha arvensis ssp. *borealis*	wild mint													X			
* *Mentha X piperita*	Peppermint											X					
* *Miscanthus sacchariflorus*	Eulalia								X								
* *Morus alba*	white mulberry						X										
Muhlenbergia mexicana	leafy satin grass											X					
Myosotis laxa	small forget-me-not											X					
* *Nasturtium microphyllum*	watercress															X	X
* *Nepeta cataria*	Catnip						X			X		X					
Oenothera biennis	common evening primrose			U[1, 2]		X	X										
Oenothera parviflora	small flowered evening primrose											X					
Onoclea sensibilis	sensitive fern											X		X	X		
Ostrya virginiana	ironwood										X						
Oxalis stricta	Yellow wood-sorrel						X			X	X	X					
Panicum capillare	witch grass					X	X										
Parthenocissus inserta	Thicket creeper								X	X	X	X					
* *Pastinaca sativa*	wild parsnip					X	X										
Phalaris arundinacea	reed canary grass											X	X	X	X		
* *Phleum pratense*	timothy					X	X										
Phragmites australis	common reed											X	X	X	X		
* *Physalis alkekengi*	Chinese lantern plant						X										
Physocarpus opulifolius	ninebark			R[1], C[3]								X					
* *Picea abies*	Norway spruce						X	X									
Picea glauca	white spruce						X	X		X	X						

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WORKING VASCULAR PLANT CHECKLIST

Scientific Name	Common Name	COSEWIC	MNR	Local Status	Legal Status	ELC Community											
						CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
* *Picea pungens*	Colorado spruce						X										
Pilea pumila	clearweed											X					
* *Pinus nigra*	Austrian pine						X	X									
Pinus resinosa	red pine			R[1], C[3]			X	X									
Pinus strobes	White pine										X						
* *Pinus sylvestris*	Scots pine						X	X									
* *Plantago major*	common plantain					X	X										
Poa compressa	Canada bluegrass					X	X	X	X								
* *Poa nemoralis*	bluegrass					X	X	X	X								
Poa pratensis ssp. *Pratensis*	Kentucky bluegrass					X	X		X								
Podophyllum peltatum	May apple										X						
Polygonatum pubescens	Downy solomon's seal											X					
Polygonum lapathifolium	nodding smartweed											X					
* *Polygonum persicaria*	lady's thumb											X					
Populus balsamifera	Balsam poplar											X		X			
Populus deltoids	Eastern cottonwood						X			X							
Populus tremuloides	trembling aspen						X			X							
Populus X Canadensis	Carolina poplar						X										
Potentilla norvegica	rough cinquefoil					X	X										
Potentilla palustris	marsh cinquefoil			U[1, 2], C[3]										X			
* *Potentilla recta*	rough-fruited cinquefoil					X	X										
* *Prunus avium*	sweet cherry								X								
Prunus serotina	black cherry										X						
Prunus virginiana ssp. *Virginiana*	choke cherry						X		X	X	X	X					
* *Puccinellia distans*	alkali grass					X	X										
Quercus macrocarpa	bur oak										X	X					

TABLE 4.
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							CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
	Quercus rubra	red oak										X						
	Ranunculus abortivus	small-flowered buttercup											X					
*	*Ranunculus acris*	common buttercup						X			X	X						
	Ranunculus hispidus var. caricetorum	Swamp buttercup													X	X		
	Ranunculus recurvatus	Hooked crowfoot					X	X										
	Ranunculus sceleratus	cursed crowfoot					X	X										
*	*Rhamnus cathartica*	common buckthorn					X	X		X	X	X	X		X	X		
*	*Rhamnus frangula*	glossy buckthorn											X			X		
	Rhus radicans ssp. *Rydbergii*	Poison-ivy					X	X		X	X	X	X					
	Rhus typhina	staghorn sumac					X			X								
	Ribes americanum	wild black currant											X		X			
	Ribes cynosbati	Prickly gooseberry										X						
*	*Ribes rubrum*	red currant						X			X							
*	*Robinia pseudo-acacia*	black locust						X										
	Rosa blanda	wild rose			U[2]							X						
*	*Rosa multiflora*	multiflora rose					X			X								
*	*Rosa rugosa*	Japanese rose					X			X								
	Rubus allegheniensis	common blackberry										X	X					
	Rubus idaeus ssp. *Melanolasius*	wild red raspberry						X		X	X	X	X		X			
	Rubus occidentalis	black raspberry										X	X					
	Rubus odoratus	flowering raspberry										X	X					
*	*Rumex crispus*	curled dock					X	X					X					
	Sagittaria latifolia	common arrowhead															X	X
*	*Salix alba*	hybrid white willow						X			X		X					
	Salix bebbiana	Bebb's willow											X		X	X		
	Salix discolour	pussy willow											X		X	X		

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WORKING VASCULAR PLANT CHECKLIST

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						CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
Salix eriocephala	Missouri willow														X		
Salix exigua	sandbar willow			U[2]								X			X		
Salix lucida	Shining willow			U[1]											X		
Salix petiolaris	Slender willow														X		
* *Salix X rubens*	crack willow						X					X					
Sambucus Canadensis	elderberry										X	X					
Sambucus racemosa ssp. *Pubens*	red-berried elder										X	X					
Sanguinaria Canadensis	bloodroot										X						
* *Saponaria officinalis*	bouncing bet					X	X										
Scirpus atrovirens	dark-green bulrush												X	X	X		
Scirpus cyperinus	wool-grass												X	X	X		
Scirpus microcarpus	red-sheathed bulrush			U[1, 2]								X					
Scirpus pungens	three-square			R[1, 2]								X					
Scirpus validus	softstem bulrush												X	X	X		
Sisyrinchium montanum	common blue-eyed grass														X		
Sium suave	water-parsnip													X			
Smilax herbacea	Carrion-flower										X						
* *Solanum dulcamara*	bittersweet nightshade					X	X	X	X	X	X	X					
Solidago altissima	tall goldenrod					X	X	X		X	X	X					
Solidago canadensis	Canada goldenrod					X	X	X		X	X	X					
Solidago flexicaulis	broad-leaved goldenrod										X						
Solidago gigantean	late goldenrod										X						
Solidago juncea	early goldenrod			U[1], R[2]							X						
Solidago nemoralis	old-field goldenrod					X	X	X		X							
Sporobolus neglectus	small rush grass											X					
* *Symphytum officinale* ssp. *Officinale*	common comfrey											X					

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						CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
* *Syringa vulgaris*	common lilac					X	X		X								
* *Taraxacum officinale*	common dandelion					X	X		X	X	X	X					
Thalictrum dioicum	early meadow-rue										X						
Thalictrum pubescens	hairy meadow-rue											X					
Thelypteris palustris	marsh fern												X	X	X		
Thuja occidentalis	Eastern white cedar							X		X	X	X					
Tilia Americana	basswood									X	X	X					
* *Tilia cordata*	little-leaf linden						X										
* *Trifolium pratense*	red clover					X	X	X									
* *Trifolium repens*	white clover					X	X	X									
Trillium erectum	red trillium										X						
Trillium grandiflorum	white trillium										X						
Tsuga Canadensis	Eastern hemlock										X						
* *Tussilago farfara*	coltsfoot					X	X		X	X	X	X					
Typha angustifolia	Narrow-leaved cattail												X	X	X	X	
Typha latifolia	common cattail												X	X	X	X	
Ulmus Americana	white elm											X	X	X	X		
* *Ulmus pumila*	Siberian elm						X										
* *Urtica dioica* ssp. *Dioica*	European stinging nettle									X		X		X			
Urtica dioica ssp. *Gracilis*	American stinging nettle									X		X		X			
* *Verbascum thapsus*	common mullein					X	X										
Verbena hastate	blue vervain											X	X	X	X		
Verbena urticifolia	white vervain										X	X					
* *Veronica longifolia*	long-leaved speedwell											X					
* *Veronica officinalis*	common speedwell											X					
Viburnum lentago	nannyberry											X					
* *Viburnum opulus*	European highbush cranberry					X	X		X								

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Scientific Name	Common Name	COSEWIC	MNR	Local Status	Legal Status	ELC Community											
						CUM1-1	CUW1	CUP3	CUT1	FOD4	FOD5	FOD7-3	MAS2-1	SWD3	SWT2-2	SA	OAO
Viburnum trilobum	highbush cranberry											X		X			
* *Vicia cracca*	bird vetch					X	X										
* *Vinca minor*	periwinkle						X			X		X					
Viola conspersa	dog violet											X					
Viola cucullata	marsh violet													X	X		
Viola pubescens	Yellow violet										X						
Viola sororia	common blue violet										X						
Vitis riparia	riverbank grape						X		X	X	X	X		X			
Xanthium strumarium	common cocklebur												X	X	X	X	

*Introduced species

COSEWIC – Committee on the Status of Endangered Wildlife in Canada:
- END – Endangered
- THR – Threatened
- SC – Special Concern

Local:
- U – Uncommon
- R – Rare
- C – Species of Concern
- 1 – Greater Toronto Area
- 2 – Region of York
- 3 – Toronto and Region Conservation Authority

OMNR – Ontario Ministry of Natural Resources:
- END – Endangered
- THR – Threatened
- VUL – Vulnerable

Legal Status:
- SARA – Species at Risk Act
- ESA – Endangered Species Act

2.5.1 Wildlife Habitat

The study area consists primarily of commercial, industrial and urban residential areas, with minor amounts of rural/agricultural areas at the east end of the project limits. The majority of the primary study area is open habitat of anthropogenic origin with little to no natural heritage features. Wildlife habitat is typical of an urban setting with species that are very tolerant of human disturbance. The most significant habitat constitutes the natural areas surrounding the main branches and tributaries of the Humber, Don and Rouge Rivers. The lowland areas surrounding the watercourses, with their mature trees and open meadows, provide nesting and dwelling habitat for wildlife species and, along the forest community, provide significant flyways and travel corridors for birds and mammals. A summary of wildlife habitat located within the primary study area is provided in Table 5.

2.5.2 Fauna

To date 126 species of birds, 23 species of mammals, and 10 species of herpetofauna have been documented in the primary study area. Table 6 presents wildlife documented in the primary study area during field investigations and recorded in the secondary study area through secondary sources of information.

2.5.3 Species at Risk

No terrestrial wildlife species of management concern beyond the local (upper tier municipal jurisdiction) level were recorded during field investigations in the primary study area.

Three species of significance were documented within the study area: Rough-legged Hawk (*Buteo lagopus*), Northern Shrike (*Lanius excubitor*), and milk snake (*Lampropeltis triangulum*). Rough-legged Hawk is designated by MNR as a non-breeding migrant/vagrant with a SRank of S1B (extremely rare breeding occurrence). Northern Shrike is designated by MNR as a non-breeding migrant/vagrant with a SRank of S2S3B (very rare to uncommon breeding occurrence). Eastern milk snake is designated by COSEWIC as 'special concern' and by MNR as 'rare to uncommon' (S3).

Sixty-four birds have been identified by Bird Studies Canada (BSC) as species of conservation priority (Couturier 1999). Thirty-six birds and one amphibian have been identified by TRCA as species of concern within TRCA's jurisdiction (TRCA 2001).

Twelve birds, one mammal (northern short-tailed shrew), one amphibian (northern red-backed salamander), and two reptiles (midland painted turtle and milk snake) are regulated under the *Fish and Wildlife Conservation Act* and 103 birds are regulated under the *Migratory Birds Convention Act*. No terrestrial wildlife listed under the *Species at Risk Act* or the *Endangered Species Act* were recorded in the primary or secondary study areas.

2.6 Designated Natural Areas

Designated natural areas include areas identified for protection by the OMNR, TRCA and upper tier and lower tier municipalities. The location of designated areas in the secondary study area is presented in Figure 2.

2.6.1 Oak Ridges Moraine

The primary study area is beyond the limits of the Oak Ridges Moraine. The north central portion of the secondary study area, from Major Mackenzie Drive to Rutherford Road between Keele Street and Bathurst Street, is located on the Oak Ridges Moraine and is designated a Settlement Area according to the Oak Ridges Moraine Conservation Plan (ORMCP).

TABLE 5.
WILDLIFE HABITAT ASSESSMENT SUMMARY

Reference Number	Area Name	GPS Location	Type of Habitat	Significant Wildlife Habitat				Comments
				Seasonal Concentration of Animals	Rare Vegetation Communities or Specialised Habitats to Wildlife	Designated Species of Conservation Concern	Animal Movement Corridors	
H1	Albion Creek, Tributary of the Lower Humber River	0609659 4847180	cultivated fields and grasses	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• uniform habitat; very little biodiversity
H2	Tributary of the Main Humber River	0609946 4847223	cultivated fields and grasses	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• habitat follows Hwy 427 ramp • uniform habitat; very little biodiversity
H3	Tributary of the Main Humber River	0610196 4847315	cultivated fields and grasses	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• seasonal pond on south side of Hwy 7 • uniform habitat; very little biodiversity
H4	Tributary of the Main Humber River	0610864 4847601	grasses and fields	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• entire northwest side of Hwy 7 and Hwy 27 being developed
H5	Tributary of Rainbow Creek	0612498 4848095	north side: urbanised/sports fields south side: Riparian	• landbird migratory stopover area	• forested area with two vegetation layers and a continuous canopy starting 40 m downstream • stream flows through forested area • large marsh on west side of stream • foraging area for birds and mammals	• no species of conservation concern were recorded	• local animal movement corridor	• kingfisher seen feeding at stream • mink seen foraging at stream • natural areas downstream more important than anthropogenic areas upstream
H6	Rainbow Creek, Tributary of the Main Humber River	0612371 4848039	north side: manicured grasses south side: FOD7-3	• none evident	• large marshland on downstream side • stream runs through marsh • foraging area for wildlife	• no species of conservation concern were recorded	• none evident	• west end of marsh connected to Ref. no. H5 • good mink habitat
H7	Main channel of the Humber River (RG Henderson Floodway)	0613356 4848446	north side: CUT1 south side: FOD7-3	• landbird migratory stopover area	• three layered forest along river • stream runs through forested area • continuous forest canopy • foraging area for birds and mammals	• no species of conservation concern were recorded	• local animal movement corridor • migratory corridor for birds	• very urbanised on east and west sides of river (housing, businesses and Woodbridge Pool & Arena)
H8	Tributary of the Main Humber River	0614457 4848768	north side: FOD7-3 south side: CUW1/FOD7-3 CUM1-1/MAS2-1	• landbird migratory stopover area	• forested area with two vegetation layers and a continuous canopy • river runs through forested area • foraging area for birds and mammals	• no species of conservation concern were recorded	• local animal movement corridor • migratory corridor for birds	• manicured grasses and trees on north side • forest and marsh on south side
H9	Emery Creek, Tributary of the Lower Humber River	-	urban	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• residential area
H10	Tributary of Black Creek	0617198 4849654	riparian vegetation and urban businesses	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• habitat mainly grasses on steep hillsides • Barn Swallow nests inside culvert
H11	Tributary of Black Creek	-	riparian	• none evident	• none present	• no species of conservation concern were recorded	• none evident	
H12	Main channel of Black Creek, Tributary of the Humber River	0618728 4850108	north side: CUW1, CUM1-1 south side: riparian (cattails and grasses)	• breeding area for waterfowl in storm water management pond • possible staging area for waterfowl in storm water management pond	• none present	• no species of conservation concern were recorded	• none evident	• north end of upstream connected to storm water management pond (35 m west) • small field and wood lot on northeast side of stream

TABLE 5.
WILDLIFE HABITAT ASSESSMENT SUMMARY

Reference Number	Area Name	GPS Location	Type of Habitat	Significant Wildlife Habitat				Comments
				Seasonal Concentration of Animals	Rare Vegetation Communities or Specialised Habitats to Wildlife	Designated Species of Conservation Concern	Animal Movement Corridors	
H13	Main channel of Black Creek, Tributary of the Humber River	0618958 4848881	west side: riparian east side: manicured grasses and man-made pond	• none evident	• foraging area for birds and mammals	• no species of conservation concern were recorded	• local animal movement corridor	• open field, grassy shoreline and some tree cover on west side of Jane Street • Beechwood Cemetery: manicured grasses, trees and pond on east side • Barn Swallows nesting under bridge
H14	Tributary of Black Creek	0619013 4848639	riparian	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• cattails, grasses and few trees • storm water management pond just south of stream on east side of Hwy 7
H15	Main channel of Black Creek, Tributary of the Humber River	0618937 4848004	riparian	• landbird migratory stop over area	• forested area with two vegetation layers • stream runs through forested area • foraging area for birds and mammals	• no species of conservation concern were recorded	• local animal movement corridor	• fields and forest cover upstream • fields and bushes downstream • pedestrian walkway parallel to stream
D1	Tributary of the West Don River	0620844 4850818	north side: CUM1-1 south side: riparian and urban	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• residential area
D3	Main channel of the West Don River	0621972 4851300	north side: FOD7-3 south side: riparian	• landbird migratory stopover area • raptor winter roosting area	• forested area with three vegetation layers and a continuous canopy • river runs through forested area • foraging area for birds and mammals	• no species of conservation concern were recorded	• local animal movement corridor • migratory corridor for birds (layered vegetation, lots of ground cover and water source)	• lots of diverse habitat surrounding stream • mature forests and open field on north side • young trees, bushes, grasses on south side • asphalt pedestrian walkway runs along stream on east side • Long-eared Owls roosting over winter • heavily concentrated migratory area
D6	Tributary of the East Don River	0624721 4854200	riparian	• possible shorebird stop over area	• none present	• no species of conservation concern were recorded	• local animal movement corridor	• north side: grasses and Richmond Hill Golf Course • south side: grasses, cattails and storm water management pond
D7	Main channel of the East Don River	0625223 4854326	riparian	• none evident	• none present	• no species of conservation concern were recorded	• local animal movement corridor	• north side: grasses plus second bridge over dirt road and golf course on west side of stream • some larger trees surround stream about 50 m upstream • Rough-winged Swallows nesting on southeast side of bridge under Hwy 7
D8	Tributary of the East Don River	0626246 4854907	riparian	• none evident	• none present	• no species of conservation concern were recorded	• local animal movement corridor	• grasses and cattails surround stream • small marsh about 20 m south of stream on west side of Yonge Street
D11	Tributary of the East Don River	0626732 4855103	urban	• none evident	• none present	• no species of conservation concern were recorded	• local animal movement corridor	• corridor under Hwy 7 & 407 by railway
D12	German Mills Creek, Tributary of the East Don River	0628419 4855369	north side: FOD7-3 south side: CUW1	• none evident	• none present	• no species of conservation concern were recorded	• local animal movement corridor	• partially wooded • east/west Hwy 407 (407) corridor located to the south
D13	Tributary of German Mills Creek	0628767 4855406	north side: urban south side: cultivated field	• none evident	• none present	• no species of conservation concern were recorded	• none evident	

TABLE 5.
WILDLIFE HABITAT ASSESSMENT SUMMARY

Reference Number	Area Name	GPS Location	Type of Habitat	Significant Wildlife Habitat				Comments
				Seasonal Concentration of Animals	Rare Vegetation Communities or Specialised Habitats to Wildlife	Designated Species of Conservation Concern	Animal Movement Corridors	
D14	Tributary of German Mills Creek	0629536 4855662	north side: FOD7-3 south side: urban, riparian (herbaceous)	• none evident	• none present	• no species of conservation concern were recorded	• local animal movement corridor	• wooded in part to north and south • landscaped swamp to south, beyond right-of-way
D15	Tributary of German Mills Creek	0630557 4856061	north side: MAS2-1 south side: urban, riparian (cattails)	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• small culvert • wetland habitat upstream
D19	Westminster Creek, Tributary of the West Don River	0622971 4851517	north side: mostly urban with narrow riparian zone south side: urban	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• cattails and phragmites surround narrow stream on north side of Centre Street • residence and business mall right beside stream on east and west sides
D20	Tributary of the East Don River	0624243 4851930	north side: riparian south side: urban	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• grasses and cattails surround dried out upstream (north side of Centre Street)
D22	Tributary of the East Don River	0624406 4853612	riparian	• landbird migratory stop over area	• forested area with two vegetation layers • stream runs through forested area • foraging area for birds and mammals	• no species of conservation concern were recorded	• none evident	• upstream grasses and mature forests • downstream grasses, cattails, open field and mature forest
R1	Tributary of Beaver Creek	0631542 4856395	north side: FOD7-3 south side: urban	• none evident	• none present	• no species of conservation concern were recorded	• none evident	
R2	Beaver Creek, Tributary of the Lower Rouge River	0631809 4856478	urban, riparian (manicured lawn, ornamentals, herbaceous and woody plantings)	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• mix of woody and herbaceous habitat north and south of Hwy 7
R3	Main channel of the Upper Rouge River	0632672 4856756	north side: CUM1-1, FOD7-3 south side: FOD 7-3	• none evident	• none present	• no species of conservation concern were recorded	• local animal movement corridor	
R6	Main channel of the Lower Rouge River	0636994 4858239	north side: FOD7-3, OA south side: CUM1-1, FOD7-3	• none evident	• constructed wetland beyond right-of-way to north • wooded riparian habitat to the north and south of Hwy 7	• no species of conservation concern were recorded	• local animal movement corridor	• landscaped to Milne Woods (ESA #139) to southeast
R7	Tributary of the Lower Rouge River	0638821 4859268	urban	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• urban surface drainage conveyance
R8	Robinson Creek, Tributary of the Lower Rouge River	0639671 4859268	north side: FOD7-3 south side: urban, riparian (wooded)	• none evident	• wooded riparian habitat north and south of Hwy 7, beyond right-of-way	• no species of conservation concern were recorded	• local animal movement corridor	
R9	Exhibition Creek, Tributary of the Lower Rouge River	0640885 4853513	FOD7-3	• none evident	• wooded riparian habitat north and south of Hwy 7, beyond right-of-way	• no species of conservation concern were recorded	• local animal movement corridor	• heavily modified with riprap

TABLE 5.
WILDLIFE HABITAT ASSESSMENT SUMMARY

Reference Number	Area Name	GPS Location	Type of Habitat	Significant Wildlife Habitat				Comments
				Seasonal Concentration of Animals	Rare Vegetation Communities or Specialised Habitats to Wildlife	Designated Species of Conservation Concern	Animal Movement Corridors	
R10	Tributary of the Little Rouge River	0642214 4859969	near urban/rural/ farm, riparian (herbaceous)	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• Short-tailed Weasel (*Mustella ermina*) family upstream in gabion basket and Meadow Vole (*Microtus pennsylvanicus*) found swimming in water
R11	Tributary of the Little Rouge River	0642534 4860075	north side: CUW1 south side: rural/farm, riparian	• none evident	• specialised habitat at Coyote storm water management pond upstream of site	• no species of conservation concern were recorded	• none evident	• Coyote storm water management pond located on north side of Hwy 7, east of this crossing outfalls (at Ref. no. R25) to this drainage feature • occasional shrubs, trees
R12	Tributary of the Little Rouge River	0643471 4860374	rural/farm, riparian (herbaceous with occasional shrubs & trees)	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• constructed agricultural drainage ditch
R13	Tributary of the Little Rouge River	0643915 4860596	rural, riparian (herbaceous)	• none evident	• none present	• no species of conservation concern were recorded	• none evident	
R19	Main channel of the Upper Rouge River	0633910 4856376	urban, riparian (wooded)	• none evident	• none present	• no species of conservation concern were recorded	• local animal movement corridor	• wooded habitat in southeast and northwest quadrants of crossing • commercial/industrial park adjacent to area
R20	Tributary of the Lower Rouge River	0634839 4856682	urban/rural/ developing, riparian (herbaceous)	• none evident	• none present	• no species of conservation concern were recorded	• none evident	
R21	Tributary of the Lower Rouge River	0635902 4856995	urban/rural/ developing, ditch (herbaceous)	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• commercial industrial setting
P1	Tributary of Petticoat Creek	0644782 4860940	rural, riparian (herbaceous dominant)	• none evident	• none present	• no species of conservation concern were recorded	• none evident	• agricultural drain
P2	Main channel of Petticoat Creek	0644927 4860999	agricultural (grasses)	• none evident	• none present	• no species of conservation concern were recorded	• none evident	
BW	Baker's Woods	0623796 4854042	FOD5	• landbird migratory stopover area	• forested area with high enclosed canopy which reduces drying, creating habitat for Northern Red-backed Salamanders (*Plethodon cinereus)* • foraging area for birds and mammals	• no species of conservation concern were recorded	• significant animal movement corridor • migratory corridor for birds	• forest has little understory vegetation due to its maturity • limited species diversity, provides refuge for species present

TABLE 6.
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA

Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status
Birds	*Podilymbus podiceps*	Pied-billed Grebe			BSC, TRCA	MBCA
	Ardea herodias	Great Blue Heron			TRCA	MBCA
	Butorides virescens	Green Heron			BSC, TRCA	MBCA
	Branta canadensis	Canada Goose				MBCA
	Anas platyrhynchos	Mallard				MBCA
	Cathartes aura	Turkey Vulture			BSC	FWCA
	Circus cyaneus	Northern Harrier				
	Accipiter striatus	Sharp-shinned Hawk			BSC, TRCA	FWCA
	Accipiter cooperii	Cooper's Hawk			BSC, TRCA	FWCA
	Buteo platypterus	Broad-winged Hawk			BSC, TRCA	FWCA
	Buteo jamaicensis	Red-tailed Hawk				FWCA
	Buteo lagopus	Rough-legged Hawk				FWCA
	Falco sparverius	American Kestrel			BSC	MBCA, FWCA
	Bonasa umbellus	Ruffed Grouse			BSC, TRCA	
	Charadrius vociferus	Killdeer				MBCA
	Tringa melanoleuca	Greater Yellowlegs				MBCA
	Tringa flavipes	Lesser Yellowlegs				MBCA
	Tringa solitaria	Solitary Sandpiper				MBCA
	Actitis macularia	Spotted Sandpiper			BSC	MBCA
	Gallinago gallinago	Wilson's Snipe			BSC, TRCA	MBCA
	Scolopax minor	American Woodcock			BSC, TRCA	MBCA
	Larus delawarensis	Ring-billed Gull				MBCA
	Larus argentatus	Herring Gull				MBCA
	Columba livia	Rock Dove				
	Zenaida macroura	Mourning Dove				MBCA
	Otus asio	Eastern Screech-owl				FWCA
	Bubo virginianus	Great Horned Owl				FWCA
	Chordeiles minor	Common Nighthawk			BSC	
	Chaetura pelagica	Chimney Swift				MBCA
	Archilochus colubris	Ruby-throated Hummingbird			BSC	MBCA
	Ceryle alcyon	Belted Kingfisher				MBCA, FWCA
	Sphyrapicus varius	Yellow-bellied Sapsucker			BSC, TRCA	MBCA
	Picoides pubescens	Downy Woodpecker				MBCA
	Picoides villosus	Hairy Woodpecker				MBCA

TABLE 6.
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA

Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status
	Colaptes auratus	Northern Flicker				MBCA
	Dryocopus pileatus	Pileated Woodpecker			BSC	MBCA
	Contopus virens	Eastern Wood-pewee				MBCA
	Empidonax flaviventris	Yellow-bellied Flycatcher				MBCA
	Empidonax alnorum	Alder Flycatcher			BSC	MBCA
	Empidonax traillii	Willow Flycatcher				MBCA
	Empidonax minimus	Least Flycatcher				MBCA
	Sayornis phoebe	Eastern Phoebe			BSC	MBCA
	Myiarchus crinitus	Great Crested Flycatcher				MBCA
	Tyrannus tyrannus	Eastern Kingbird			BSC	MBCA
	Eremophila alpestris	Horned Lark			BSC	MBCA
	Progne subis	Purple Martin			BSC	MBCA
	Tachycineta bicolor	Tree Swallow				MBCA
	Stelgidopteryx serripennis	Northern Rough-winged Swallow			BSC	MBCA
	Riparia riparia	Bank Swallow			BSC	MBCA
	Petrochelidon pyrrhonota	Cliff Swallow			BSC	MBCA
	Hirundo rustica	Barn Swallow			BSC	MBCA
	Cyanocitta cristata	Blue Jay				FWCA
	Corvus brachyrhynchos	American Crow				FWCA
	Poecile atricapillus	Black-capped Chickadee			BSC	MBCA
	Sitta carolinensis	White-breasted Nuthatch				MBCA
	Sitta canadensis	Red-breasted Nuthatch			BSC	MBCA
	Certhia americana	Brown Creeper			BSC, TRCA	MBCA
	Troglodytes aedon	House Wren				MBCA
	Troglodytes troglodytes	Winter Wren			BSC, TRCA	MBCA
	Regulus satrapa	Golden-crowned Kinglet			BSC, TRCA	MBCA
	Regulus calendula	Ruby-crowned Kinglet			BSC, TRCA	MBCA
	Polioptila caerulea	Blue-gray Gnatcatcher				MBCA
	Sialia sialis	Eastern Bluebird			BSC	MBCA
	Catharus fuscescens	Veery			BSC, TRCA	MBCA
	Catharus ustulatus	Swainson's Thrush			BSC	MBCA
	Catharus guttatus	Hermit Thrush			BSC, TRCA	MBCA
	Hylocichla mustelina	Wood Thrush			BSC, TRCA	MBCA
	Turdus migratorius	American Robin				MBCA

TABLE 6.
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA

Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status
	Dumetella carolinensis	Gray Catbird			BSC	MBCA
	Mimus polyglottos	Northern Mockingbird			BSC	
	Toxostoma rufum	Brown Thrasher			BSC, TRCA	MBCA
	Bombycilla cedrorum	Cedar Waxwing				MBCA
	Lanius excubitor	Northern Shrike				MBCA
	Sturnus vulgaris	European Starling				
	Vireo solitarius	Blue-headed Vireo			TRCA	MBCA
	Vireo gilvus	Warbling Vireo				MBCA
	Vireo philadelphicus	Philadelphia Vireo				MBCA
	Vireo olivaceus	Red-eyed Vireo				MBCA
	Vermivora pinus	Blue-winged Warbler			BSC	MBCA
	Vermivora chrysoptera	Golden-winged Warbler			BSC, TRCA	MBCA
	Vermivora peregrina	Tennessee Warbler				MBCA
	Vermivora ruficapilla	Nashville Warbler			BSC, TRCA	MBCA
	Dendroica petechia	Yellow Warbler				MBCA
	Dendroica pensylvanica	Chestnut-sided Warbler			BSC, TRCA	MBCA
	Dendroica magnolia	Magnolia Warbler			BSC, TRCA	MBCA
	Dendroica tigrina	Cape May Warbler				MBCA
	Dendroica caerulescens	Black-throated Blue Warbler			BSC, TRCA	MBCA
	Dendroica coronata	Yellow-rumped Warbler			BSC, TRCA	MBCA
	Dendroica virens	Black-throated Green Warbler			BSC, TRCA	MBCA
	Dendroica fusca	Blackburnian Warbler			BSC, TRCA	MBCA
	Dendroica pinus	Pine Warbler			BSC, TRCA	MBCA
	Dendroica palmarum palmarum	Western Palm Warbler				MBCA
	Dendroica castanea	Bay-breasted Warbler				MBCA
	Dendroica striata	Blackpoll Warbler				MBCA
	Mniotilta varia	Black-and-white Warbler			BSC, TRCA	MBCA
	Setophaga ruticilla	American Redstart			BSC, TRCA	MBCA
	Seiurus aurocapillus	Ovenbird			BSC, TRCA	MBCA
	Seiurus noveboracensis	Northern Waterthrush			BSC, TRCA	MBCA
	Oporornis philadelphia	Mourning Warbler			BSC	MBCA
	Geothlypis trichas	Common Yellowthroat				MBCA
	Wilsonia pusilla	Wilson's Warbler				MBCA
	Wilsonia canadensis	Canada Warbler			BSC, TRCA	MBCA

TABLE 6.
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA

Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status
	Cardinalis cardinalis	Northern Cardinal				MBCA
	Pheucticus ludovicianus	Rose-breasted Grosbeak				MBCA
	Passerina cyanea	Indigo Bunting				MBCA
	Pipilo erythrophthalmus	Eastern Towhee			BSC	MBCA
	Spizella arborea	American Tree Sparrow				MBCA
	Spizella passerina	Chipping Sparrow				MBCA
	Spizella pusilla	Field Sparrow			BSC	MBCA
	Passerculus sandwichensis	Savannah Sparrow			BSC	MBCA
	Ammodramus savannarum	Grasshopper Sparrow			BSC	MBCA
	Melospiza melodia	Song Sparrow				
	Melospiza georgiana	Swamp Sparrow			BSC	MBCA
	Zonotrichia albicollis	White-throated Sparrow			BSC, TRCA	MBCA
	Zonotrichia leucophrys	White-crowned Sparrow				MBCA
	Junco hyemalis	Dark-eyed Junco			BSC	MBCA
	Dolichonyx oryzivorus	Bobolink			BSC, TRCA	MBCA
	Agelaius phoeniceus	Red-winged Blackbird				
	Sturnella magna	Eastern Meadowlark			BSC, TRCA	
	Quiscalus quiscula	Common Grackle				
	Molothrus ater	Brown-headed Cowbird				
	Icterus galbula	Baltimore Oriole				MBCA
	Carpodacus mexicanus	House Finch				MBCA
	Carduelis tristis	American Goldfinch			BSC	MBCA
	Passer domesticus	House Sparrow				
Mammals	*Didelphis virginiana*	Virginia Opossum				
	Blarina brevicauda	Northern Short-tailed Shrew				FWCA
	Sylvilagus floridanus	Eastern Cottontail				
	Tamias striatus	Eastern Chipmunk				
	Marmota monax	Woodchuck				
	Sciurus carolinensis	Grey Squirrel				
	Tamiasciurus hudsonicus	Red Squirrel				
	Castor canadensis	Beaver				
	Peromyscus leucopus	White-footed Mouse				
	Peromyscus maniculatus	Deer Mouse				
	Microtus pennsylvanicus	Meadow Vole				

TABLE 6.
WILDLIFE SPECIES DOCUMENTED IN THE STUDY AREA

Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status
	Ondatra zibethicus	Muskrat				
	Rattus norvegicus	Norway Rat				
	Mus musculus	House Mouse				
	Canis latrans	Coyote				
	Canis familiaris	Domestic Dog				
	Vulpes vulpes	Red Fox				
	Procyon lotor	Raccoon				
	Felis catus	Domestic Cat				
	Mustela erminea	Ermine				
	Mustela vison	Mink				
	Mephitis mephitis	Striped Skunk				
	Odocoileus virginianus	White-tailed Deer				
Herpetofauna	*Plethodon cinereus*	Northern Red-backed Salamander			TRCA	FWCA
	Bufo americanus	American Toad				
	Pseudacris crucifer	Spring Peeper				
	Pseudacris maculata	Boreal Chorus Frog				
	Rana pipiens	Northern Leopard Frog				
	Rana clamitans	Green Frog				
	Chelydra serpentina	Snapping Turtle				
	Chrysemys picta marginata	Midland Painted Turtle				FWCA
	Thamnophis sirtalis sirtalis	Eastern Garter Snake				
	Lampropeltis triangulum	Milk Snake				FWCA

COSEWIC – Committee on the Status of Endangered Wildlife in Canada:
- END – Endangered
- THR – Threatened
- SC – Special Concern

Local:
- BSC – Bird Studies Canada Species of Conservation Priority
- TRCA – Toronto and Region Conservation Authority Species of Concern

OMNR – Ontario Ministry of Natural Resources:
- END – Endangered
- THR – Threatened
- VUL – Vulnerable

Legal Status:
- MBCA - Migratory Birds Convention Act
- SARA – Species at Risk Act
- ESA – Endangered Species Act
- FWCA – Fish and Wildlife Conservation Act (P) Protected Species (G) Game Species

2.6.2 Environmental Significant/Sensitive Areas

One Environmentally Significant/Sensitive Area (ESA) exists within the primary study area. Baker's Woods (ESA #128), an approximately 35 ha tract of Dry-Fresh Sugar Maple Deciduous Forest (FOD5), is located in the northwest corner of the intersection of Highway 7 and Bathurst Street in the City of Vaughan. Two ESAs are located within the secondary study area. Milne Woods (ESA #139) is located on the main branch of the Rouge River between McCowan and Markham Roads, downstream of the study area. Unionville Marsh (ESA #89) is located on the main branch of the Rouge River just west of Kennedy Road, upstream of the primary study area.

2.6.3 Provincially Significant Wetlands

There are no Provincially Significant Wetlands (PSWs) within the primary study area. One PSW is located within the secondary study area. Unionville Marsh is located on the main branch of the Rouge River just west of Kennedy Road, upstream of the primary study area.

2.6.4 Areas of Natural and Scientific Interest

One Area of Natural and Scientific Interest (ANSI) exists within the primary study area. Baker's Woods, a provincially significant ANSI, is located in the northwest corner of the intersection of Highway 7 and Bathurst Street in the City of Vaughan.

2.6.5 Woodlots

Very few woodlots exist within the primary or secondary study areas. The most significant woodlot within the study area is Baker's Woods. There are a number of small woodlots within the secondary study area between 9th Line and Reesor Road and a small woodlot at the eastern end of the primary study area, just west of York-Durham Townline.

2.6.6 Natural Corridors

Wooded areas along watercourses in the secondary study area act as corridors for wildlife tolerant of an urban environment. These areas allow for wildlife movement along the watercourses to and from more protected areas surrounding the secondary study area such as PSWs, ESAs and ANSIs. The secondary study area is highly urbanized and very few natural areas in locations other than along watercourses are linked together.

2.6.7 Rouge Park North Management Plan

The Rouge Park North Management Plan includes valleylands surrounding the Rouge River in the secondary study area to the south of Highway 7 between Woodbine Avenue and Warden Avenue and valleylands surrounding the main branch and tributaries of the Rouge River to the northwest, northeast and southeast of the intersection of Highway 7 and Kennedy Road. The Rouge Park North Management Plan includes valleylands surrounding Beaver Creek where it crosses Highway 7 to the west of Woodbine Avenue and valleylands surrounding the Little Rouge River where it crosses Highway 7 west of the Village of Locust Hill. According to the Rouge Park North Management Plan, valleylands surrounding the Rouge River to the south of Highway 7 between Woodbine Avenue and Warden Avenue and valleylands surrounding the Little Rouge River where it crosses Highway 7 west of the Village of Locust Hill are designated 'Special Management Zones.' According to the Rouge Park North Management Plan, land surrounding Walden Pond to the northwest of the intersection of Highway 7 and Kennedy Road is designated a 'Natural Area.'

2.6.8 Natural Heritage System

According to the Region of York Official Plan, lands surrounding the Humber River, Don River, Rouge River and their tributaries are designated a part of the Regional Greenlands System. Lands within the secondary study area are designated Environmenal Policy Areas and Conservation Areas – Regional Forests. These natural heritage features are connected to other regional natural heritage features north of the secondary study area and provide linkages that facilitate wildlife movement.

According to the City of Vaughan Official Plan, lands surrounding Rainbow Creek, Humber River, Black Creek, Don River and the East Don River are designated 'Major Open Space and Valley Lands'.

Within the Town of Richmond Hill 'Hazards Lands' surround a tributary of the East Don River in the northwest corner of Highway 7 and Yonge Street and German Mills Creek in the northeast corner of Highway 7 and Bayview Avenue. Land designated 'Major Open Space' is located midway between Valleymede Drive and West Beaver Creek Road.

According to the Town of Markham Official Plan, lands surrounding the East Don River, German Mills Creek and two tributaries of German Mills Creek, Beaver Creek, Rouge River, two tributaries of the Rouge River, Little Rouge River and one tributary of the Little Rouge River are designated 'Hazard Lands/Valleylands.' Land designated 'Special Policy Area' is associated with 'Hazard Lands/Valleylands' of the Rouge River within/adjacent to the primary study area at Main Street (Unionville), Kennedy Road and McCowan Road.

3.0 PROJECT DESCRIPTION

The proposed Highway 7 Corridor and Vaughan North-South Link Public Transit Improvements is a bus rapid transit (BRT) system convertible to light rail tranist located mostly within the Highway 7 right-of-way. There are a number of locations where transit buses will mix with existing traffic, since the right-of-way through these sections is not wide enough to accommodate a dedicated transitway. These areas of mixed traffic from west to east include:

- return loops on Highway 50 and Huntington Road, south of Highway 7;
- Highway 7 from Kipling Avenue to Islington Avenue;
- Keele Street from Highway 7 to Steeles Avenue;
- Jane Street from immediately north of the CN Halton rail line south to the proposed east-west collector road to be located along the Hydro Corridor from Jane Street to Keele Street;
- Highway 7 from the GO Bradford rail line to the Highway 407/Centre Street flyover;
- Bathurst Street from the Worth Boulevard/Flamingo Road intersection to the terminus of the Bathurst Street Connector Road to Highway 7;
- Highway 7 westbound traffic from the Bathurst Street Connector Road to Red Maple Road;
- Highway 7 from Bayview Avenue to immediately west of the German Mills Creek crossing;
- Highway 7 under the Highway 404 flyover bridges;
- Highway 7 from approximately 65 m east of the Grandview Boulevard/Galsworthy Drive intersection to approximately 200 m east of the Christman Drive/Wideman Street intersection; and,
- Highway 7 from approximately 250 m east of the CP Havelock rail line crossing to the York/Durham Townline.

The intial BRT will consist of a 4.0 m wide median with one 3.5 m wide dedicated bus lane in each direction located on each side of the median. The bus lane will be identified using coloured asphalt and a rumble strip will be placed between the bus lane and regular traffic to discourage use of the bus lane by private automobiles. The locations of transitway stations are presented in Figure 1. A typical cross-section for the BRT and BRT Stations is presented in Figures 4 and 5, respectively.

The Langstaff Gateway Intermodal Station is proposed on the west side of the CN Bala/GO Transit railway line north of Highway 7. The Vehicle Maintenance and Storage Facility is proposed on the west side of the CN Bala/GO Transit railway line south of Langstaff Road. This facility is addressed in the EA prepared for the Yonge Street Corridor Public Transit Improvements.

Another component of this study includes the class environmental assessment for the localized widening of Highway 7 from four to six lanes from Montgomery Court/Fairburn Drive to just west of the Stouffville GO rail line (in the vicinity of Sciberras Road). This proposed widening includes construction of a centre median.

The future plan for the Vaughan North-South Link is to connect the Vaughan Corporate Centre at Highway 7 with the proposed Steeles West Station via an extension to the Spadina Subway. The proposed extension of the Spadina Subway from Downsview Station to the Steeles West Station is currently undergoing an Individual EA. Once a preferred alignment for the Spadina Subway from Downsview Station to the Steeles West Station has been selected, York Region intends to prepare an Addendum to the Highway 7 Corridor and Vaughan North-South Link Public Transit Improvements Individual Environmental Assessment. The environmental effects associated with a subway extension from Steeles Avenue Station to the Vaughan Corporate Centre will be addressed in the EA Addendum. As a result, this EA addresses a proposed BRT in mixed traffic along Jane Street from immediately north of the CN Halton rail line south to the proposed east-west collector road to be located along the Hydro Corridor from Jane Street to Keele Street.

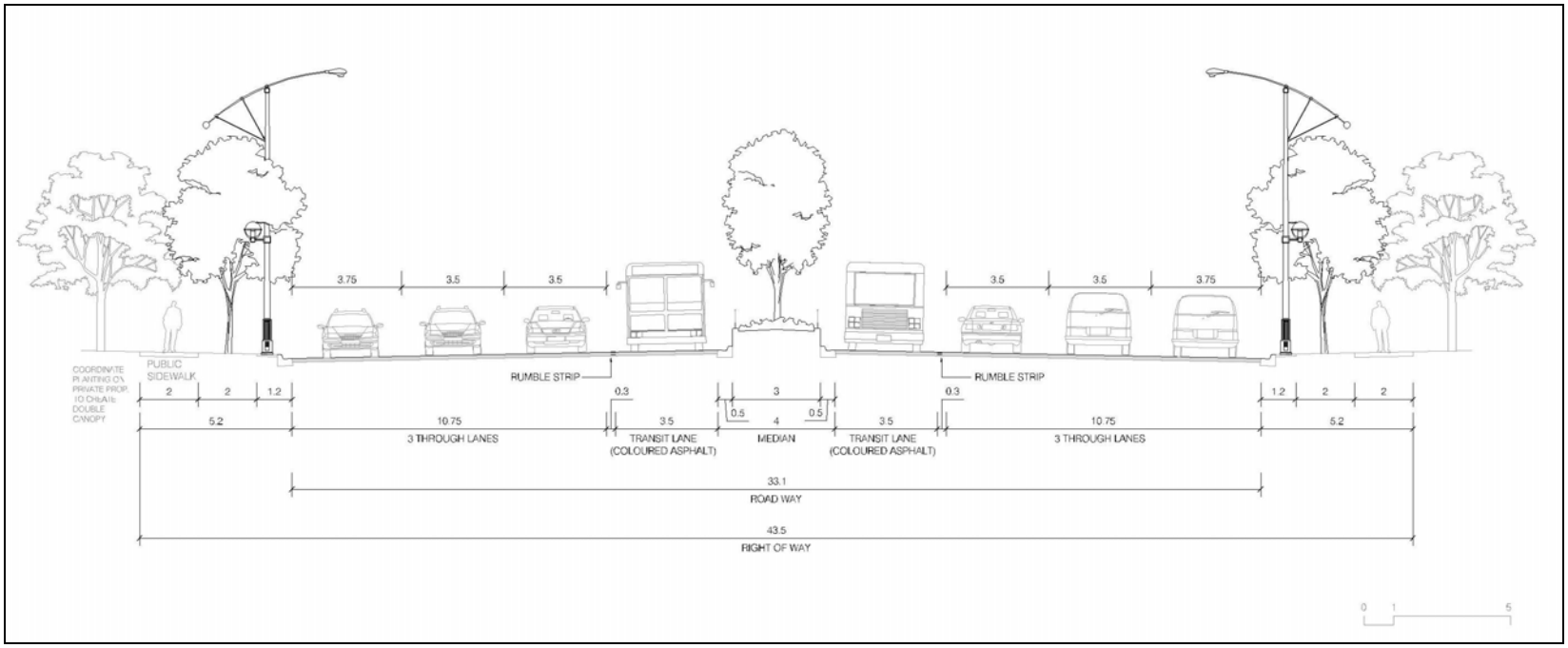

FIGURE 4. TYPICAL CROSS-SECTION OF BRT WITH ISLAND MEDIAN

There are two other components of this study. The first component includes the class environmental assessment for the localized widening of Highway 7 from four to six lanes from Montgomery Court/Fairburn Drive to just west of the Stouffville GO rail line (in the vicinity of Sciberras Road). This proposed widening includes construction of a centre median.

The second component includes the detail design study to widen Warden Avenue in the vicinity of Highway 7. There is a woodlot on the west side of Warden Avenue between Clegg Road and Cedarland Drive that will likely be impacted. Proposed improvements in this area include widening to a maximum of 10.4 m on the west side and a maximum of 10.9 m on the east side, in order to accommodate extra lanes, sidewalks etc. This component also includes widening the structure over the Rouge River approximately 11.8 m to the west.

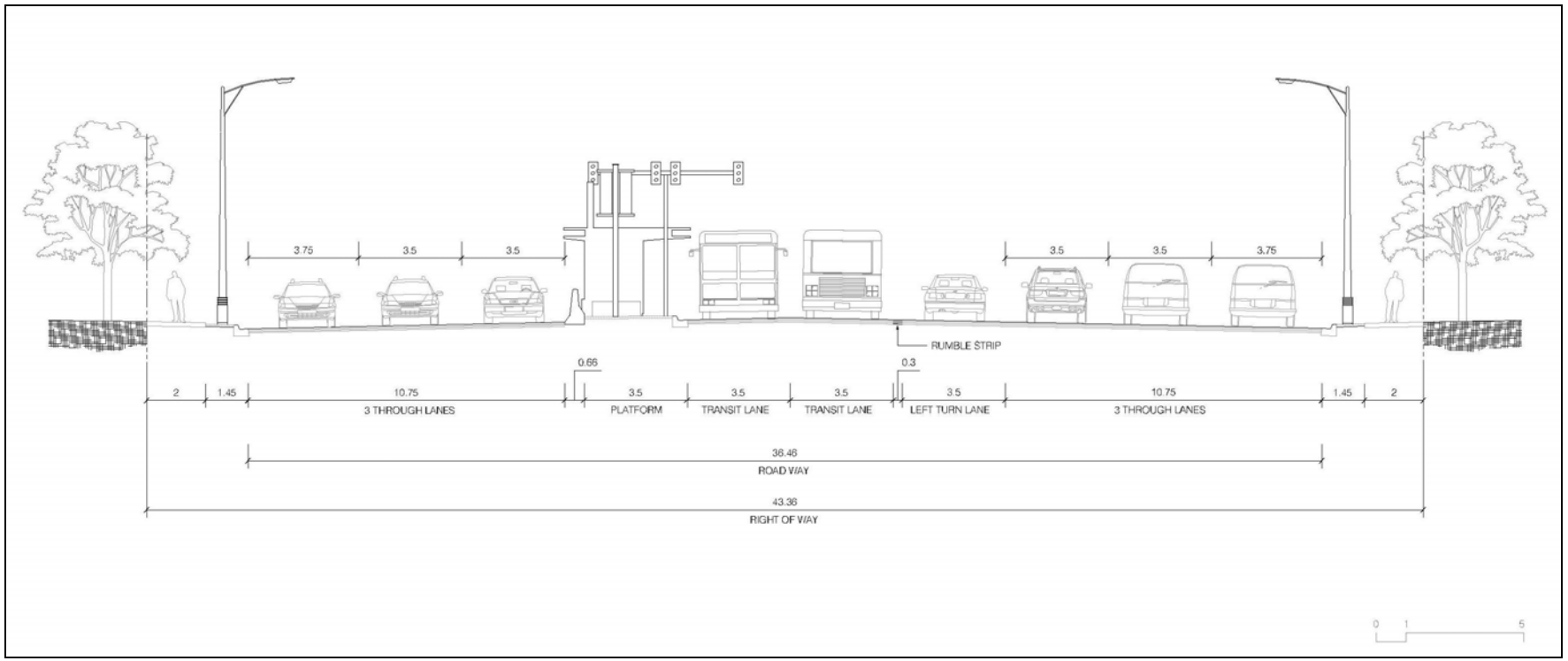

FIGURE 5. TYPCIAL CROSS-SECTION OF BRT STATION

4.0 IMPACT ASSESSMENT AND ENVIRONMENTAL PROTECTION

4.1 Physiography and Soils

Loam and sandy loam soils located within the project limits have susceptibility to erosion. Consequently, soil disturbance associated with drainage improvements, grading revisions, culvert extension, etc. may result in erosion of, and sedimentation to, sensitive receiving watercourses. For this reason, standard erosion and sedimentation control measures will be followed during construction in accordance with Ontario Provincial Standard Specification (OPSS) 577 to minimize construction-related impacts on surface water quality and fish habitat. Site-specific erosion and sedimentation control measures to be implemented prior to construction will be identified during detail design. Erosion and sedimentation control measures will include:

- placing straw bale flow checks at regular intervals in ditches down-gradient from areas of soil disturbance in rural sections;
- protecting inlets to catch basins and maintenance holes in urban sections;
- placing silt fence along stream margins in areas of soil disturbance;
- limiting the extent and duration that soils are exposed to the elements to the minimum area and time necessary to perform the work;
- applying seed and mulch, tackifier and/or erosion control blanket in areas of soil disturbance to provide adequate slope protection and long-term slope stabilization; and,
- monitoring and maintenance of erosion and sedimentation control measures during construction to ensure their effectiveness.

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

4.2 Geology/Hydrogeology

The BRT and localized widening of Highway 7 has the potential to impact groundwater quality and quantity, recharge/discharge areas and water wells.

4.2.1 Quality of Shallow Groundwater

Storm water that has contacted paved surfaces may become affected by substances associated with roads to generate surface runoff with compromised water quality. If affected runoff infiltrates through the ground surface, such as at adjacent grassed areas or unlined ditches, the quality of shallow groundwater can also be affected. Storm water runoff from road surfaces may contain elevated concentrations of oil and grease and/or other hydrocarbons, de-icing road salt (chloride and sodium), heavy metals, and suspended solids.

The proposed construction of additional transit lanes and the localized widening of Highway 7 has the potential to affect shallow groundwater quality by increasing the road surface area and therefore also increasing the volume of impacted storm water runoff. In other words, the development of transit lanes and proposed road widening can increase the volume of source contaminants available that potentially

may impact groundwater quality. The presence/absence of curb and gutter structures and associated storm water sewers also affects the amount of recharge that occurs

The recharge areas would have greater susceptibility to effects upon shallow groundwater quality, as impacted storm water runoff can infiltrate in such areas. Depending on a variety of factors, a component of the impacted runoff can infiltrate through a pervious ground surface, and migrate downward to the water table, thereby increasing the concentration of chloride and other parameters in shallow groundwater. At some locations, impacted groundwater may reach surface watercourses to affect water quality of baseflows. Effects could occur where active water supply wells with shallow construction are present downgradient of the transit alignment.

There are natural mechanisms that will help to polish affected runoff that infiltrates to the shallow groundwater. As storm water runoff contacts and infiltrates the soil surface, and as it moves through underlying sediments in the unsaturated and saturated soil zones, the water quality will be significantly buffered and filtered by natural processes. The natural processes are similar to those that "polish" sewage effluent discharged by on-site subsurface disposal systems. However, some components, such as chloride and sodium, may persist, and concentrations are mainly reduced by dilution by unaffected infiltration and/or groundwater with distance from the transit lanes that are the source.

Impacts to shallow groundwater quality can be minimized by employing Best Management Practices. Storm water runoff impacted from contact with roads will be prevented from reaching open soils by curb and gutters along the edges of roads that guide impacted water to storm water management facilities. Infrastructures can be installed to improve the quality of groundwater before it infiltrates, such as oil and grease separation traps, and/or other components. Since the application of de-icing road salt increases the concentrations of some parameters in runoff water, minimization of the application of road salt would improve runoff water quality. Advanced approaches to road salt application can reduce the mass of road salt applied, such as judicious timing, improved spreader machinery, pre-wetting methods, pavement temperature monitoring, and other techniques. Alternative substances to de-icing salt are available, including other chloride salts, and acetate-based substances. Alternative substances generally are more expensive and should be considered for more sensitive groundwater and surface water receivers, such as adjacent to surface watercourses.

4.2.2 Quantity of Shallow Groundwater

All of the surficial soil types of the study area will recharge groundwater to varying degrees, and so each has some degree of susceptibility to quality impacts. Some surficial soil types are relatively more permeable than others, and thus more susceptible to quality impacts. In particular, Newmarket Till (Unit 3f) and some glacial lake deposits (Unit 8a) have greater susceptibility due to their sandy texture, in comparison to the finer-grained Halton Till and Wildfield Till (Unit 4b and 4a, respectively) and some glacial lake deposits (Unit 7) that have silt and clay texture. Greater emphasis should be placed on directing storm water runoff generated from the transit road lanes away from adjacent lands in areas of Newmarket Till and other sandy textured soil.

The proposed development of transit lanes and localized widening of Highway 7 has the potential to affect the quantity of shallow groundwater because paved road surfaces will reduce the volume of precipitation that can infiltrate and recharge the groundwater. Some of the land on which the proposed transit lanes and road widening will be constructed presently consists of open soil or grassed areas that contribute recharge to shallow groundwater. Paving over that land by proposed transit lanes and/or road widening will obstruct the recharging of the shallow groundwater that is presently occurring.

The typical width of a tranist lane is 3.5 metres. Along Highway 7, the roadside lands within approximately four metres of the current curbside partially consist of grassed areas and open soil that will be pervious to infiltration, as well as paved parking areas, sidewalks and access to driveways. In the vicinity of Yonge Street/Highway 407, the railside lands within approximately 20 metres of the rail line are rail-bed gravel and grassed lands and unlined ditches that will be relatively pervious to infiltration.

The precise area of open soil and grassed land that are currently and would be paved over by the proposed transit lanes and localized road widening has not physically been determined given the size of the study area. A visual estimate of the proportion of pervious areas to paved areas along Highway 7 is approximately 90:10, based on aerial photography and field reconnaissance. This proportion will vary with location, as some roadside areas are mostly grassed, whereas other areas, such as urbanized sections are almost completely paved.

The reduction of infiltration that could result from adding two proposed transit lanes and two proposed roadway lanes can be estimated. Infiltration depends upon several factors, including soil type, ground slope, and vegetation, all of which vary along the proposed transit alignment. The recharge rate for soils found along the alignment has been estimated by using Table 3 of the MOE rural development guidelines (MOE 1995), which is based on soil type. Newmarket Till (Unit 3f) and some glaciolacustrine sediments (Unit 8a) are sandy in texture and the recharge rate is estimated as 200 to 250 mm/year. Halton Till, Wildfield Till, and some glacial lake sediments (Units 4b, 4a, and 7, respectively) are silt and clay textured materials, and the recharge rate for those units is estimated between 100 and 150 mm/year. Calculations of current infiltration were estimated per kilometre of road within those soil zones, for two 3.5 m wide lanes, and assuming that 90% of land to be covered by the lanes is currently pervious soil. For Newmarket Till, infiltration potentially will be reduced by up to 1,260 to 1,575 m^3/year per kilometre of transitway. For Halton Till and Wildlfied Till sediments, infiltration potentially will be reduced by up to 630 to 945 m^3/year per kilometre of transitway/roadway.

The amounts by which recharge may be decreased due to the proposed transitway and/or localized roadway are considered negligible relative to the total quantity that occurs within the associated catchment areas. The net result is that the transitway likely would not result in a measurable change in groundwater elevations at locations away from the proposed transit lands, and effects would be undetectable relative to effects of natural climatic variations. However, it would be beneficial if the medians and shoulders along roadways and "Park and Ride" parking lots proposed for construction were to include vegetated areas and the use of permeable pavement, where practical, to promote recharge.

The transitway will be constructed at grade and will not require extensive dewatering activity. Site-specific dewatering may be required to permit construction of new or modified bridges and culverts. These dewatering activities will be localized and of short duration; therefore, they will have negligible adverse effects on aquifers. A Permit to Take Water will be obtained for any dewatering activities in excess of 50,000 l/day.

A detailed stormwater management plan will be prepared during preliminary and detail design. The stormwater management plan will investigate opportunities to maintain groundwater recharge and discharge functions and maintain groundwater quality.

A subsurface investigation will be conducted during preliminary and detail design to identify groundwater and soil conditions. Impact assessment and mitigation measures will be performed at that time to address any issues related to groundwater quality and quantity.

4.2.3 Potential to Impact Water Supply Wells

The MOE water well database indicates that historically approximately 1,200 water supply wells have been constructed in the primary study area. One result of urbanization and the associated provision of municipal water supply servicing is that the majority of those wells will be inactive, decommissioned, or demolished. It is only those wells that remain in active use that potentially may have water supply concerns. Information as to which individual wells in the study area remain in active use is not available. However, for the active wells, the susceptibility to impact from the proposed transitway for a water supply well will depend on several factors, including the construction of the well, type of geology, the horizontal hydraulic gradient from the transit alignment and distance from the transit alignment.

Construction details of supply wells in active use are not known from available data. Water wells that are still in active use and that obtain water from shallow groundwater, such as dug wells, will be more susceptible to changes in shallow groundwater quality. Drilled wells that tap deeper aquifers will be less susceptible. The MOE water well database indicates that wells of shallow dug/bored construction and of drilled construction may be present. The MOE water well database indicates that most wells in the study area obtain water from the overburden, from a wide range of depths. The depth of wells relative to ground surface, based on the depth of the top of screen, ranges from approximately 4 to 107 metres below ground level (m bgl), with a median depth of approximately 30 m bgl.

Geologic conditions are variable within the depth range exploited by water supply wells in the study area. The water supply aquifers at most wells are overlain, or confined, by a significant thickness of layers of fine-grained clay and silt sediments that will tend to restrict the vertical movement of impacted shallow groundwater. However, there may be some wells in the area that are screened at shallow depth and/or have no protective layers above the screen, and will be more susceptible to shallow groundwater quality effects. Active wells that are located downgradient of the proposed transit alignment will be more susceptible to impact.

For the most part, the proposed transit development will involve adding two paved lanes to an existing four to six-lane road. In the area of the proposed Highway 7 widening (Montgomery Court to Sciberras Road) the road will be widened an additional two lanes. The generation of additional de-icing salt and other road surface contaminants will not be significant, and the amount of impacted runoff that reaches adjacent pervious soil will be relatively low. Impacts to shallow groundwater are anticipated to be low. Urbanization has removed most water supply wells that were historically located in the study area, reducing the number of potentially affected users. Best management practices should be employed for de-icing substances, including timing, machinery, and alternative substances, as appropriate. Groundwater recharge can be promoted by constructing grassed areas on medians and adjacent roadside lands where appropriate.

During preliminary and detail design for the BRT, any remaining domestic wells within the influence of the BRT will be identified. If these wells are inactive, they will be decommissioned in accordance with Ontario Regulation 903 of the *Ontario Water Resources Act.* If these wells are active, a pre-construction well inspection will be conducted to establish background conditions and further monitoring will be conducted, as warranted, during and post-construction. A contingency plan, including a commitment to supply water to affected users, will be developed during preliminary and detail design.

4.3 Aquatic Habitats and Communities

The BRT and the localized widening of Highway 7 has the potential to result in a harmful alteration, disruption or destruction (HADD) of fish habitat due to the following effects:

- loss of site-specific habitat;

- changes to water quality and quantity;
- alterations to base flow;
- changes in water temperature; and,
- barriers to fish passage.

On July 24, 1998, the TRCA signed a Level 3 Agreement with the Department of Fisheries and Oceans (DFO), which established a streamlined approach to addressing issues pertaining to the federal *Fisheries Act*. Conservation Authorities with a Level 3 Agreement determine whether the proposal has a potential for a HADD of fish habitat. The TRCA will work with the proponent to suggest ways to mitigate the HADD, and if mitigable, write Letters of Advice on behalf of DFO. If the TRCA determines that the HADD cannot be mitigated, then the TRCA will provide a skeleton of a Letter of Intent and a DFO application in order for the proponent to prepare a compensation package. Note that only the DFO through the Minister of Fisheries and Oceans can authorize compensation regarding a HADD pursuant to Section 35(2) of the *Fisheries Act*. Discussions will be held with the TRCA, DFO and MNR during detail design to determine specific requirements related to fish habitat compensation.

4.3.1 Loss of Site-Specific Habitat

A total of 45 watercourse crossings are located along the preferred transitway alignment and/or location of road widening, 42 crossings have existing culverts, three crossings are new and will require culverts. Of the 45 crossings, 37 provide fish habitat (34 exisiting culverts, 3 new culverts).

Thirteen of the culverts at watercourses providing fish habitat are long enough to accommodate the transitway and/or road widening and therefore do not require extensions. Of the 20 culverts (providing fish habitat) requiring extensions, one requires extension on the north side only (D19), and two require extensions on the south side only (H5 and R4), the remaining culverts will be lengthened approximately equally from the centre line of Highway 7. The three new crossings are proposed along Town Centre Boulevard South: one at the main branch of the Upper Rouge River (R19); and two crossings of tributaries of the Lower Rouge River (R20 and R21).

Culvert extensions range from 5 m to 28 m (total extension). Eleven watercourse crossings are classified as “Important” habitat; nine watercourse crossings are classified as “Marginal” habitat. The precise area of fish habitat impacted as a result of culvert modifications will be determined during detail design.

New culverts range in length from 12 m to 16 m. One watercourse crossing is classified as “Important” habitat and two watercourse crossings are classified as “Marginal” habitat. The precise area of fish habitat impacted as a result of these new culverts will be determined during detail design.

The hierarchy of available protection options for “Important” and “Marginal” habitat includes: relocation of the project; redesign of the project; mitigation of adverse effects; and, compensation for the loss of fish habitat, in this order of preference. Since the BRT cannot be relocated or redesigned to avoid a net loss of fish habitat, the first two protection options do not apply. To reduce the potential for alteration of fish habitat, the following environmental protection measures will be implemented:

- revise cross-section to reduce footprint area, where possible;
- avoid or reduce the length of the culvert extension to the extent possible through the use of headwalls, wingwalls and guiderail;

- implement an in-water construction timing restriction to protect spawning fish, incubating eggs and fry emergence; based on fish communities present no in-water work should be permitted from September 16 to June 30 in coldwater and coolwater systems, and from March 16 to June 30 in warmwater systems, in any calendar year;

- install the culvert extensions to match the inverts of the existing culverts and stream beds; the culvert should be open bottom or countersunk a minimum of 20% of the culvert height and then backfilled with native substrate;

- install the new culverts/bridges using fish-friendly designs including appropriate horizontal and vertical clearances, open bottoms, countersinking, etc.

- delineate work areas with construction fencing to minimize the area of disturbance;

- perform all work in the dry using a temporary flow bypass system; dewatered effluent should be treated prior to discharge to receiving watercourses;

- capture and safely release fish isolated by construction activities to the watercourse upstream of the work area;

- restrict the use of heavy equipment in watercourses and on watercourse banks; and,

- implement good housekeeping practices related to materials storage/stockpiling, equipment fueling/maintenance, etc. during construction.

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

During detail design, discussions will be held with regulatory agencies to determine approval requirements. The TRCA will determine if the proposed works will result in a HADD or can be mitigated. If required, a fish habitat compensation plan will be prepared during detail design in consultation with the TRCA and DFO. A *Fisheries Act* authorization will be secured prior to any in-water work. Consultations with the MNR will also occur during detail design to determine if a work permit will be required under the *Lakes and Rivers Improvement Act*. It is also anticipated that a fill permit will be required under the Fill, Construction and Alteration to Waterway Regulation administered by the TRCA. A fill permit will be secured prior to any ground disturbance in fill regulated areas.

A summary of work proposed at watercourse crossings, environmental protection measures and net environmental effects is presented in Table 7.

TABLE 7.
SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. Number	Waterbody Name	Station	Existing Crossing	Proposed Work	Site-Specific Mitigation	Net Environmental Effects
H1	Albion Creek, Tributary of the Lower Humber River	10+929	concrete box culvert	approximately 9.5 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
H2	Tributary of the Main Humber River	11+165	open bottom concrete culvert	approximately 7 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
H3	Tributary of the Main Humber River	11+482	corrugated steel pipe (csp)	approximately 11 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
H4	Tributary of the Main Humber River	12+204	concrete box culvert	approximately 10 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
H5	Tributary of the Main Humber River	13+758	bridge	approximately 12 m extension on south side of Highway 7 only	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat

TABLE 7.
SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. Number	Waterbody Name	Station	Existing Crossing	Proposed Work	Site-Specific Mitigation	Net Environmental Effects
H6	Rainbow Creek, Tributary of the Main Humber River	13+919	enclosed upstream, concrete pipe downstream	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
H7	Main Branch of the Humber River (R.G. Henderson Floodway)	14+843	bridge	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
H8	Tributary of the Main Humber River	15+984	concrete box culvert	approximately 8.5 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
H10	Tributary of Black Creek	18+913	concrete box culvert	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
H12	Black Creek	20+464	concrete box culvert	approximately 10.5 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
H13	Black Creek	221+652	concrete box culvert	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
H14	Tributary of Black Creek	221+889	concrete box culvert	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
D1	Tributary of the West Don River	22+690	twin open bottom concrete culvert	approximately 14 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat

TABLE 7.
SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. Number	Waterbody Name	Station	Existing Crossing	Proposed Work	Site-Specific Mitigation	Net Environmental Effects
D3	West Don River	23+943	bridge	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
D6	Tributary of the East Don River	28+415	concrete box culvert	approximately 6 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
D7	East Don River	28+938	twin CSP	approximately 7 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
D8	Tributary of the East Don River	30+203	concrete box culvert	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
D12	German Mills Creek	34+200	CSP	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
D14	Tributary of German Mills Creek	35+351	open bottom concrete culvert	approximately 7.5 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
D15	Tributary of German Mills Creek	36+463	concrete box culvert	approximately 5.5 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat

TABLE 7.
SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. Number	Waterbody Name	Station	Existing Crossing	Proposed Work	Site-Specific Mitigation	Net Environmental Effects
D19	Westminster Creek	325+104 (Centre Street)	concrete box culvert (u/s side only)	approximately 5 m extension on north side of Highway 7 only	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
D20	Tributary of the East Don River	326+454 (Centre Street)	CSP	approximately 5.5 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
D22	Tributary of the East Don River	328+465 (Bathurst Street)	concrete box culvert	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
R1	Tributary of Beaver Creek	37+492	CSP	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
R2	Beaver Creek	37+789	open bottom concrete culvert	approximately 9 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
R3	Upper Rouge River	38+693	bridge	approximately 10 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat

TABLE 7.
SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. Number	Waterbody Name	Station	Existing Crossing	Proposed Work	Site-Specific Mitigation	Net Environmental Effects
R4	Tributary of the Lower Rouge River	40+379	concrete culvert with gabions	approximately 9 m extension on south side of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
R6	Lower Rouge River	43+256	bridge	approximately 2.75 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
R8	Robinson Creek	46+128	CSP	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
R9	Exhibition Creek	46+744	concrete box culvert	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
R10	Tributary of the Little Rouge River	48+814	concrete box culvert	approximately 8 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
R11	Tributary of the Little Rouge River	49+143	CSP	approximately 9 m extension on north and south sides of Highway 7	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
R14	Little Rouge River	51+117	Bridge	no work required	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no net environmental effects

TABLE 7.
SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. Number	Waterbody Name	Station	Existing Crossing	Proposed Work	Site-Specific Mitigation	Net Environmental Effects
R19	Upper Rouge River	440+284 (Town Centre Boulevard South)	none	new bridge approximately 30 m span x 13 m wide	• erosion and sedimentation control • stormwater management to provide Level 1 treatment	• no alteration of fish habitat
R20	Tributary of the Lower Rouge River	441+322 (Town Centre Boulevard South)	none	new culvert approximately 16 m in length	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat
R21	Tributary of the Lower Rouge River	442+083 to 442+184 (Town Centre Boulevard South)	None	new culvert approximately 12 m in length	• in-water construction timing restriction • perform in-water work in the dry • countersink culvert and backfill with local substrate to match existing stream inverts • erosion and sedimentation control • stormwater management to provide Level 1 treatment	• harmful alteration of fish habitat anticipated • compensation required to ensure no net loss of fish habitat

4.3.2 Changes to Water Quality and Quantity

The BRT and localized road widening have the potential to alter water quality and quantity by reducing the permeability of the ground resulting in increased runoff of surface water. An increase in runoff may promote erosion downstream, thus impairing water quality with sediments.

During detail design, a stormwater management plan will be prepared to address potential water quality and quantity effects. It is anticipated that runoff from the BRT and/or localized road widening will be collected in storm sewers and conveyed to exiting stormwater treatment facilities within the project limits. Alternatively, where stormwater treatment facilities are not available, new facilities will be developed to treat stormwater prior to discharge to receiving watercourses. SWMPs such as enhanced grassed swales, oil/grit separators, infiltration trenches, filter strips, etc. will be incorporated into the BRT on a site-specific basis. It is anticipated that Level 1 treatment will be required for all receiving watercourses. As a result, the changes to water quality/quantity as a result of the BRT and/or localized road widening are not anticipated to be significant.

4.3.3 Alterations to Base Flow

The BRT and/or localized road widening have the potential to alter base flow conditions by reducing the permeability of the ground, thus reducing infiltration and subsequent discharge to watercourses through springs, seeps and groundwater upwellings. The watercourses in the study area have been urbanized and there does not appear to be a significant groundwater contribution to these watercourses in the vicinity of Highway 7.

A stormwater management plan will be prepared during detail design to address potential reductions in baseflow. Methods that encourage infiltration such as infiltration trenches, perforated storm sewers and detention ponds will be investigated.

4.3.4 Changes in Water Temperature

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

During detail design, a stormwater management plan will be prepared to address treatment of surface water runoff. Methods used to reduce the temperature of runoff such as infiltration trenches and perforated storm sewers will be investigated.

4.3.5 Barriers to Fish Passage

No barriers to fish passage will result from this project.

4.4 Vegetation and Vegetation Communities

The BRT and/or localized road widening have the potential to result in the displacement of and disturbance to vegetation and vegetation communities. Effects on vegetation related to the transitway/road widening may include:

- displacement of vegetation and vegetation communities;

- disturbance to vegetation through edge effects (windthrow, sunscald, changes in light conditions and invasion by exotic species), drainage modifications and salt spray; and,

- displacement of rare, threatened or endangered vegetation or significant vegetation communities.

Over time these disturbances may alter community structure, composition and function. Effects are most prominent in areas that have not been previously disturbed.

4.4.1 Displacement of Vegetation and Vegetation Communities

Clearing will be required within the new right-of-way to construct the centre median, two new bus lanes, and in some areas, sidewalks. The right-of-way vegetation is primarily ornamental plantings that provide an aesthetic value with some ecological value. Urban vegetation provides habitat for birds and small mammals, shade, soil stabilization, and carbon cycling through respiration. For this reason, efforts should be made to protect urban vegetation that does not need to be removed to construct the BRT.

The BRT and/or road widening will be constructed primarily within the existing right-of-way with several exceptions. Vegetation located adjacent to the right-of-way is comprised of cultural meadow, cultural thickets, cultural savannahs, cultural woodlands, deciduous forests, deciduous swamps, thicket swamps, shallow marshes, shallow aquatic and open aquatic communities.

Encroachment on vegetation located adjacent to the right-of-way will occur in approximately 18 locations throughout the entire study area. Vegetation communities in 12 of these locations are primarily cultural in nature. These areas have been heavily modified previously by urban development and as a result, removal of approximately 2.0 ha of these communities throughout the entire 39.9 km study area is considered insignificant.

In the remaining six locations, vegetation communities are primarily semi-natural as a result of historic cultural influences. These areas, associated with watercourses, have regenerated into Fresh-Moist Willow Lowland Deciduous Forests (FOD7-3) following historic clearing events. Removal of approximately 1.1 ha of this community type will occur throughout the entire study area. Removal of vegetation in natural communities accounts for only 0.12 ha throughout the entire study area. A summary of the vegetation communities located within the project limits and potential removals is presented in Table 8. The following environmental protection measures designed to reduce vegetation removals will be considered on a site-specific basis during detail design:

- reduce the area of the BRT and/or road widening footprint to the extent possible;

- reduce grading requirements to the extent possible;

- provide local tree protection including guiderails, retaining walls and ditches, where warranted;

- identify and protect trees to be retained during construction using a temporary tree protection barrier in accordance with OPSS 565;

- prepare site-specific Edge Mangement Plans and Tree Protection Plans in accordance with TRCA guidelines; and,

- restore vegetation removed for the BRT and/or road widening with landscape plantings following TRCA's Landscaping Guidelines.

TABLE 8.
SUMMARY OF PROPOSED VEGETATION REMOVALS, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. No. and Location	ELC Community	Site-Specific Impact	Proposed Mitigation	Net Environmental Effect
D1 Highway 7 at Keele Street	CUM1-1	• removal of approximately 35 m^2 of CUM1-1	• no proposed mitigation	• CUM1-1 has low ecological value, net impact is insignificant
D2 Highway 7 west of Centre Street	CUW1	• removal of approximately 298 m^2 of CUW1	• no proposed mitigation	• CUW1 has low ecological value, net impact is insignificant
D6 Highway 7 east of Bathurst Street	FOD5	• removal of approximately 382 m^2 of FOD5	• minimize the area of vegetation removals to the extent possible • use pruning and trimming to minimize encroachment of remaining vegetation • delineate work zones using construction fencing/tree protection barrier • manage the application of road salt to the extent possible • replace vegetation removed with like-for-like to maintain no net loss	• clearing of new forest edges may result in sunscald, windthrow and invasion by exotic species • road salt may result in vegetation mortality and dieback
H6 Highway 7 west of Kipling Avenue	FOD7-3	• removal of approximately 1 m^2 of FOD7-3		
H7 Highway 7 west of Islington Avenue	FOD7-3	• removal of approximately 93 m^2 of FOD7-3		
H8 Highway 7 west of Pine Valley Drive	FOD7-3	• removal of approximately 4 m^2 of of FOD7-3		
	CUM1-1/ MAS2-1	• removal of approximately 216 m^2 of CUM1-1/MAS2-1	• no proposed mitigation	• CUM1-1 has low ecological value and MAS2-1 in this location is the result of previous land disturbance and is not naturally occurring, net impact is insignficiant
H12 Highway 7 at Jane Street	CUM1-1	• removal of approximately 1,720 m^2 of CUM1-1	• no proposed mitigation	• CUM1-1 has low ecological value, net impact is insignificant

TABLE 8.
SUMMARY OF PROPOSED VEGETATION REMOVALS, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. No. and Location	ELC Community	Site-Specific Impact	Proposed Mitigation	Net Environmental Effect
H15 Steeles Avenue at Jane Street	CUW1	• removal of approximately 1,410 m^2 of CUW1	• no proposed mitigation	• CUW1 has low ecological value, net impact is insignificant
	FOD7-3	• removal of approximately 1,625 m^2 of FOD7-3	• minimize the area of vegetation removals to the extent possible • use pruning and trimming to minimize encroachment of remaining vegetation • delineate work zones using construction fencing/tree protection barrier • manage the application of road salt to the extent possible • replace vegetation removed with like-for-like to maintain no net loss	• clearing of new forest edges may result in sunscald, windthrow and invasion by exotic species • road salt may result in vegetation mortality and dieback
P2 Highway 7 east of Locust Hill	CUS1	• removal of approximately 14 m^2 of CUS1	• no proposed mitigation	• CUS1 has low ecological value, net impact is insignificant
	CUT1	• removal of approximately 7,489 m^2 of CUT1	• no proposed mitigation	• CUT1 has low ecological value, net impact is insignificant
R3 Highway 7 at Rodick Road	CUM1-1	• removal of approximately 1,946 m^2 of CUM1-1	• no proposed mitigation	• CUM1-1 has low ecological value, net impact is insignificant
R6 Highway 7 at Main Street Unionville	FOD7-3	• removal of approximately 2,382 m^2 of FOD7-3	• minimize the area of vegetation removals to the extent possible • use pruning and trimming to minimize encroachment of remaining vegetation • delineate work zones using construction fencing/tree protection barrier • manage the application of road salt to the extent possible • replace vegetation removed with like-for-like to maintain no net loss	• clearing of new forest edges may result in sunscald, windthrow and invasion by exotic species • road salt may result in vegetation mortality and dieback
	CUM1-1	• removal of approximately 1,696 m^2 of CUM1-1	• no proposed mitigation	• CUM1-1 has low ecological value, net impact is insignificant

TABLE 8.
SUMMARY OF PROPOSED VEGETATION REMOVALS, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. No. and Location	ELC Community	Site-Specific Impact	Proposed Mitigation	Net Environmental Effect
R8 Highway 7 at Main Street Markham	FOD7-3	• removal of approximately 312 m^2 of FOD7-3	• minimize the area of vegetation removals to the extent possible • use pruning and trimming to minimize encroachment of remaining vegetation • delineate work zones using construction fencing/tree protection barrier • manage the application of road salt to the extent possible • replace vegetation removed with like-for-like to maintain no net loss	• clearing of new forest edges may result in sunscald, windthrow and invasion by exotic species • road salt may result in vegetation mortality and dieback
R9 Highway 7 at Savannah Crescent	FOD7-3	• removal of approximately 2,097 m^2 of FOD7-3		
R10-R11 Highway 7 east of 9th Line	CUW1	• removal of approximately 1,185 m^2 of CUW1	• no proposed mitigation	• CUW1 has low ecological value, net impact is insignificant
R14 Highway 7 west of Locust Hill	FOD4	• removal of approximately 881 m^2 of FOD4	• minimize the area of vegetation removals to the extent possible • use pruning and trimming to minimize encroachment of remaining vegetation • delineate work zones using construction fencing/tree protection barrier • manage the application of road salt to the extent possible • replace vegetation removed with like-for-like to maintain no net loss	• clearing of new forest edges may result in sunscald, windthrow and invasion by exotic species • road salt may result in vegetation mortality and dieback
	CUW1	• removal of approximately 1,031 m^2 of CUW1	• no proposed mitigation	• CUW1 has low ecological value, net impact is insignificant
R19	FOD7-3	• removal of approximately 3,089 m^2 of FOD7-3	• minimize the area of vegetation removals to the extent possible • use pruning and trimming to minimize encroachment of remaining vegetation • delineate work zones using construction fencing/tree protection barrier • manage the application of road salt to the extent possible • replace vegetation removed with like-for-like to maintain no net loss	• clearing of new forest edges may result in sunscald, windthrow and invasion by exotic species • road salt may result in vegetation mortality and dieback

4.4.2 Disturbance to Vegetation and Vegetation Communities

Disturbance to vegetation as a result of the BRT and/or road widening is considered negligible since the majority of the vegetation located adjacent to the right-of-way has been previously disturbed by urban development. For example, approximately 37% of the vegetation recorded within the project limits is non-indigenous.

Minimal to no clearing will occur in forested areas; therefore adverse effects associated with the creation of new forest edge are not anticipated.

The BRT and localized road widening will be developed as an urban cross-section; therefore, no ditching that may result in drainage modification will occur on this project.

The effects of salt spray on vegetation are considered minor and unavoidable due to safety concerns. Vegetation dieback is typically limited to the outermost edge of vegetation communities and varies based on the orientation of the transportation corridor, the direction of the prevailing winds, the frequency and volume of salt applied, and the sensitivity of the receiving vegetation to salt. Measures to reduce potential impacts of road salt are presented under Section 4.2.1, Quality of Shallow Groundwater.

4.4.3 Displacement of Rare, Threatened or Endangered Vegetation or Significant Vegetation Communities

A total of 34 species considered uncommon and/or rare in the Greater Toronto Area (GTA) and/or the Region of York were documented during field investigations. The status of these species and a description of their locations within the study area are presented in Table 9. In most cases these species were documented well outside the Highway 7 right-of-way, deep within established FOD7-3 communities. The notable exception to this is purple-stemmed angelica (*Angelica atropurpurea*), which was found growing directly under the Highway 7 bridge over the main branch of the Little Rouge River. A temporary tree protection barrier will be used during construction to retain this community. If this is not feasible the specimens will be transplanted to a suitable location in the vicinity of their current habitat.

Several of these uncommon and/or rare species have been planted within/adjacent to the study area and are not naturally occurring. This is the case for species such as black walnut (*Juglans nigra*), red cedar (*Juniperus virginiana*) and red pine (*Pinus resinosa*).

Generally these specimens are beyond the zone of influence and therefore will not be removed. Minor encroachments into these communities are anticipated resulting in the removal of several of these specimens. As these species are planted and not naturally occurring the significance of their removal is diminished.

TABLE 9.
SUMMARY OF UNCOMMON AND/OR RARE SPECIES WITHIN THE STUDY AREA

Scientific Name	Common Name	Ref. No.	Status	Details
Angelica atropurpurea	Purple-stemmed Angelica	R6, R14	R1,2	Several individuals of this species are located in the FOD7-3 community of the main branch of Little Rouge River (R14), including one almost directly below the Highway 7 bridge. This species is also located in an FOD7-3 along the main branch of the Rouge River (R6) on the north side of Highway 7 between Kennedy Road and Bullock Drive.
Antennaria neglecta	Cat's Foot	P2*	U1	This species is located in the CUM1-1 towards the east end of the study area on the east side of the new Highway 7 alignment (aerial photos do not show this new alignment). At the time of field investigations there were approximately 50 individual plants in the CUM1-1 over 8 m off edge of pavement.
Apios Americana	Groundnut	H7	R1,2	A small number of individuals of this species are located in an FOD7-3 community along the main branch of the Humber River.
Bidens tripartata	Swamp Tickseed	P2*	U1	A small number of individuals of this species are located in the SWD3 and SWT2-2 communities at the east end of the study area on the east side of the new Highway 7 alignment, well off the right-of-way.
Bidens vulgate	Tall Beggar-ticks	R6, R14	U1, R2	A small number of individuals of this species are located in the FOD7-3 community of the main branch of Little Rouge River (R14). This species is also located in an FOD7-3 along the main branch of the Rouge River (R6) on the north side of Highway 7 between Kennedy Road and Bullock Drive.
Cardamine concatenate	Cut-leaved Toothwort	D6	R1	Individuals of this species are located in the FOD5 community that constitutes Baker's Woods, an ESA and ANSI located in the northwest quadrant of Highway 7 and Bathurst Street.
Carex aurea	Golden-fruited Sedge	P2*	U2	Individuals of this species are located in the FOD5 community at the east end of the study area on the east side of the new Highway 7 alignment, well off the right-of-way.
Carex hirtifolia	Pubescent Sedge	P2*	U1,2	Individuals of this species are located in the FOD5 community at the east end of the study area on the east side of the new Highway 7 alignment, well off the right-of-way.
Carex hitchcockiana	Hitchcock's Sedge	D6	U1,2	Individuals of this species are located in the FOD5 community at the east end of the study area on the east side of the new Highway 7 alignment, well off the right-of-way.

TABLE 9.
SUMMARY OF UNCOMMON AND/OR RARE SPECIES WITHIN THE STUDY AREA

Scientific Name	Common Name	Ref. No.	Status	Details
Carex laxiflora	Loose-flowered Sedge	P2*	U1,2	Individuals of this species are located in the FOD5 community at the east end of the study area on the east side of the new Highway 7 alignment, well off the right-of-way.
Chelone glabra	Turtlehead	R14	U1,2	One individual of this species is located in the FOD7-3 community along the main branch of the Little Rouge River, well north of the Highway 7 right-of-way.
Cicuta maculate	Spotted Water Hemlock	H7	U1	One individual of this species is located in the FOD7-3 community along the main branch of the Humber River, well off the Highway 7 right-of-way.
Claytonia virginica	Spring-beauty	D6	R2	Individuals of this species are located in the FOD5 community that constitutes Baker's Woods, an ESA and ANSI located in the northwest quadrant of Highway 7 and Bathurst Street.
Cornus foemina ssp. racemosa	Gray Dogwood	P2*	U2	Individuals of this species are located in the CUT1 community at the east end of the study area on the west side of the new Highway 7 alignment, well off the right-of-way.
Cypripedium calceolus	Yellow Lady's Slipper	R4^	R1,2	Individuals of this species are located in the SWT2-2 community in the northwest quadrant of Highway 7 and Village Parkway, well north of the Highway 7 right-of-way.
Desmodium canadense	Showy Tick-trefoil	H7	U1, R2	One individual of this species is located in the FOD7-3 community along the main branch of the Humber River, well off the Highway 7 right-of-way.
Eleocharis smallii	Spike-rush	H7	U1	One individual of this species is located in the FOD7-3 community along the main branch of the Humber River, well off the Highway 7 right-of-way.
Elymus virginicus	Virginia Wild-rye	D3, H7, R6	U2	Several individuals of this species are located in FOD7-3 communities along tributaries of the West Don River and the main branches of the Humber and Little Rouge Rivers.
Euonymus obovata	Running Strawberry Bush	P2*	R2	Individuals of this species are located in the FOD5 community at the east end of the study area on the east side of the new Highway 7 alignment, well off the right-of-way.
Geranium maculatum	Wild Geranium	P2*	U1, R2	Individuals of this species are located in the FOD5 community at the east end of the study area on the east side of the new Highway 7 alignment, well off the right-of-way.

TABLE 9.
SUMMARY OF UNCOMMON AND/OR RARE SPECIES WITHIN THE STUDY AREA

Scientific Name	Common Name	Ref. No.	Status	Details
Hackelia virginiana	Stickseed	D3, D6, R6, R14	U1, R2	Several individuals of this species are located in FOD7-3 communities along tributaries of the West Don River and the main branches of the Rouge and Little Rouge Rivers.
Juglans nigra	Black Walnut	D3, H7, R14	R2	This species is located in several FOD7-3 communities throughout the study area. The most notable location is an FOD7-3 located on the south side of Highway 7 between Christman Court and Wooten Way in the Town of Markham. This is a mature plantation of black walnut with approximately 10-15 individual trees of dbh > 10 cm. It is doubtful any of the black walnut in the study area are naturally occurring.
Juniperus virginiana	Red Cedar	R14	U1,2	Red cedar are planted in conjunction with an FOD7-3 community along a tributary of the Humber River. There are less than five individuals and they are all of dbh < 10 cm.
Lilium michiganense	Michigan Lily	R14	U1,2	One individual of this species is located in the FOD7-3 community along the main branch of the Little Rouge River, well north of the Highway 7 right-of-way.
Oenothera biennis	Common Evening Primrose	D3, R6	U1,2	Several individuals of this species are located in FOD7-3 communities along tributaries of the West Don River.
Physocarpus opulifolius	Ninebark	R9	R1	Individuals of this species are located in the FOD7-3 community along a tributary of the Rouge River, well off the Highway 7 right-of-way.
Pinus resinosa	Red Pine	R9, R10-R11, R14	R1	Red pine are planted in conjunction with an FOD7-3 community along a tributary of the Rouge River. They also occur within the CUW1 community (which is an abandoned nursery) and within the FOD4 community associated with the main branch of the Little Rouge River. There are generally less than five individuals in any given location and they have all been planted. The size of trees of this species varies, but some are of dbh > 10 cm.
Potentilla palustris	Marsh Cinquefoil	P2*	U1,2	Individuals of this species are located in the SWD3 community at the east end of the study area on the east side of the new Highway 7 alignment, well off the right-of-way.
Rosa blanda	Wild Rose	P2*	U2	Individuals of this species are located in the FOD5 community at the east end of the study area on the east side of the new Highway 7 alignment, well off the right-of-way.
Salix exigua	Sandbar Willow	H7	U2	One individual of this species is located in the FOD7-3 community along the main branch of the Humber River, well off the Highway 7 right-of-way.

TABLE 9.
SUMMARY OF UNCOMMON AND/OR RARE SPECIES WITHIN THE STUDY AREA

Scientific Name	Common Name	Ref. No.	Status	Details
Salix lucida	Shining Willow	R14	U1	One individual of this species is located in the FOD7-3 community along the main branch of the Little Rouge River, well north of the Highway 7 right-of-way.
Scirpus microcarpus	Red-sheathed Bulrush	R14	U1,2	One individual of this species is located in the FOD7-3 community along the main branch of the Little Rouge River, well north of the Highway 7 right-of-way.
Scirpus pungens	Three-square	H7	R1,2	One individual of this species is located in the FOD7-3 community along the main branch of the Humber River, well off the Highway 7 right-of-way.
Solidago juncea	Early Goldenrod	P2*	U1, R2	Individuals of this species are located in the CUT1 community at the east end of the study area on the west side of the new Highway 7 alignment, well off the right-of-way.

4.5 Wildlife and Wildlife Habitat

The BRT and/or road widening have the potential to result in the displacement of and disturbance to wildlife and wildlife habitat. Effects on wildlife related to the BRT may include:

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

Effects are most prominent in areas that have not been previously disturbed.

4.5.1 Displacement of Wildlife and Wildlife Habitat

The BRT and road widening will be constructed primarily within the existing right-of-way with several exceptions. The right-of-way consists of previously modified/disturbed terrestrial wildlife habitat with low habitat structure and diversity and limited habitat capability. Consequently, the development of the BRT and localized road widening will have no significant effect on wildlife and wildlife habitat.

Numerous bird species located within the project limits are listed under the *Migratory Birds Convention Act* (MBCA). The MBCA prohibits the killing, capturing, injuring, taking or disturbing of migratory birds (including eggs) or damaging, destroying, removing or disturbing of nests. While migratory insectivorous and non-game birds are protected year-round (migratory game birds are only protected from March 10 to September 1), permits are seldom secured and the Act is seldom enforced for removal of wildlife habitat outside of the nesting season. To meet the requirements of the MBCA, no vegetation removals should occur during the nesting season. With several exceptions, this includes the period from April 1 to July 31. This timing restriction will also protect the 12 birds listed under the *Fish and Wildlife Conservation Act* (FWCA).

4.5.2 Barrier Effects on Wildlife Passage

No new barriers to wildlife passage will be created as a result of the transitway or localized road widening. The existing barrier posed by Highway 7 will be increased due to the addition of two new bus lanes, a median and a sidewalk for the transitway, and two new roadway lanes and a median in the area of localized widening of Highway 7. Given the urban nature of the study area, the transitway and localized road widening will have no significant impact on wildlife passage.

4.5.3 Wildlife/Vehicle Conflicts

The addition of the BRT to Highway 7 and localized widening of Highway 7 will increase the width of the traveled surface resulting in an increased risk of mortality for wildlife that elects to cross the road. Highway 7 currently poses a significant barrier to wildlife movement due to its up to seven-lane cross-section. As a result, crossing opportunities for terrestrial wildlife are limited to exiting culverts/bridges located at watercourse crossings. While the increase in width of the Highway 7 corridor resulting from the addition of the BRT increases exposure of wildlife to vehicle conflicts, the potential increase in wildlife mortality above existing conditions is considered minor. The 4.0 m wide vegetated median associated with the transitway may provide a refuge for wildlife that elects to cross Highway 7.

Opportunities for wildlife to cross under Highway 7 exist at culverts/bridges located within the project limits. Extensions are required at 20 of the 37 watercourse crossings within the study limits. These proposed extensions are not anticipated to have a significant effect on wildlife passage within the study area. Three new bridges/culverts are required along Town Centre Boulevard South. These culverts will be designed to facilitate wildlife passage to the extent feasible.

New or modified culverts and bridges will be investigated during preliminary and detail design to identify opportunities to maintain and promote wildlife passage. Methods to enhance wildlife passage such as increasing vertical and horizontal clearances, drift fence, dry benches, etc. will be taken into consideration on a site-specific basis.

4.5.4 Disturbance to Wildlife from Noise, Light and Visual Intrusion

Noise, light and visual intrusion may alter wildlife activities and patterns. In urban settings, such as the study area, wildlife have become acclimatized to the urban conditions and only those fauna that are tolerant of human activities remain. Given the extent of urbanization in the study area, the tolerance of the wildlife assemblage to human activities and the limited zone of influence of the BRT and the localized road widening, disturbance to wildlife from noise, light and visual intrusion will have no significant adverse effects.

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

Three species of significance were documented within the study area: Rough-legged Hawk (*Buteo lagopus*), Northern Shrike (*Lanius excubitor*), and milk snake (*Lampropeltis triangulum*).

Rough-legged Hawk and Northern Shrike are designated based on the rarity of their breeding within the GTA and/or the Region of York. The Highway 7 right-of-way does not provided suitable breeding habitat for either of these species.

Rough-legged hawk is a nomadic species that prospects for its food sources. When these sources are found, they exploit that source and move on. Their distribution is broadcast and they do not depend on any specific location in the GTA that can be protected. As a result, the adverse effects of the BRT on this species are considered negligible and no specific environmental protection measures are warranted.

Northern Shrike is a migratory species and does not depend on habitat located within or adjacent to the transitway. Their centre of breeding is outside of the GTA and the record for this species is most likely a stray migrant. As a result, the adverse effects of the transitway on this species are considered negligible and no specific environmental protection measures are warranted.

The milk snake is secretive and is seldom seen in the open. The snake may be found in diverse habitat ranging from semi-arid to damp forests, open woodlands, meadows, prairies, rocky hillsides and outcrops, sand dunes, farmlands and suburban areas. In the day, they can be found under boards, logs, trash and sawdust piles. The snake is active from April to September and they are diurnal in the spring and fall and nocturnal in the summer. Most milk snakes move away from their rocky outcropping or mammal burrow hibernacula to farms and grasslands with suitable food and cover in the summer. Mating occurs shortly after hibernation in June and July and hatching occurs in August and September within six to nine weeks of egg laying. Due to the generalized habitat requirements of this species and the presence of these habitats throughout the project limits and elsewhere within the province, species-specific environmental protection measures, other than to prevent the harassment of these species if they are encountered during construction, are not warranted.

4.6 Designated Natural Areas

For the most part, the BRT and localized road widening will have no adverse effects on designated natural areas within the zone of influence of the project. However, the BRT will require three new watercourse crossings in the vicinity of Town Centre Boulevard South.

The most notable crossing is located on the IBM property at Town Centre Boulevard South over the Upper Rouge River (R19). The Upper Rouge River (R19) is a well-defined valley system that provides a semi-natural corridor for wildlife movement. To reduce the potential effects on the valley system, the following environmental protection measures have been incorporated into the design of the new bridge to be constructed at this location:

- the bridge has been located near an area that was previously disturbed on the north valley slope by the installation of a storm sewer;
- the bridge will cross the valley system at right angles to reduce the footprint area;
- the bridge will consist of a span that will be sized in accordance with the Valley and Stream Corridor Management Program (TRCA 1994);
- the soffit of the bridge will be at least 3.5 m above the valley floor and provide a dry crossing to maintain wildlife passage;
- erosion and sedimentation control measures will be used;
- no work will be performed in the watercourse or on the watercourse banks; and,
- areas disturbed outside of the footprint of the bridge/piers/abutments will be revegetated using native non-invasive species in accordance with TRCA Landscaping Guidelines.

The remaining two new crossings are located on tributaries of the Rouge River (R20 and R21). These new crossings will be designed in accordance with the Valley and Stream Corridor Management Program (TRCA 1994) and all required approvals and permits will be secured during preliminary and detail design. The span/dimension details of all new crossings will be determined through an analysis of the meander belt width and the 100-year erosion limit during preliminary and detail design.

5.0 MONITORING

The potential for impact by the proposed transit development and localized widening of Highway 7 in the study area to the quantity of shallow groundwater is considered to be negligible. The degree of impact to groundwater elevations resulting from the transit/roadway development is likely to be undetectable away from the alignment, given the normal variations resulting from seasonal climatic conditions. Therefore, monitoring of groundwater elevations is not a priority for this proposed form of transit development or road widening.

The potential for impact by the proposed transit development and localized widening of Highway 7 in the study area to the quantity of shallow groundwater is considered to be moderately significant. It is considered most probable that the proposed transitway/road widening will result in effects to shallow groundwater quality that are detectable, but those effects will also be acceptable with respect to the Ontario Drinking Water Standards for groundwater. Since the anticipated impact will likely remain within acceptable limits, monitoring of groundwater quality will be performed as required.

During construction, an environmental inspector will make frequent random site visits for the duration of in-water work. The environmental inspector will be responsible for delineating work areas, ensuring that erosion and sedimentation control measures are functional, that the provisions related to fisheries and watercourse protection are met, and that fish habitat compensation measures are implemented in accordance with the terms and conditions of the *Fisheries Act* authorization.

Post-construction monitoring is typically prescribed in the *Fisheries Act* authorization. The terms and conditions of the *Fisheries Act* authorization will be met. Post-construction monitoring, if prescribed, will determine the effectiveness of environmental protection and compensation measures, identify problem areas and recommend corrective measures.

6.0 REFERENCES

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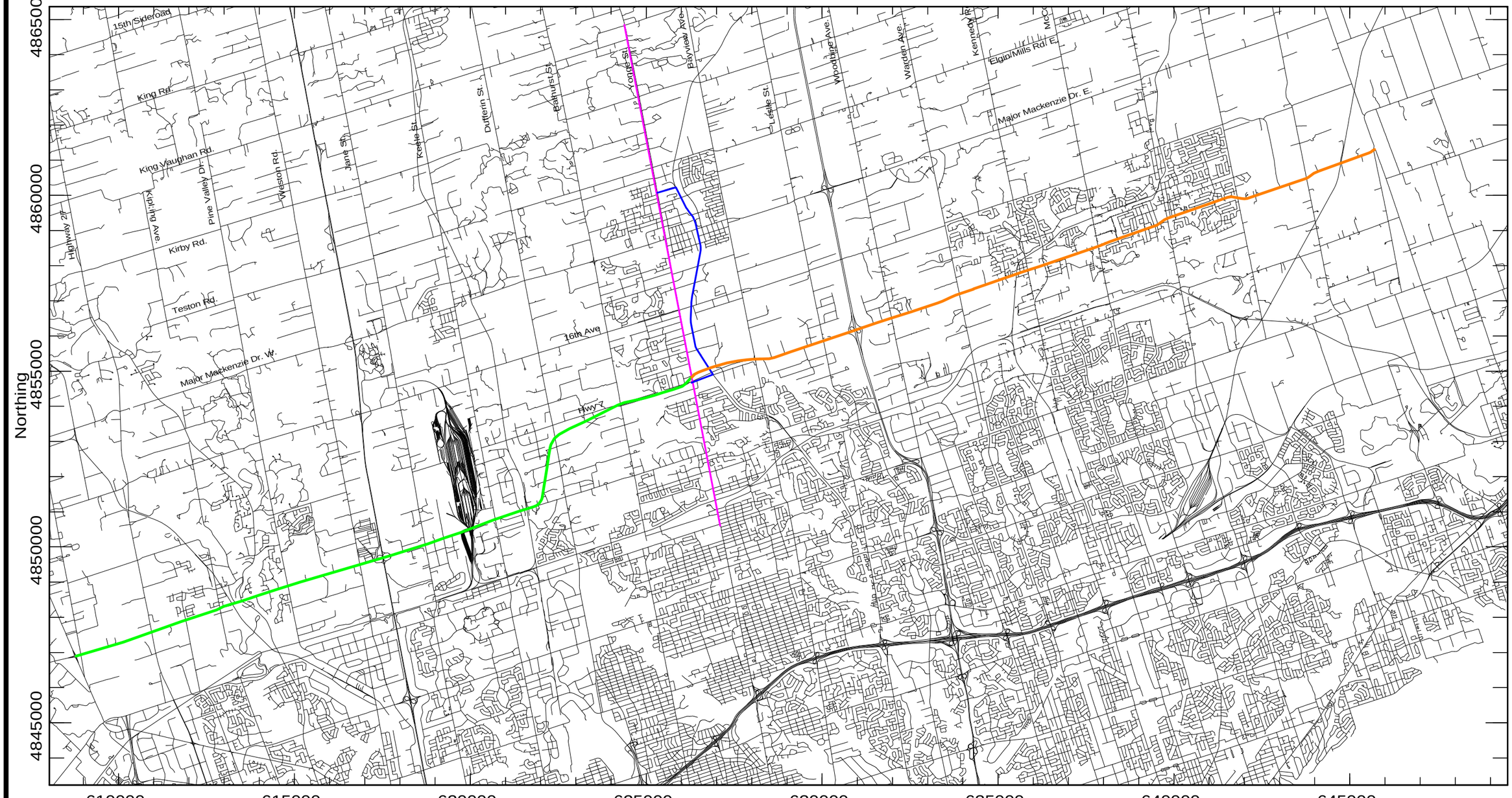
APPENDIX A
SURFICIAL GEOLOGY

APPENDIX B
SUBSURFACE GEOLOGY



Yonge Street Sections
Railway Sections
Highway 7 Sections West of Yonge Street
Highway 7 Sections East of Yonge Street

Scale in metres
0 2000 4000 6000
Scale: 1: 110000

York Region Transit Plan for York Consortium 2002

Location of Cross Sections

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.01

East

West

Highway 50

Highway 427

Highway 27

6910614 (8.3)

4902789 (-172.8)

6910840 (19.7)

4902832 (178.0)

6912814 (92.3)

6907011 (173.9)

6910327 (30.6)

6907010 (54.9)

6907015 (83.9)

6907001 (-187.8)

6913973 (-172.2)

Elevation

225

200

175

150

125

Notes:

1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 200 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

10+000 11+000 12+000 13+000 13+800

Section Distance

Legend

Ground Surface
Bedrock
Static Water Level

Sand
Fine Sand
Clay
Hardpan

Silt
Fill
Gravel
Previously Dug or Bored

Dense
Shale
Limestone

6912589 (12.5) MOE Well Designation (distance from section line)

Scale in metres

0 400 800

Approximate Scale: 1: 10000

York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #1

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00

East

West

Elevation

225
200
175
150
125

Rainbow Creek

Kipling Avenue

Humber River

Pine Valley Drive

6908498 (-68.1)
6906854 (-25.8)
6906855 (-69.0)
6908890 (191.0)
6909328 (-29.7)
6913013 (-16.4)
6906856 (-24.9)
6913992 (90.4)
6906711 (-37.9)
6915491 (-56.0)
6906719 (26.0)

Notes:
1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 200 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

13+600
14+600
15+600
16+600
17+400
Section Distance

Legend

Ground Surface
Bedrock
Static Water Level

Sand
Fine Sand
Clay
Hardpan
Silt
Fill
Gravel
Previously Dug or Bored
Dense
Shale
Limestone

6912589 (12.5) MOE Well Designation (distance from section line)

Scale in metres
0 400 800
Approximate Scale: 1: 10000

York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #2

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00

East

West

Weston Road

Highway 400

Jane Street

6906719 (26.0)
6906720 (26.7)
6906717 (38.5)
6916196 (38.3)
6906718 (35.6)
6906721 (75.9)
6906712 (-35.3)
6913367 (-135.1)
6913368 (-69.6)
6912625 (158.5)
6913366 (-128.4)
6913165 (88.7)
6912627 (110.6)
6914987 (57.8)
6906633 (-102.1)
6915801 (148.4)
6906634 (-180.4)
6906640 (30.3)
6906532 (37.2)

Elevation
200
150
100

Notes:
1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 200 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

17+200 18+200 19+200 20+200 21+000
Section Distance

Legend

Ground Surface
Bedrock
Static Water Level
6912589 (12.5) MOE Well Designation (distance from section line)

Sand
Fine Sand
Clay
Hardpan
Silt
Fill
Gravel
Previously Dug or Bored
Dense
Shale
Limestone

Scale in metres
0 400 800
Approximate Scale: 1: 10000

York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #3

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00

East

West

Elevation

200

150

100

6918531 (166.9)

6906525 (-186.7)

6906527 (-167.2)

6906526 (-87.9)

6906529 (-52.1)

6906530 (-134.0)

6906405 (-130.1)

6906402 (-25.3)

Keele Street

6906396 (-95.1)

6906395 (-147.1)

6906410 (43.0)

6906390 (-70.8)

6906411 (66.9)

6909118 (-90.2)

Centre Street

Notes:

1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 200 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

20+800 21+800 22+800 23+800 24+600

Section Distance

Legend

Ground Surface
Bedrock
Static Water Level

Sand
Fine Sand
Clay
Hardpan

Silt
Fill
Gravel
Previously Dug or Bored

Dense
Shale
Limestone

6912589 (12.5) MOE Well Designation (distance from section line)

Scale in metres

0 400 800

Approximate Scale: 1: 10000

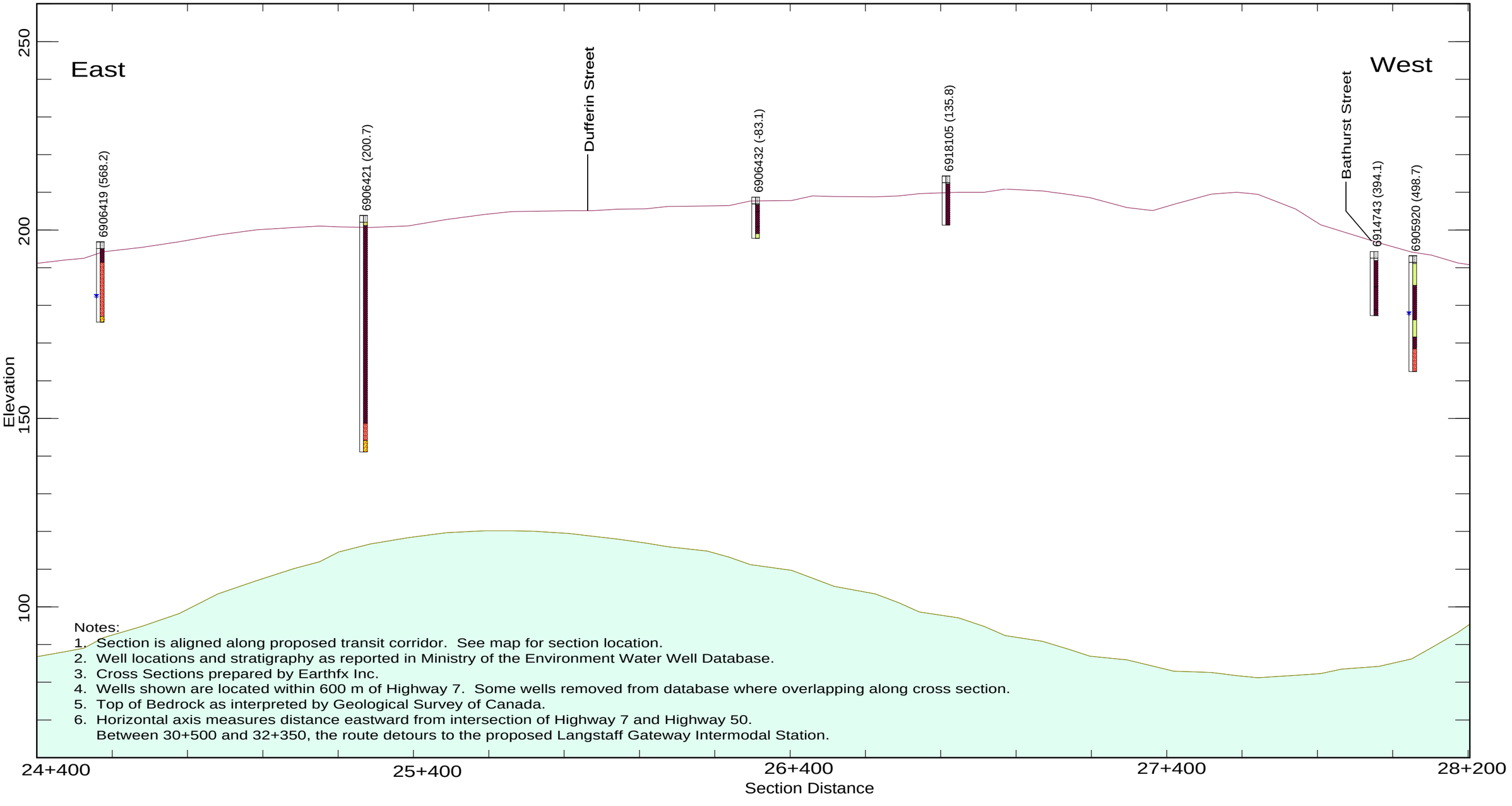
York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #4

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00



Notes:
1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 600 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

Legend

- Ground Surface
- Bedrock
- Static Water Level
- Sand
- Fine Sand
- Clay
- Hardpan
- Silt
- Fill
- Gravel
- Dense
- Shale
- Limestone
- Previously Dug or Bored

6912589 (12.5) MOE Well Designation (distance from section line)

Scale in metres

0 400 800

Approximate Scale: 1: 10000

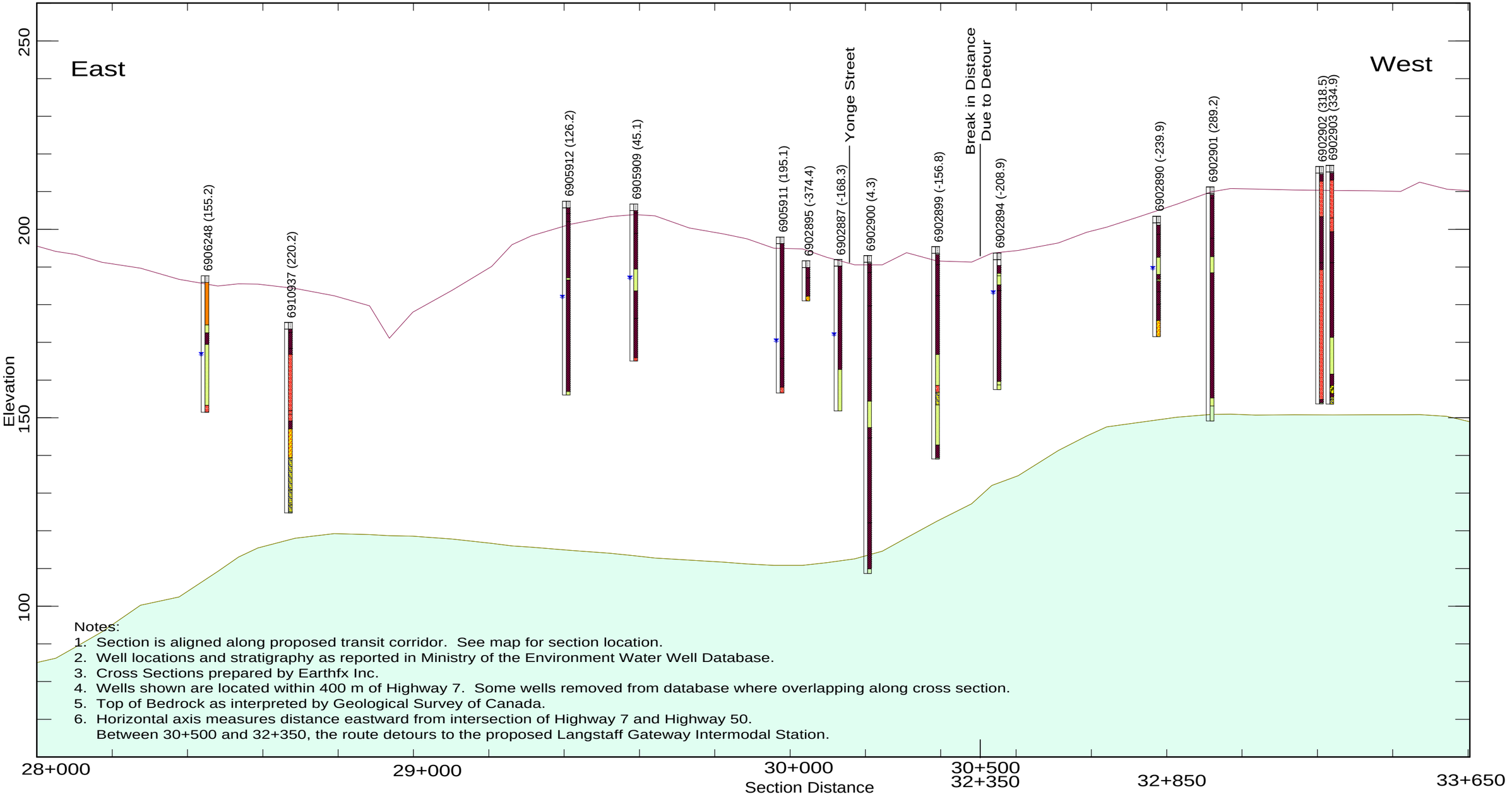
York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #5

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00



Notes:
1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 400 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

Legend

- Ground Surface
- Bedrock
- Static Water Level
- Sand
- Fine Sand
- Clay
- Hardpan
- Silt
- Fill
- Gravel
- Previously Dug or Bored
- Dense
- Shale
- Limestone

6912589 (12.5) MOE Well Designation (distance from section line)

Scale in metres

0 400 800

Approximate Scale: 1: 10000

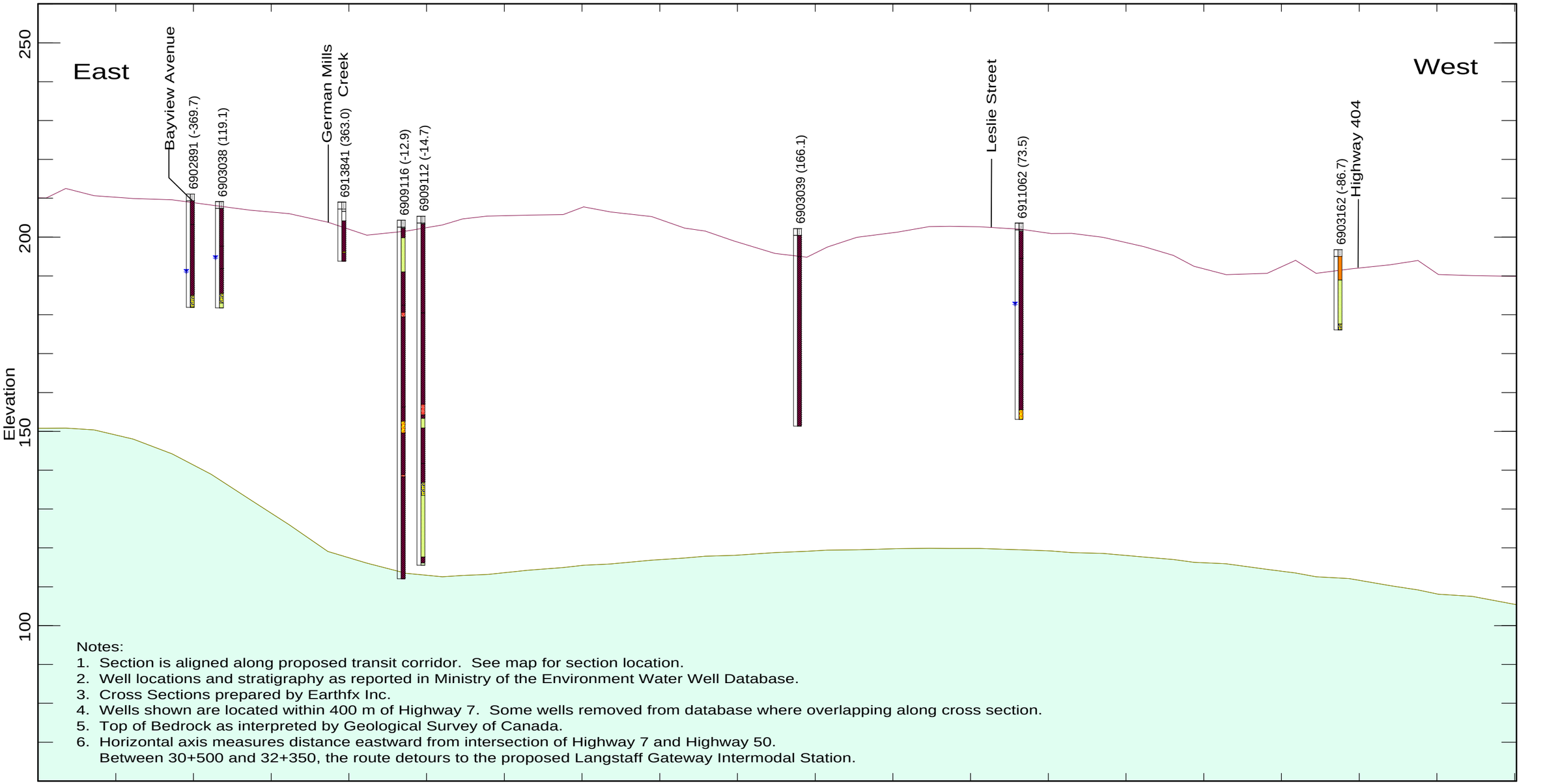
York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #6

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00



Notes:

1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 400 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

Legend

- Ground Surface
- Bedrock
- Static Water Level
- Sand
- Fine Sand
- Clay
- Hardpan
- Silt
- Fill
- Gravel
- Previously Dug or Bored
- Dense
- Shale
- Limestone

6912589 (12.5) MOE Well Designation (distance from section line)

Scale in metres

0 400 800

Approximate Scale: 1: 10000

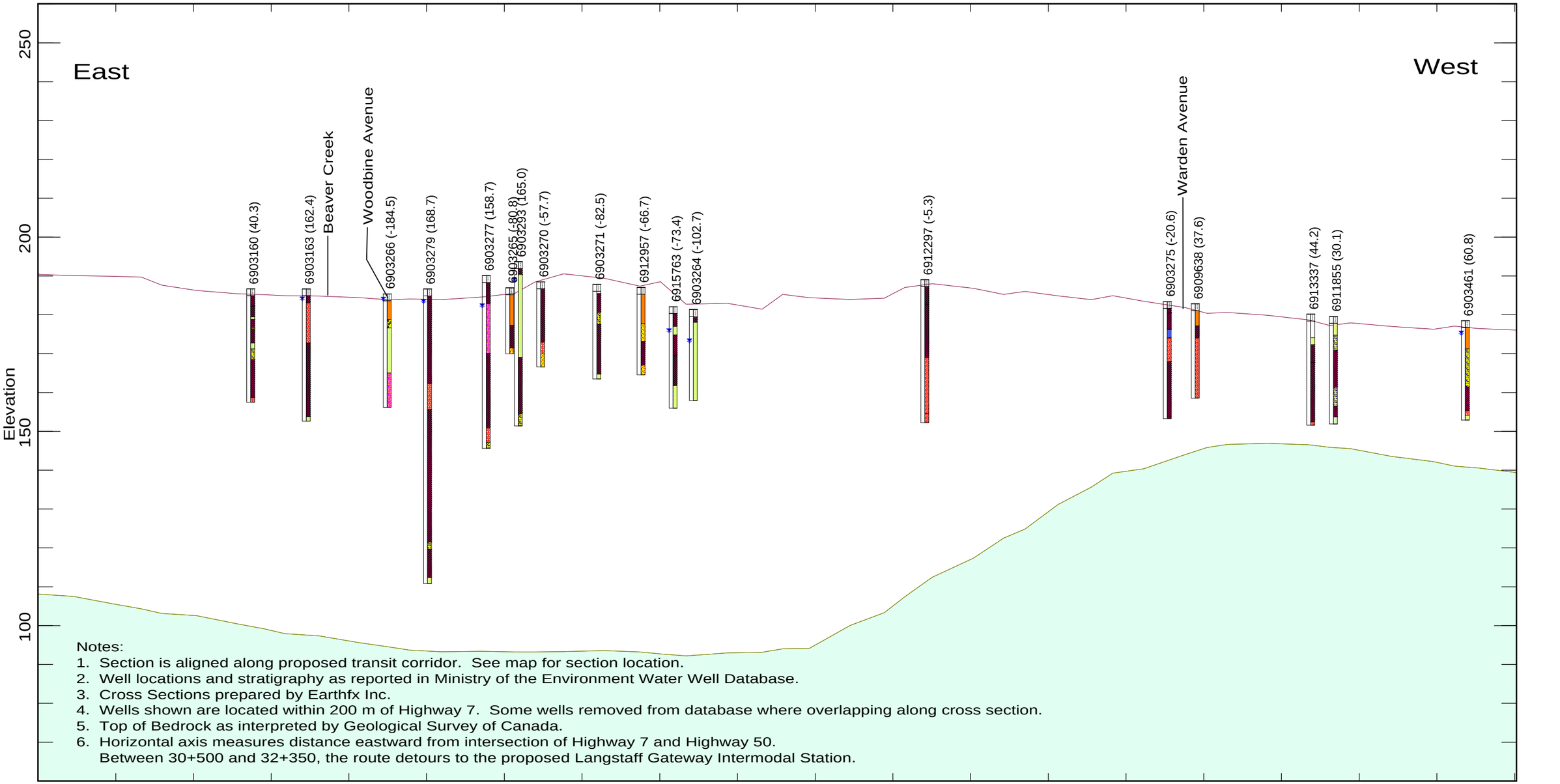
York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #7

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00



Notes:

1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 200 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

Legend

- Ground Surface
- Bedrock
- Static Water Level
- Sand
- Fine Sand
- Clay
- Hardpan
- Silt
- Fill
- Gravel
- Previously Dug or Bored
- Dense
- Shale
- Limestone

6912589 (12.5) MOE Well Designation (distance from section line)

Scale in metres

0 400 800

Approximate Scale: 1: 10000

York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #8

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00

East

West

Elevation

250
200
150
100

6903461 (60.8)
6903462 (54.8)
6903447 (-57.3)
6903466 (56.4)
6914919 (71.9)
6903460 (99.6)
6911856 (35.5)
6903446 (-63.4)
6914001 (64.4)
6903438 (-83.7)
6903454 (43.5)
6903464 (98.8)
6903442 (-71.2)
6903457 (77.2)
6903749 (-58.7)
6910166 (37.2)
Kennedy Road
6903755 (38.2)
6903764 (88.9)
6903759 (89.4)
6903765 (66.4)
6903734 (-21.1)
6909161 (59.0)
6903722 (-68.4)
6911447 (-92.6)
6903719 (-43.8)
6903720 (-84.2)
6910709 (90.2)
McCowan Road
6904171 (93.8)

Notes:
1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 100 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

40+650 41+650 42+650 43+650 44+450

Section Distance

Legend

Ground Surface
Bedrock
Static Water Level

Sand
Fine Sand
Clay
Hardpan
Silt
Fill
Gravel
Previously Dug or Bored
Dense
Shale
Limestone

6912589 (12.5) MOE Well Designation (distance from section line)

Scale in metres

0 400 800

Approximate Scale: 1: 10000

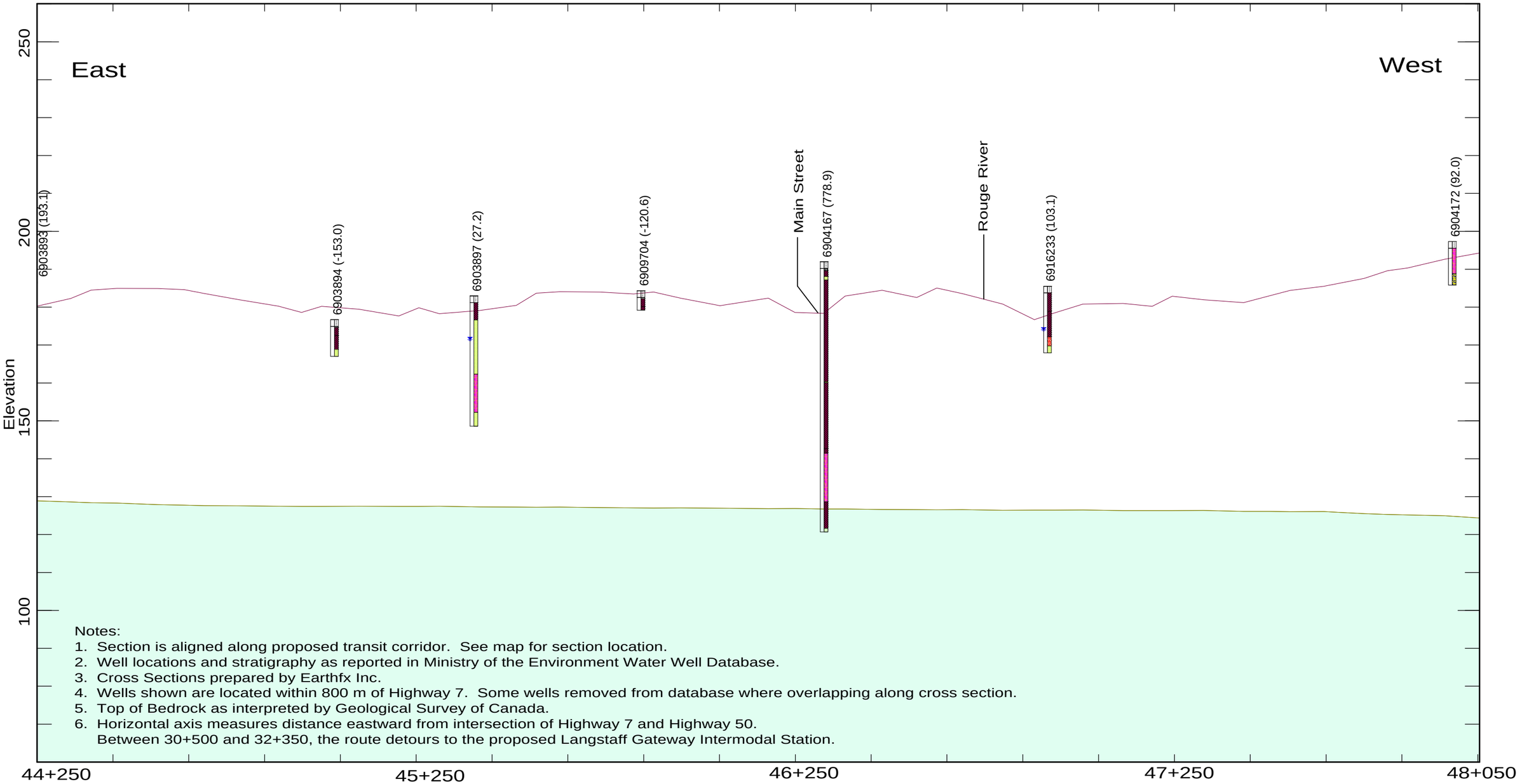
York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #9

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00



Notes:
1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 800 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

Legend

Ground Surface
Bedrock
Static Water Level

Sand
Fine Sand
Clay
Hardpan
Silt
Fill
Gravel
Previously Dug or Bored
Dense
Shale
Limestone

6912589 (12.5) MOE Well Designation (distance from section line)

Scale in metres
0 400 800
Approximate Scale: 1: 10000

York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #10

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00

East

West

Elevation

250

200

150

100

Ninth Line

Reesor Road

Little Rouge Creek

6904172 (92.0)
6903992 (-20.7)
Terraprobe 98-21 (65.6)
Terraprobe 98-22 (-59.8)
6904076 (-48.4)
6904080 (135.5)
6912908 (64.8)
6904086 (26.5)
6904074 (-45.8)
6904078 (34.0)
6914321 (21.4)
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6917410 (37.7)
6904133 (85.1)
6904126 (-12.1)
6918601 (-34.5)
6913444 (30.2)
6913831 (35.2)

Notes:

1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 150 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

47+850 48+850 49+850 50+850 51+650

Section Distance

Legend

Ground Surface
Bedrock
Static Water Level
6912589 (12.5) MOE Well Designation (distance from section line)

Sand
Fine Sand
Clay
Hardpan
Silt
Fill
Gravel
Previously Dug or Bored
Dense
Shale
Limestone

Scale in metres

0 400 800

Approximate Scale: 1: 10000

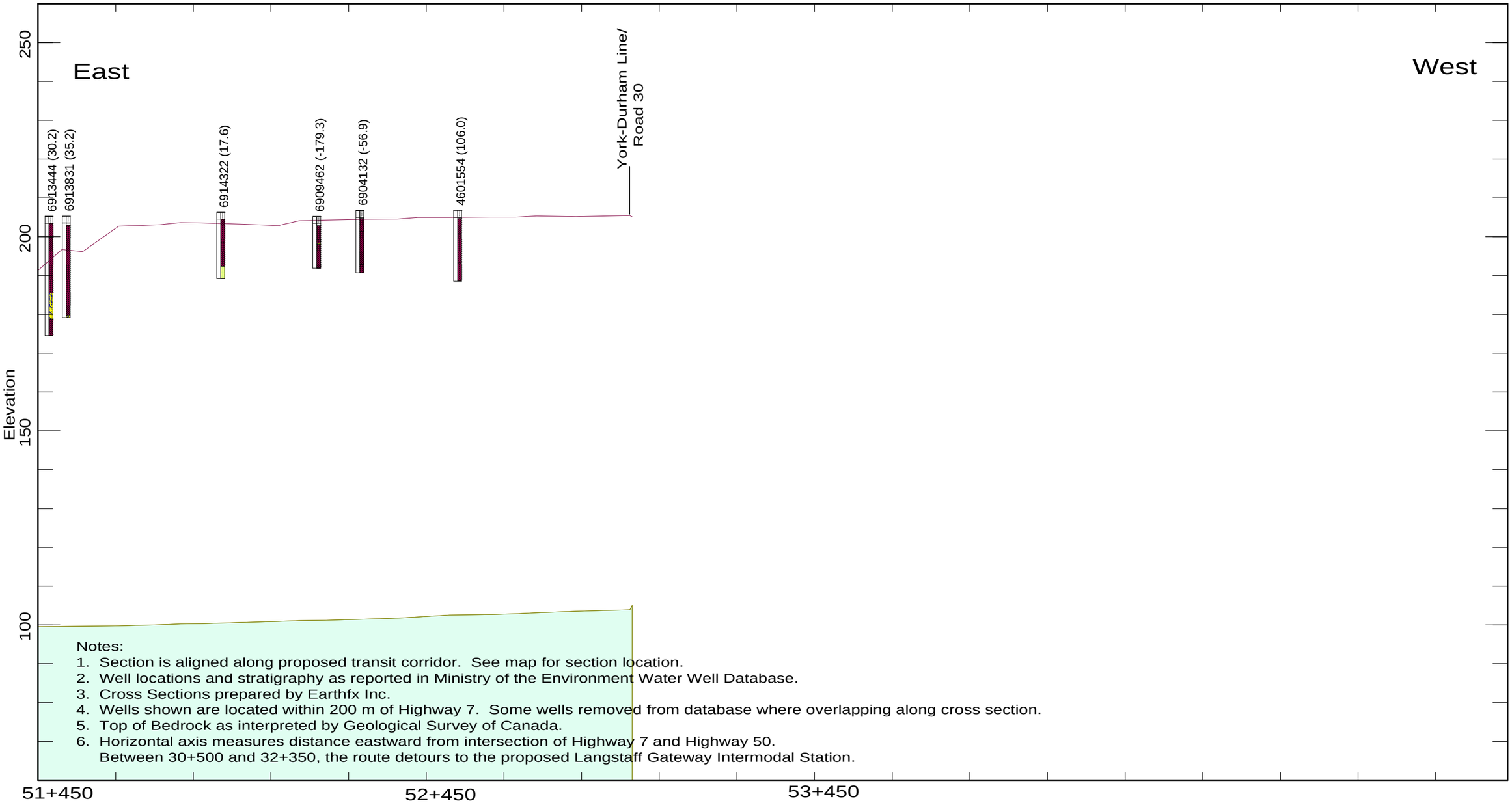
York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #11

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00



Notes:

1. Section is aligned along proposed transit corridor. See map for section location.
2. Well locations and stratigraphy as reported in Ministry of the Environment Water Well Database.
3. Cross Sections prepared by Earthfx Inc.
4. Wells shown are located within 200 m of Highway 7. Some wells removed from database where overlapping along cross section.
5. Top of Bedrock as interpreted by Geological Survey of Canada.
6. Horizontal axis measures distance eastward from intersection of Highway 7 and Highway 50.
   Between 30+500 and 32+350, the route detours to the proposed Langstaff Gateway Intermodal Station.

Legend

- Ground Surface
- Bedrock
- Static Water Level
- Sand
- Fine Sand
- Clay
- Hardpan
- Silt
- Fill
- Gravel
- Previously Dug or Bored
- Dense
- Shale
- Limestone

6912589 (12.5) MOE Well Designation (distance from section line)

Scale in metres

0 400 800

Approximate Scale: 1: 10001

York Region Transit Plan for York Consortium 2002

Highway 7 Alignment Cross Section #12

Date: 8/27/2003

Units: UTM NAD 83

Project Number: 021516.00

APPENDIX C
WATERCOURSE CROSSINGS – PHOTOGRAPHIC RECORD

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AUGUST 2003

PHOTO APPENDIX

H1: Albion Creek, facing upstream (north) from the Highway 7 culvert.

H1: Albion Creek, facing downstream (south) towards the Highway 7 culvert.

H1: Albion Creek, facing downstream (south) from the Highway 7 culvert.

H1: Albion Creek, facing upstream (north) towards the Highway 7 culvert.

H2: Tributary of theMain Humber River, facing upstream (north) from Highway 7.

H2: Tributary of the Main Humber River, facing downstream (south) from Highway 7.

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PHOTO APPENDIX

H3: Tributary of the Main Humber River, facing upstream (north) from the Highway 7 culvert.

H3: Tributary of the Main Humber River, facing downstream (south) towards the Highway 7 culvert.

H3: Tributary of the Main Humber River, facing downstream (south) from the Highway 7 culvert.

H3: Tributary of the Main Humber River, facing upstream (north) towards the Highway 7 culvert.

H4: Tributary of the Main Humber River, facing upstream (northeast) from the Highway 7 culvert.

H4: Tributary of the Main Humber River, facing upstream (northwest) from the Highway 7 culvert.

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PHOTO APPENDIX

H4: Tributary of the Main Humber River, facing downstream (south) towards the Highway 7 culvert.

H4: Tributary of the Main Humber River, facing downstream (south) from the Highway 7 culvert.

H4: Tributary of the Main Humber River, facing upstream (north) towards the Highway 7 culvert.

H5: Tributary of Rainbow Creek, facing upstream (north) from the Highway 7 bridge.

H5: Tributary of Rainbow Creek, facing downstream (south) towards the Highway 7 bridge.

H5: Tributary of Rainbow Creek, facing downstream (south) from the Highway 7 bridge.

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AUGUST 2003

PHOTO APPENDIX

H5: Tributary of Rainbow Creek, facing upstream (north) towards the Highway 7 bridge.

H6: Rainbow Creek, facing downstream (south) from the Highway 7 culvert.

H6: Rainbow Creek, tributary of the Humber River, facing upstream (north) towards the Highway 7 culvert.

H7: The Main Humber River, facing upstream (north) from the Highway 7 bridge.

H7: The Main Humber River, facing downstream (south) towards the Highway 7 bridge.

H7: The Main Humber River, facing downstream (south) from the Highway 7 bridge.

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PHOTO APPENDIX

H7: The Main Humber River, facing upstream (north) towards the Highway 7 bridge.

H8: Tributary of the Main Humber, River facing upstream (north)from the Highway 7 culvert.

H8: Tributary of the Main Humber River, facing downstream (south) towards the Highway 7 culvert.

H8: Tributary of the Main Humber, River facing downstream (south) from the Highway 7 culvert.

H8: Tributary of the Main Humber River, facing upstream (north) towards the Highway 7 culvert.

H10: Tributary of Black Creek, facing upstream (north) from the Highway 7 culvert.

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AUGUST 2003

PHOTO APPENDIX

H10: Tributary of Black Creek, facing downstream (south) toward the Highway 7 culvert.

H10: Tributary of Black Creek, facing downstream (south) from the Highway 7 culvert.

H10: Tributary of Black Creek, facing upstream (north) towards the Highway 7 culvert.

H11: Tributary of Black Creek, facing upstream (north) from H10 Highway 7 culvert.

H12: Black Creek facing upstream (north) from the Highway 7 culvert.

H12: Black Creek further upstream (north) from the Highway 7 culvert, at the stormwater management pond outflow.

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AUGUST 2003

PHOTO APPENDIX

H12: Black Creek facing downstream (south) towards the Highway 7 culvert.

H12: Black Creek facing downstream (south) from the Highway 7 culvert.

H12: Black Creek facing upstream (north) towards the Highway 7 culvert.

H13: Black Creek facing upstream (east) from the Jane Street culvert.

H13: Black Creek facing downstream (west) towards the Jane Street culvert.

H13: Black Creek facing downstream (west) from the Jane Street culvert.

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PHOTO APPENDIX

H13: Black Creek facing upstream (east) towards the Jane Street culvert.

H14: Tributary of Black Creek, facing upstream (east) from the Jane Street culvert.

H14: Tributary of Black Creek, facing downstream (west) towards the Jane Street culvert.

H14: Tributary of Black Creek, facing downstream (west) from the Jane Street culvert.

H14: Tributary of Black Creek, facing upstream (east) towards the Jane Street culvert.

H15: Black Creek facing upstream (north) from the Steeles Avenue bridge.

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AUGUST 2003

PHOTO APPENDIX

H15: Black Creek facing downstream (south) towards the Steeles Avenue bridge.

H15: Black Creek facing downstream (south) towards the Steeles Avenue bridge.

H15: Black Creek facing downstream (south) from the Steeles Avenue bridge.

H15: Black Creek facing upstream (north) towards the Steeles Avenue bridge.

D1: Tributary of the West Don River, facing upstream (northwest) from the Highway 7 culvert.

D1: Tributary of the West Don River, facing downstream (southeast) towards the Highway 7 culvert.

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PHOTO APPENDIX

D1: Tributary of the West Don River, facing downstream (southeast) from the Highway 7 culvert.

D1: Tributary of the West Don River, facing upstream (northwest) towards the Highway 7 culvert.

D2: Tributary of the West Don River, facing upstream (northwest) from the Highway 7 culvert.

D2: Tributary of the West Don River, facing downstream (southeast) towards the Highway 7 culvert.

D2: Tributary of the West Don River, facing downstream (south) from the Highway 7 culvert.

D2: Tributary of the West Don River, facing upstream (north) towards the Highway 7 culvert.

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PHOTO APPENDIX

D3: The West Don River, facing upstream (north) from the Highway 7 bridge.

D3: The West Don River, facing downstream (south) towards the Highway 7 bridge.

D3: The West Don River, facing downstream (south) from the Highway 7 bridge.

D3: The West Don River, facing upstream (north) towards the Highway 7 bridge.

D5: Tributary of the East Don River, facing upstream (north) from the Highway 7 culvert.

D5: Tributary of the East Don River, further upstream (north) from the Highway 7 culvert, at the stormwater management pond outflow.

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PHOTO APPENDIX

D5: Tributary of the East Don River, facing downstream (south) towards the Highway 7 culvert.

D5: Tributary of the East Don River, facing downstream (south) from the Highway 7 culvert.

D5: Tributary of the East Don River, facing upstream (north) towards the Highway 7 culvert.

D6: Tributary of the East Don River, facing upstream (north) from the Highway 7 culvert.

D6: Tributary of the East Don River, facing downstream (south) towards the Highway 7 culvert.

D6: Tributary of the East Don River, facing downstream (south) from the Highway 7 culvert.

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PHOTO APPENDIX

D6: Tributary of the East Don River, facing upstream (north) towards the Highway 7 culvert.

D7: The East Don River, facing a pedestrian bridge upstream (north) from the Highway 7culvert.

D7: The East Don River, facing upstream (north) from the pedestrian bridge.

D7: The East Don River, facing downstream (south) towards the pedestrian bridge, with the Highway 7 culvert further downstream.

D7: The East Don River, facing railway bridge downstream (south) from the Highway 7 culvert.

D7: The East Don River, facing upstream (north) towards the Highway 7 culvert.

PROJECT #TA2818
AUGUST 2003

PHOTO APPENDIX

D8: Tributary of the East Don River, facing upstream (northwest) from the Highway 7/Yonge Street culvert.

D8: Tributary of the East Don River, facing downstream (southeast) towards the Highway 7/Yonge Street culvert.

D8: Tributary of the East Don River, facing downstream (southeast) from the Highway 7/Yonge Street culvert.

D8: Tributary of the East Don River, facing upstream (northwest) towards the Highway 7/Yonge Street culvert.

D9: Tributary of the East Don River, facing upstream (north) from the Highway 407/Langstaff Road culvert.

D9: Tributary of the East Don River, facing downstream (south) towards the Highway 407/Langstaff Road culvert.

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PHOTO APPENDIX

D9: Tributary of the East Don River, facing downstream (south) from the Highway 407/Langstaff Road culvert.

D9: Tributary of the East Don River, facing upstream (north) towards the Highway 407/Langstaff Road culvert.

D12: German Mills Creek facing upstream (north) from the Highway 7 culvert.

D12: German Mills Creek facing downstream (south) towards the Highway 7 culvert.

D12: German Mills Creek facing downstream (south) from the Highway 7 culvert.

D12: German Mills Creek facing upstream (north) towards the Highway 7 culvert.

PHOTO APPENDIX

D14: Tributary of German Mills Creek, facing a sanitary sewer under gabion protection upstream (north) from the Highway 7 culvert.

D14: Tributary of German Mills Creek, facing downstream (south) towards the Highway 7 culvert.

D14: Tributary of German Mills Creek, facing downstream (south) from the Highway 7 culvert.

D14: Tributary of German Mills Creek, facing upstream (north) towards the Highway 7 culvert.

D15: Tributary of German Mills Creek, facing upstream (north) from the Highway 7 culvert.

D15: Tributary of German Mills Creek, facing downstream (south) from the Highway 7 culvert.

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AUGUST 2003

PHOTO APPENDIX

D16: The West Don River, facing upstream (north) south of Highway 407.

D16: The West Don River, facing downstream (south) south of Highway 407.

D17: Westminster Creek facing downstream(south) south of Highway 407.

D17: Westminster Creek facing upstream(north) towards the culvert, south of Highway 407.

D18: Tributary of Westminster Creek facing downstream (south) from the culver, south of Highway 407.

D18: Tributary of Westminster Creek facing upstream (north) towards the culvert, south of Highway 407.

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AUGUST 2003

PHOTO APPENDIX

D19: Westminster Creek facing upstream (north) from the Centre Street culvert.

D19: Westminster Creek facing downstream (south) towards the Centre Street culvert.

D20: Tributary of the East Don River, facing upstream (north) from the Centre Street culvert.

D20: Tributary of the East Don River, facing downstream (south) towards the Centre Street culvert.

D22: Tributary of the East Don River, facing upstream (west) from the Bathurst Street culvert.

D22: Tributary of the East Don River, facing downstream (east) towards the Bathurst Street culvert.

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AUGUST 2003

PHOTO APPENDIX

D22: Tributary of the East Don River, facing downstream (east) from the Bathurst Street culvert.

D22: Tributary of the East Don River, facing upstream (west) towards the Bathurst Street culvert.

R1: Tributary of Beaver Creek, facing downstream (north) from the Highway 7 culvert.

R1: Tributary of Beaver Creek, facing upstream (south) towards the Highway 7 culvert.

R2: Beaver Creek facing upstream (north) from the Highway 7 culvert.

R2: Beaver Creek facing downstream (south) towards the Highway 7 culvert.

PROJECT #TA2818
AUGUST 2003

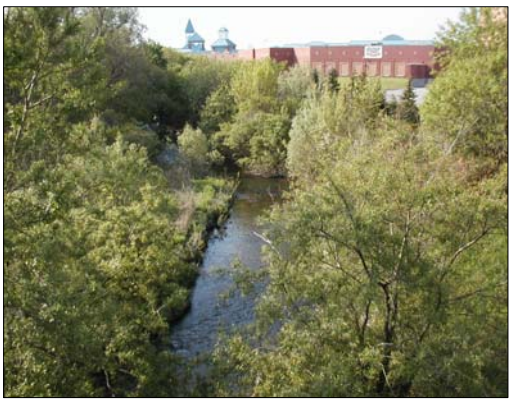
PHOTO APPENDIX

R2: Beaver Creek facing downstream (south) from the Highway 7 culvert.

R2: Beaver Creek facing upstream (north) towards the Highway 7 culvert.

R3: The Upper Rouge River, facing upstream (north) from the Highway 7 bridge.

R3: The Upper Rouge River, facing downstream (south) towards the Highway 7 bridge.



R3: The Upper Rouge River, facing downstream (south) from the Highway 7 bridge.

R3: The Upper Rouge River, facing upstream (north) towards the Highway 7 bridge.

PROJECT #TA2818
AUGUST 2003

PHOTO APPENDIX

R4: Tributary of the Lower Rouge River, facing upstream (north) from the Highway 7 culvert.

R4: Tributary of the Lower Rouge River, facing downstream (south) towards the Highway 7 culvert.

R4: Tributary of the Lower Rouge River, facing downstream (south) from the Highway 7 culvert.

R4: Tributary of the Lower Rouge River, facing upstream (north) towards the Highway 7 culvert.

R5: The Lower Rouge River, facing upstream (south) from the Highway 7 bridge.

R5: The Lower Rouge River, facing downstream (north) towards the Highway 7 bridge.

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AUGUST 2003

PHOTO APPENDIX

R5: The Lower Rouge River, facing downstream (north) from the Highway 7 bridge.

R5: The Lower Rouge River, facing upstream (south) towards the Highway 7 bridge.

R6: The Lower Rouge River, facing upstream (north) from the Highway 7 bridge.

R6: The Lower Rouge River, facing downstream (south) towards the Highway 7 bridge.

R6: The Lower Rouge River, facing upstream (north) towards the Highway 7 bridge.

R8: Robinson Creek facing upstream (north) from the Highway 7 culvert.

PROJECT #TA2818
AUGUST 2003

PHOTO APPENDIX

R8: Robinson Creek facing downstream (south) towards the Highway 7 culvert.

R9: Exhibition Creek facing upstream (north) from the Highway 7 culvert.

R9: Exhibition Creek facing downstream (south) towards the Highway 7 culvert.

R9: Exhibition Creek facing downstream (south) from the Highway 7 culvert.

R9: Exhibition Creek facing upstream (north) towards the Highway 7 culvert.

R10: Tributary of the Little Rouge River, facing upstream (north) from the Highway 7 culvert.

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AUGUST 2003

PHOTO APPENDIX

R10: Tributary of the Little Rouge River, facing downstream (south) towards the Highway 7 culvert.

R10: Tributary of the Little Rouge River, facing downstream (south) from the Highway 7 culvert.

R10: Tributary of the Little Rouge River, facing upstream (north) towards the Highway 7 culvert.

R11: Tributary of the Little Rouge River, facing R25 and upstream (north) from the Highway 7 culvert.

R11: Tributary of the Little Rouge River, facing downstream (south) towards the Highway 7 culvert.

R11: Tributary of the Little Rouge River, facing downstream (south) from the Highway 7 culvert.

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AUGUST 2003

PHOTO APPENDIX

R11: Tributary of the Little Rouge River, facing upstream(north) towards the Highway 7 culvert.

R12: Tributary of the Little Rouge River, facing upstream (north) from the Highway 7 culvert.

R12: Tributary of the Little Rouge River, facing downstream (south) towards the Highway 7 culvert.

R12: Tributary of the Little Rouge River, facing upstream (north) towards the Highway 7 culvert.

R13: Tributary of the Little Rouge River, facing upstream (north) from the Highway 7 culvert.

R13: Tributary of the Little Rouge River, facing downstream (south) from the Highway 7 culvert.

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PHOTO APPENDIX

R14: The Little Rouge River facing upstream (north) from the Highway 7 bridge.

R14: The Little Rouge River facing downstream (south) towards the Highway 7 bridge.

R14: The Little Rouge River facing downstream (south) from the Highway 7 bridge.

R14: The Little Rouge River facing upstream (north) towards the Highway 7 bridge.

R15: Beaver Creek facing upstream (northwest) from the Woodbine Avenue culvert.

R15: Beaver Creek facing downstream (southeast) towards the Woodbine Avenue culvert.

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AUGUST 2003

PHOTO APPENDIX

R15: Beaver Creek facing downstream (southeast) from the Woodbine Avenue culvert.

R15: Beaver Creek facing upstream (northwest) towards the Woodbine Avenue culvert.

R16: Beaver Creek facing upstream (northwest) north of Yorktech Drive.

R16: Beaver Creek facing downstream (southeast) north of Yorktech Drive.

R17: The Upper Rouge River, facing upstream (northwest), southeast of Rodick Road within the IBM complex.

R17: The Upper Rouge River, facing downstream (southeast), southeast of Rodick Road within the IBM complex. R18 is further downstream.

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PHOTO APPENDIX

R19: The Upper Rouge River, facing upstream (south), west of Warden Avenue within the IBM complex.

R19: The Upper Rouge River, facing downstream (north), west of Warden Avenue within the IBM complex.

R20: Tributary of the Lower Rouge River, facing upstream (south), north of proposed Enterprise Boulevard within proposed Markham Centre area.

R20: Tributary of the Lower Rouge River, facing downstream (north), north of proposed Enterprise Boulevard within proposed Markham Centre area.

R21: Tributary of the Lower Rouge River, facing upstream (west), west of the south end of Main Street Unionville.

R21: Tributary of the Lower Rouge River, facing downstream (east), west of the south end of Main Street Unionville.

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AUGUST 2003

PHOTO APPENDIX

R22: Tributary of the Lower Rouge River, facing upstream (west) from the Main Street Unionville culvert.

R22: Tributary of the Lower Rouge River, facing downstream (east) towards the Main Street Unionville culvert.

R22: Tributary of the Lower Rouge River, facing downstream (east) from the Main Street Unionville culvert.

R22: Tributary of the Lower Rouge River, facing upstream (west) towards the Main Street Unionville culvert.

R23: The Lower Rouge River, facing upstream (west) from the Main Street Unionville bridge.

R23: The Lower Rouge River, facing downstream (east) towards the Main Street Unionville bridge.

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PHOTO APPENDIX

R23: The Lower Rouge River, facing downstream (east) from the Main Street Unionville bridge.

R23: The Lower Rouge River, facing upstream (west) towards the Main Street Unionville bridge.

R24: Tributary of the Little Rouge River, facing upstream (north) south of Markham-Stouffville Hospital.

R24: Tributary of the Little Rouge River, facing downstream (south) south of the Markham-Stouffville Hospital.

R25: Tributary of the Little Rouge River, facing upstream (north) towards Coyote Pond.

R25: Tributary of the Little Rouge River, facing downstream (south) with R11 and Highway 7 visible in the background.

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PHOTO APPENDIX

P1: Tributary of Petticoat Creek, facing upstream (north) from the Highway 7 culvert

P1: Tributary of Petticoat Creek, facing downstream (south) towards the Highway 7 culvert

P1: Tributary of Petticoat Creek, facing downstream (south) from the Highway 7 culvert

P1: Tributary of Petticoat Creek, facing upstream (north) towards the Highway 7 culvert

P2: Petticoat Creek, facing upstream (north) from the Highway 7 culvert.

P2: Petticoat Creek, facing downstream (south) towards the Highway 7 culvert.

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AUGUST 2003

PHOTO APPENDIX

P2: Petticoat Creek, facing downstream (south) from the Highway 7 culvert.

P2: Petticoat Creek, facing upstream (north) towards the Highway 7 culvert.