NATURAL SCIENCES REPORT

NORTH YONGE STREET CORRIDOR
PUBLIC TRANSIT and ASSOCIATED ROAD IMPROVEMENTS
TRANSIT CLASS ENVIRONMENTAL ASSESSMENT

prepared for:

YRTP
YORK RAPID TRANSIT PLAN
Making the Right Connections!

prepared by:

LGL LIMITED
environmental research associates

with

JAGGER HIMS LIMITED
Environmental Consulting Engineers

DECEMBER 2008

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PUBLIC TRANSIT and ASSOCIATED ROAD IMPROVEMENTS
TRANSIT CLASS ENVIRONMENTAL ASSESSMENT

prepared by

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LGL Project # TA4174

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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).

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 Class Environmental Assessment for the Yonge Street North Corridor Public Transit and Associated Road Improvements. 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 study area, 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 Yonge Street Corridor 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.

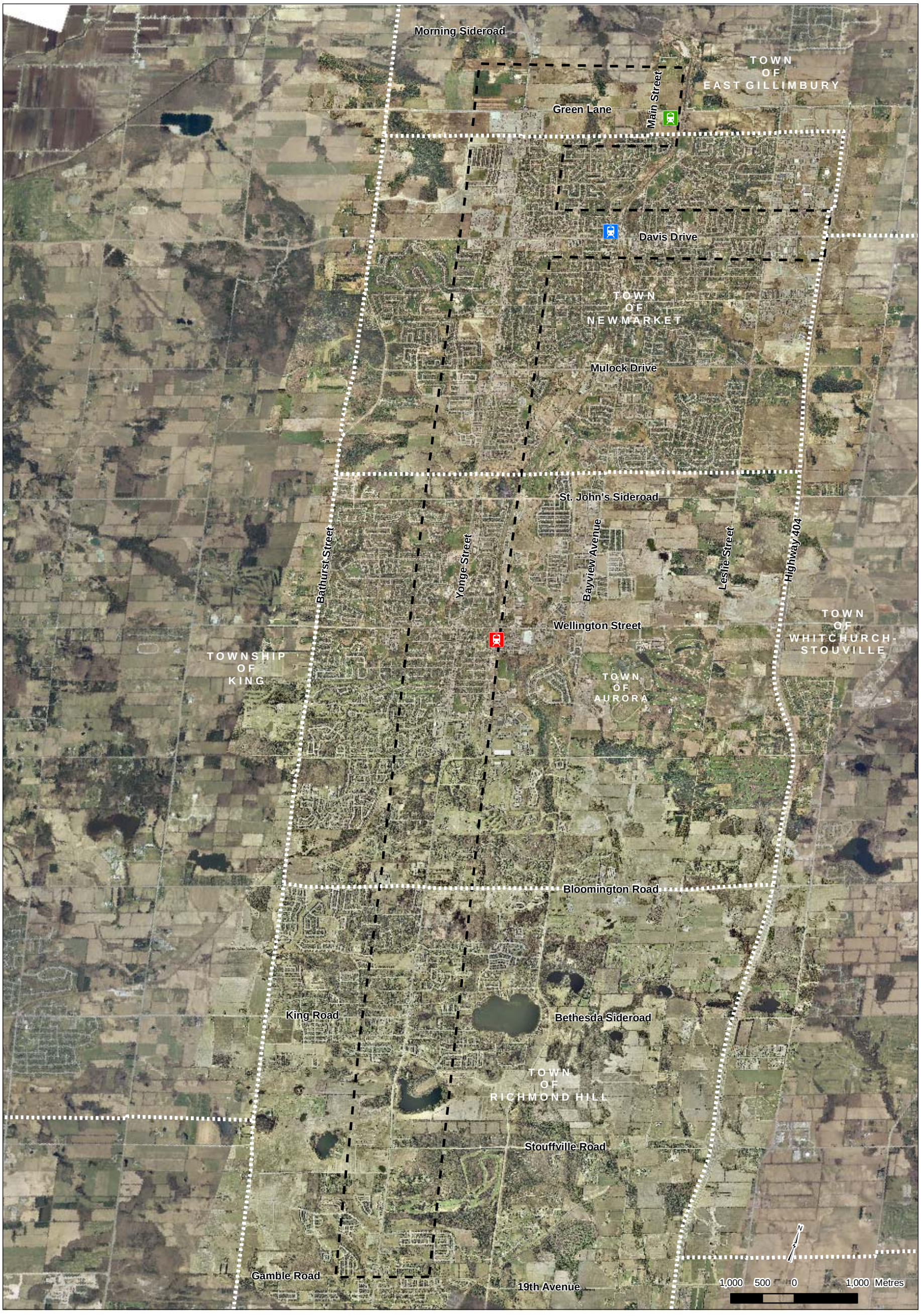
The original study area that was identified for the natural sciences investigation for the YRTP study extended from Gamble Road/19th Avenue, located in the Town of Richmond Hill to Green Lane, located in the Town of East Gwillimbury. The western limit was delineated by Bathurst Street as it traverses through Richmond Hill, Aurora and Newmarket and the eastern limit was delineated by Highway 404. A number of major transportation corridors oriented in a north/south direction are present in this section of York Region including: Bathurst Street, Yonge Street, Baview Avenue, Leslie Street and Highway 404. Major transportation corridors running east/west include: Gamble Road/19th Avenue, Stouffville Road, Bloomington Road, Vandorf Sideroad, Wellington Street/Aurora Road, St. Johns Sideroad , Davis Drive and Green Lane. The major north/south corridors were evaluated during the "alternatives to" phase of this study, with the Yonge Street corridor retained for further evaluation.

The primary study area for this phase of the environmental assessment includes an approximately 100 m wide corridor along Yonge Street from 19th Avenue/Gamble Road to Green Lane, the proposed alignment for the Yonge Street Rapidway. In addition, similar corridors were identified along Davis Drive from Yonge Street to Harry Walker Parkway. as well as along Green Lane from Yonge Street to the GO bus terminal.

The northern section of the study area is under the jurisdiction of the Lake Simcoe Region Conservation Authority (LSRCA) while the southern portion is located within the jurisdiction of the Toronto Region Conservation Authority (TRCA). The headwaters of three major watersheds are found in the study area. The East Holland River (LSRCA) watershed flows north draining the northern portion of the study area and the East Humber River and Rouge River (TRCA) watersheds flow south draining the southern portion of the study area.

The Oak Ridges Moraine is the most significant physiographic region within the study area. Within the jurisdiction of TRCA on Yonge Street from Gamble Road to Bloomington Road the lands are designated in the Oak Ridges Moraine Conservation Plan as "Natural Core Area" on the east side of Yonge Street surrounding Bond Lake and "Natural Linkage Area" on the west side of Yonge Street, west of Bond Lake. Further south on Yonge Street, on the east side, south of Stouffville Road the area is designated as "Natural Linkage Area" with a small section on the west side of Yonge Street as well. A very small section of "Countryside Area" is located on the east side of Yonge Street, south of Stouffville Road. The balance of the lands in TRCA's jurisdiction is designated as "Settlement Area." Within the jurisdiction of TSRCA on Yonge Street from Bloomington Road to Industrial Parkway the lands are designated as "Settlement Area."

A key plan of the study area is presented in Figure 1.



LEGEND

- Study Area
- Municipal Boundary
- East Gwillimbury GO Station
- Newmarket GO Station
- Aurora GO Station

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KEY PLAN

Project:	TA4174	**Figure:**	1
Date:	July 2008	**Checked By:**	GAN
Scale:	1 : 62,000	**Prepared By:**	MWF

2.1 Physiography and Soils

The study area is located within the Schomberg Clay Plains and the Oak Ridges Moraine physiographic regions. The former region extends centrally through the region from approximately Aurora Road to Green Lane and the latter region encompasses the entire southern portion of the study area from Aurora Road, south to Gamble Road/19th Avenue.

The soils within the Schomberg Clay Plains are classed as Schomberg clay loam and Schomberg clay silts. Both of these soils are slightly alkaline, demonstrate good drainage and are generally associated with a smooth, moderately sloping to irregular steeply sloping type of topography. The east branch of the Holland River is mainly confined to this area. Along the north-eastern limits of the study area, the Schomberg clay loams are replaced by Bondhead sandy loams and Perry fine sandy loams. There soils provide good drainage on a smooth, gently to moderately sloping type of topography.

Within the southern half of the study area between Aurora Road and Gamble Road/19th Avenue, the soil types associated with the Oak Ridges Moraine are noticeably different. Pockets of Schomberg clay loams are present; however, the majority of the area is underlain by Pontypool sandy loam and Woburn loam. Both of these soils provide good drainage and are characteristic of a smooth to irregular steeply sloping type of topography. A diversity of soil types is represented in the Oak Ridges/Lake Wilcox area. Immediately west of Lake Wilcox to the Yonge Street corridor the soils within the East Humber River watershed are comprised of Milikan loam and Brady sandy loam. Both of these soils are imperfectly drained and slightly acidic. Milikan loams occur in a moderately sloping topography while Brady sandy loams are generally confined to a very gently sloping type of topography. A band of Brighton sandy loam over gravel extends northeast from Wilcox Lake to Bloomington Road between Bayview Avenue and Leslie Street. This soil type is characterized as having good drainage through a very gently sloping topography. Toward and along the eastern boundary of the study area between Stouffville Road and Bloomington Road, the gently sloping topography is maintained; however, the gravely soils are replaced by Peel clay. This soil type is imperfectly drained and is generally found in a smooth to gently sloping landform. This relationship is evident by the presence of the Wilcox Lake Bog and the Wilcox-St. George Wetland Complex. The Forester Marsh area located west of Bayview Avenue, south of Bloomington Road, provides another distinct type of soil classification within the study area. The soil series is classed as Muck and is described as having well decomposed organic deposits (18" +) over mineral material and as having very poor drainage.

2.2 Geology/Hydrogeology

Jagger Hims Limited conducted an investigation of hydrogeological conditions along the southern portion of the proposed alignment in 2003. A subsequent investigation of the northern section of the proposed alignment was completed in 2008. The study area for the hydrogeological investigation along the northern section of the proposed alignment includes approximately 500 m on either side of Yonge Street between 19th Avenue/Gamble Road and Green Lane, Green Lane between Yonge Street and the East Gwillimbury GO station and Davis Drive from Yonge Street to Leslie Street. The hydrogeological investigation involved collection of secondary information and field reconnaissance.

2.2.1 Surficial Geology along Yonge Street

The main physiographic regions in the study area are the Schomberg Clay Plains and the Oak Ridges Moraine, as previously discussed. These regions comprise the primary units of surficial geology along the proposed Yonge Street alignment. The surficial sediments in the study area overlie the relatively flat-lying Palaeozoic rocks of the St. Lawrence Lowlands (Geological Survey of Canada, 1997).

The Schomberg Clay Plains are classified as glacial lake deposits of silt and clay that are massive to laminated. The Oak Ridges Moraine is a region comprised of moraine deposits of fine sand to gravel and glacial till deposits of clayey silt to silt. The glacial deposits occur in till or lake plains often with interbedded fine sand, silt and clay. The surficial geology of the northern section of the proposed Yonge Street, from Gamble Road/19th Avenue to Green Lane, is illustrated in Appendix C.

The surficial geology in the study area from Gamble Road/19th Avenue to King Road is primarily glaciolacustrine-derived silty to clayey till, with a band of ice-contact stratified deposits. Moving north from King Road there is a band of glaciofluvial deposits and then another band of ice-contact stratified deposits. North of Henderson Drive/Vandorf Sideroad, the surficial geology changes to massive-well laminated with seams of older alluvial deposits.

2.2.2 Horizontal Groundwater Movement

The physical setting of the study area indicates that the water table surface can be interpreted to be a subtle reflection of the ground surface topography trends. Groundwater in the study area will tend to move in the local downslope direction. In areas where a surface water course is present, the shallow groundwater flow will be toward the surface water course. Shallow groundwater flow can also be impacted by the presence of underground service trenches, which can result in complex local flow patterns.

The development of the proposed Yonge Street alignment potentially may impact local shallow groundwater quality. If quality effects were to occur, the affected groundwater would move down-gradient. Any down-gradient active groundwater supply wells or surface water courses that are hydraulically connected to the shallow groundwater system would have a greater susceptibility to any potential effects. It is unlikely that local wells and water courses located up-gradient of the proposed alignment would be affected.

2.2.3 Groundwater Recharge/Discharge Areas

Groundwater recharge occurs in areas where groundwater movement within the surficial soils has a downward component. The amount of recharge per unit area depends on the climatic moisture surplus, and local conditions such as soil type, ground slope, vegetation, and impervious cover. Groundwater recharge will occur over the majority of the study area that is located along surface water courses and their flood plains. Areas that are covered in impervious surfaces (buildings, roads and parking areas) will not contribute significantly to groundwater recharge. Primary areas of groundwater recharge will be located in areas of natural groundcover or where soil is exposed, including parks, lawns, golf courses, school yards, undeveloped lots, open fields and grassed roadside drainage ditches.

A groundwater discharge area is land where groundwater movement in the surficial soils has an upward component. The water table in discharge areas is usually close to or at the ground surface. Discharge areas include permanent surface water courses (where dry season flow is maintained through baseflow contributions) and wetlands, depending on site conditions.

In general, infiltration and recharge of the shallow groundwater system and underlying aquifers replenishes the volume of groundwater that discharges as baseflow contributions to surface water courses. Decreases in recharge can result in decreased volume of baseflow to surface water courses and, consequently, lower stream flow and potentially higher temperatures during the summer and early fall months.

Recharge and discharge areas were interpreted as part of the hydrogeologic analysis of the study area. Discharge areas are interpreted to occur at the surface water courses, and in the adjacent floodplain areas.

There are nine (9) areas where a water course is crossed by Yonge Street within the study area, as shown in Figure 3a. In addition, there are four (4) areas where a water course crosses or abuts Davis Drive within the study area, as illustrated in Figure 3b. Finally, there are two locations on Green Lane where a surface water course crosses the road in the study area, illustrated in Figure 3c.

The water well database indicated 1061 well records relevant to the proposed Yonge Street alignment. Reported water levels at time of well construction range from 72 m below ground surface to at or above ground surface. The database shows that for the well records relevant to the proposed alignment, five (5) wells were reported with the water level at ground surface and four (4) wells were reported as having artesian or flowing conditions (water level above ground surface). The four (4) wells with flowing or artesian conditions are located:

- Off St. John's Sideroad E on Pinnacle Trail. The well is separated from Yonge Street by the St. Andrews Valley Golf and Country Club. The Holland River flows through the St. Andrews Valley Golf and Country Club in between Yonge Street and the reported artesian well.
- In St. Andrews Valley Golf and Country Club on the east side of the Holland River from Yonge Street.
- West of Yonge Street, North of Wellington, along the Holland River near the Aurora Community Centre. The well survey data provided for this well indicates that, when drilled, the water level was recorded at 7 feet above ground surface.
- North of Davis Drive just off Main St, East of Yonge. The record for this well indicates a water level of 4 feet above ground when the well was drilled.

There are also several wells on record in the study area that indicate a shallow water table condition. These are wells where, at time of construction, the water level was reported as being at or just below ground surface (less than 2 feet below surface). Of these wells, two are located near the wells reported as artesian in the St. Andrews Valley Golf and Country Club and near the Aurora Community Centre. The other wells reported with shallow groundwater conditions are located: south-east of the intersection of Yonge and Mulock Dr; east of Yonge and north of Industrial Parkway South; northeast of intersection of Yonge and Bloomington Road East and west of Yonge, south of Jefferson Sideroad.

Wells are not reported as being present everywhere in the Study Area, and depth to static water level information was not available for all wells reported in the MOE database, so there may be other locations with artesian conditions or a shallow water table that are not documented by the available data.

Wetlands are also general indicators of shallow water table discharge areas. There are several wetland-type areas adjacent or in close proximity to the proposed Yonge Street alignment between Gamble Road and Green Lane. The wetlands are identified in Figure 3a, 3b and 3c. Beginning in the south, the provincially significant Philips-Bond-Thompson Wetland Complex is located on the northwest corner of the intersection of Yonge and Jefferson Sideroad. The provincially significant complex including Bond Lake and Bond Lake Bog are located north of the intersection of Yonge Street and Stouffville Road, on the east side of Yonge. Another section of the Philips-Bond-Thompson Wetland Complex is located opposite Bond Lake Bog, on the west side of Yonge. The provincially significant and locally significant Wilcox-St. George Wetland Complex is located on both sides of Yonge north of King Road. Finally, the Aurora Mackenzie Marsh, designated as provincially significant, is located on St. John's Sideroad at Yonge.

2.2.4 Well Distribution

The MOE well record database was used to compile an inventory of water supply wells in the study area. The MOE database documents the historic presence of about 970 water supply wells along the Yonge Street corridor from Gamble Road to Green Lane. There is no information available to confirm which, if any, of the listed wells are still in operation. Also, it is noted that the MOE database typically does not include records for all of the wells that have been drilled in specific areas. Also, the locations of wells listed in the database can be inaccurate with respect to the on-ground locations.

The number of wells within a 100 m wide corridor along Yonge Street was counted based on GPS positions reported in the MOE water well database. The results are presented in one-kilometre sections relative to proposed transit alignment, beginning at the intersection of Yonge and Gamble/19th Ave in Richmond Hill (15+000) and ending at the intersection of Yonge and Green Lane in Newmarket (33+600). The position of the wells (either east or west of Yonge) is indicated. Counts provided should be considered as estimates, due to accuracy limitations of locations in the source database. Additional water supply wells may be located within the Study Area that are not registered in the MOE database.

Section	Count of Historic Wells	
	West	East
15+000 – 16+000	5	6
16+000 – 17+000	4	2
17+000 – 18+000	0	6
18+000 – 19+000	1	4
19+000 – 20+000	2	0
20+000 – 21+000	2	0
21+000 – 22+000	1	6
22+000 – 23+000	3	0
23+000 – 24+000	1	5
24+000 – 25+000	0	0
25+000 – 26+000	0	0
26+000 – 27+000	0	0
27+000 – 28+000	0	0
28+000 – 29+000	0	2
29+000 – 30+000	0	1
30+000 – 31+000	0	0
31+000 – 32+000	1	1
32+000 – 33+000	1	1
33+000 – 33+600	1	0

The majority of the wells historically documented in the study area are no longer active and almost certainly have been demolished, buried over, or decommissioned following urbanization. Most residential, commercial, and industrial sites are fully serviced by municipal water supplies.

2.3 Aquatic Habitats and Communities

A review of background information on fish communities and habitat within the Rouge River, East Humber River and East Holland River watersheds was undertaken by LGL Limited. The Lake Simcoe Region Conservation Authority (LSRCA), the Toronto Region Conservation Authority (TRCA) and the Ministry of Natural Resources (MNR) provided fish collection data. Information from the MNR included

survey reports for fish collection stations conducted by MNR staff as well as field collection records provided to MNR by various consultants under Scientific Collection Permits. Specific reference to any Consultant reports is not made as the data is considered to be part of the MNR data base. Information used in our analysis spanned a period from 1976 to the present.

2.3.1 Fish Communities

One of the most commonly used indices to describe fish communities is in relation to the thermal regime of the fish species present. Temperate freshwater fish fall into three thermal groups along the temperature gradient axis – cold, cool or warm water fishes. Similarly, freshwater streams are also characterized as coldwater, coolwater or warmwater and generally, but not always, reflect the species present. Working definitions for these three classifications are as follows:

> Coldwater stream – A watercourse that supports species that are best adapted, prefer or usually occur at water temperatures less than 19°C.
>
> Coolwater stream - A watercourse that supports species that are best adapted, prefer or usually occur at water temperatures between 19°C and 25°C.
>
> Warmwater stream - A watercourse that supports species that are best adapted, prefer or usually occur at water temperatures greater than 25°C.

In the present study, fish species representative of all three temperature regimes were found to occur. Of the 29 species identified, approximately 70% fell within the cool water guild, represented predominately by Catostomids (white sucker), Cyprinids (minnows, shiners and dace) and Percids (perch and darters); 30% fell within the warm water guild including Centrarchids (bass, bluegill and pumpkinseed) and Ictalurids (brown bullhead), while only 10% fell within the cold water guild, represented by Salmonids (brook trout) and Cottids (sculpins). Overlap between the coolwater and warmwater guilds was evident in fish communities exhibiting Centrarchid and Cyprinid species. The overlap occurred with species having preferred temperature regimes within the 21°C - 26°C range. Life history data, including temperature regimes for each representative fish species occurring in the study area, are given in Table 1. The information presented follows the classifications outlined in Eakins, R.J. 2007, Ontario Freshwater Fishes Life History DataBase, Version 2.98.

Site-specific fish collection data was not always available for a particular road crossing location. To circumvent this, data points both upstream and downstream from a specific crossing were combined to describe the fish community present. A summary of the fish species collected by MNR and LSRCA at inventoried streams within the Yonge Street corridor is presented in Table 2. The locations of the 'Fish dot/sampling locations' are illustrated in Figure 2.

In addition to acquired data, field site visits were undertaken by LGL staff to determine existing habitat conditions and record the physical characteristics of each watercourse. A summary of this information is given in Table 3.

Table 1
Species List and Life History Data
For Fish Species Occurring in the Study Area

Family Name	Scientific Name	Common Name	Thermal Regime	Preferred Temperature	Tolerance	Economic Importance	Status		
							S-Rank	MNR	COSEWIC
Catostomidae	*Catostomus commersonii*	white sucker	coolwater	22.4°C	tolerant	forage fish; bait fish; coarse fish	S5	none	none
Centrarchidae	*Ambloplites rupestris*	rock bass	coolwater	20.6 – 23.3°C	intermediate	pan fish	S5	none	none
	Lepomis gibbosus	Pumpkinseed	warmwater	21.1 – 23.9°C	intermediate	panfish	S5	none	none
	Lepomis macrochirus	Blugill	warmwater	23.9 – 26.7°C	intermediate	panfish	S5	none	none
	Micropterus salmoides	largemouth bass	warmwater	20 - 30°C	intermediate	sport fish	S5	none	none
Cottidae	*Cottis bairdii*	mottled sculpin	coldwater	16.6°C	intermediate	forage fish; bait fish	S5	none	none
	Cottus cognatus	slimy sculpin	coldwater	9 - 14°C	intolerant	forage fish; bait fish	S5	none	none
Cyprinidae	*Carassius auratus*	Goldfish	warmwater	27.9°C	tolerant	ornamental species	S5	none	none
	Hybognathus hankinsoni	brassy minnow	coolwater	16 - 27°C	intermediate	forage fish; bait fish	S5	none	none
	Luxilus cormutus	common shiner	coolwater	21.9°C	intermediate	bait fish	S5	none	none
	Notemigomus crysolucas	golden shiner	coolwater	17 - 24°C	tolerant	bait fish	S5	none	none
	Notropis atherinoides	emerald shiner	coolwater	9 - 23°C	intermediate	bait fish; forage fish	S5	none	none
Cyprinidae	*Notropis hudsonius*	spottail shiner	coolwater	13 -22°C	intermediate	bait fish	S5	none	none

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Species List and Life History Data
For Fish Species Occurring in the Study Area

Family Name	Scientific Name	Common Name	Thermal Regime	Preferred Temperature	Tolerance	Economic Importance	Status		
							S-Rank	MNR	COSEWIC
	Phoxinus eos	northern redbelly dace	coolwater	13 - 21°C	intermediate	bait fish	S5	none	none
	Pimephales notatus	bluntnose minnow	warmwater	29°C	tolerant	bait fish	S5	none	none
	Pimiphales promelas	fathead minnow	warmwater	23 - 29°C	tolerant	bait fish ; forage fish	S5	none	none
	Rhinichthys atratulus	eastern blacknose dace	coolwater	15 - 22°c	tolerant	bait fish ; forage fish	S5	none	none
	Rhinichthys cataractae	longnose dace	coolwater	20.6°C	intermediate	bait fish ; forage fish	S5	none	none
	Semotilus atromaculatus	creek chub	coolwater	20.8°C	tolerant	bait fish	S5	none	none
Esocidae	*Esox lucius*	northern pike	coolwater	22.5°C	intermediate	sport fish	S5	none	none
Fundulidae	*Fundulus diaphanus*	banded killifish	coolwater	21°C	tolerant	bait fish	S5	none	none
Gasterosteidae	*Culaea inconstans*	brook stickleback	coolwater	21.3°C	tolerant	forage fish ; bait fish	S5	none	none
Ictaluridae	*Ameiurus nebulosus*	brown bullhead	warmwater	24.9 – 27.3°C	tolerant	coarse fish	S5	none	none
Percidae	*Etheostoma exile*	Iowa darter	coolwater	12 - 25°C	intermediate	bait fish	S5	none	none
Percidae	*Etheostoma nigrum*	jonny darter	coolwater	22.8°C	intermediate	forage fish ; bait fish	S5	none	none
	Perca flavescens	yellow perch	coolwater	18 - 22°C	intermediate	pan fish ; bait fish	S5	none	none

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Family Name	Scientific Name	Common Name	Thermal Regime	Preferred Temperature	Tolerance	Economic Importance	Status		
							S-Rank	MNR	COSEWIC
	Percina maculata	blackside darter	coolwater	17 -21°C	intermediate	bait fish	S5	none	none
Salmonidae	*Salvelinus fontinalis*	brook trout	coldwater	16°C	intolerant	sport fish	S5	none	none
Umbridae	*Umbra limi*	central mudminnow	coolwater	16 -23°CF	tolerant	bait fish	S5	none	none

Table 2
Fish Collected by MNR, TRCA and LSRCA at Inventoried Streams within the Yonge Street Corridor

Family Name	Scientific Name	Common Name	Status	Watercourse Sampling Stations									
				Rouge River	East Humber River		Tannery Creek		Armitage Creek	East Holland River	Western Creek	Unnamed Tributaries East Holland River		
					Trib A	Main	East Branch	Main Branch				YGL 1	YGL 2	YDD 3
Catostomidae	*Catostomus commersonii*	white sucker	S5	11	589 802	23-2, 589, 802	71	6, 149, 344, 338, EH11	148, 212, 213, 214	332, EH01	202, 204	Location 375 No catch		Location 348 EH28 No catch
Centrarchidae	*Ambloplites rupestris*	rock bass	S5			183				332, EH01				
	Lepomis gibbosus	pumkinseed	S5			183	71	344, 338, EH11,		332, EH01				
	Lepomis macrochirus	blugill	S5		589 802	589, 802								
	Micropterus salmoides	largemouth bass	S5		802	802, 183		338, EH11,		332, EH01				
Cottidae	*Cottis bairdii*	mottled sculpin	S5		802	802		6, 143	212, 213, 214	332, EH01				
	Cottus cognatus	slimy sculpin	S5											
Cyprinidae	*Carassius auratus*	goldfish	S5								201, 202, 203, 204, 205			
	Hybognathus hankinsoni	brassy minnow	S5											
	Luxilus cormutus	common shiner	S5		589 802	589, 802, 183				332	202			
	Notemigomus crysolucas	golden shiner	S5					149, 338, EH 11						

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Family Name	Scientific Name	Common Name	Status	Watercourse Sampling Stations										
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					Trib A	Main	East Branch	Main Branch				YGL 1	YGL 2	YDD 3
	Notropis atherinoides	emerald shiner	S5			23-2, 219, 220								
	Notropis hudsonius	spottail shiner	S5											
	Phoxinus eos	northern redbelly dace	S5	11										
	Pimephales notatus	bluntnose minnow	S5		589 802	589, 802	71	6, 148, 332	212, 213, 214	EH01				
	Pimiphales promelas	fathead minnow	S5	11		219, 220	71	344		332, EH01	343			
	Rhinichthys atratulus	eastern blacknose dace	S5	11	589 802	589, 802	EH13, 71	6, 149, 344, 338, EH11	148, 212, 213, 214	332, EH01			316	
	Rhinichthys cataractae	longnose dace	S5	11				149, 344, 338, EH11		332, EH01				
	Semotilus atromaculatus	creek chub	S5	11	589 802	23-1, 589, 802	EH13, 71	6, 149, 344, 338, EH11,	148, 212, 213, 214	332, EH01	201, 202		316	
Esocidae	*Esox lucius*	northern pike	S5			23-1								
Fundulidae	*Fundulus diaphanus*	banded killifish	S5			23-2, 183								

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Family Name	Scientific Name	Common Name	Status	Watercourse Sampling Stations										
				Rouge River	East Humber River		Tannery Creek		Armitage Creek	East Holland River	Western Creek	Unnamed Tributaries East Holland River		
					Trib A	Main	East Branch	Main Branch				YGL 1	YGL 2	YDD 3
Gasterosteidae	*Culaea inconstans*	brook stickleback	S5				EH13, 71	6, 149, 344, 338, EH11	148, 212, 213, 214					
Ictaluridae	*Ameiurus nebulosus*	brown bullhead	S5			23-2, 740, 183								
Percidae	*Etheostoma exile*	Iowa darter	S5		802	802								
	Etheostoma nigrum	jonny darter	S5	11	589 802	802, 589								
	Perca flavescens	yellow perch	S5		589 802	23-2, 589, 802, 183								
Salmonidae	*Salvelinus fontinalis*	brook trout	S5	8				143						
Umbridae	*Umbra limi*	central mudminnow	S5		589 802	23-1, 23-2, 219, 220, 589, 802, 740								

LEGEND

- Fish Sampling Location
- Transitway Crossing Location
- Watershed Boundary
- Municipal Boundary
- Oak Ridges Moraine North Boundary
- Watercourse

LGL LIMITED
environmental research associates

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

FISH SAMPLING LOCATIONS AND TRANSITWAY CROSSING LOCATIONS

Project:	TA4174	**Figure:**	2
Date:	December 2008	**Checked By:**	GAN
Scale:	1 : 45,000	**Prepared By:**	MWF

Table 3
Fish Habitat Assessment Summary

Crossing Number	Waterbody Name	Location & GPS Position	Type of Crossing	Fish Dot Sampling Stations	Fish Community		Habitat Summary		Habitat Type I, II, III	Flow Conditions	Waterbody Sensitivity	Drainage Connectivity	Comments
					CA[1] Value	LGL[2] Value	Upstream	Downstream					
YR1	Rouge River Tributary 'C'	Yonge Street 800m north of Gamble Road	Concrete box culvert 2mx2m	8,11	cold-water		• natural channel • mean width – 1.5m • morphology – poor, • open, meadow, no canopy • substrate – silt	• natural channel • mean width – 1.5m • morphology – poor, • open, meadow, no canopy • substrate – silt	II	permanent, low flow	low	good	historical records indicate a cold-water fisheries watercourse presently degraded resulting from urban stresses
Y1	East Branch – Humber River	Yonge St.at King Rd. 0624028, 4866863	concrete box culvert 2m x 4m	23, 219, 220, 589, 740, 802	cool – water	cool – water	• natural channel • mean width – 8m • morphology – runs, pools • contiguous with extensive cattail marsh • substrate – silt, detritus, clay, boulder	• natural channel mean width – 3.5m • morphology – riffles, runs, pools • emergent vegetation along banks • substrate – gravel, sand, silt, detritus, rubble	II	permanent, low flow	moderate	good	
Y1A	East Branch – Humber River tributary	Yonge Street at Black Forest Drive	1.5m CSP	589, 802	cool-water	cool-water	• no defined channel • morphology – poor, • open, no canopy • wetland • substrate – silt	• modified channel • mean width – 1m • morphology – poor • riparian vegetation – none • substrate – silt	II u/s III d/s	permanent, low flow	moderate u/s low d/s	good	
Y2	East Branch of Tannery Creek – tributary of East Holland River	Yonge St. between Kennedy and Church Sts. 0622943, 4872574	concrete box culvert 3m x 3m	EH11, EH13, 71, 149, 338	cold – water	cool – water	• natural channel • mean width – 1.7 – 2.5m • morphology – riffles, runs • riparian vegetation – trees, shrubs • substrate – cobble, sand, gravel, silt, detritus	• natural channel • mean width – 1.7 – 2.5m • morphology – riffles, runs • riparian vegetation – trees, shrubs • substrate – cobble, sand, gravel, silt, detritus	II	permanent, moderate / high flow	low	good	litter strewn on banks, commercial/residential area, no widening of roadway at this location
Y3	Main Branch – Tannery Creek	Yonge St. south of Orchard Heights Blvd 0622685, 4873937	2 – 4m CSP	EH11, 149, 338	cold – water	cool – water	• natural channel • mean width – 3.4m • morphology – some riffles, mainly runs • no vegetative canopy • sparse riparian vegetation – cultural thicket • substrate – sand, gravel, silt, detritus	• natural channel • mean width – 5m • morphology – riffles, mainly runs and pools • no vegetative canopy • sparse riparian vegetation – cultural meadow • substrate – sand, gravel, silt, detritus	II	permanent, moderate / high flow	high	good	northern most culvert is 95% blocked fish community structure similar to crossing Y2

Table 3
Fish Habitat Assessment Summary

Crossing Number	Waterbody Name	Location & GPS Position	Type of Crossing	Fish Dot Sampling Stations	Fish Community		Habitat Summary		Habitat Type I, II, III	Flow Conditions	Waterbody Sensitivity	Drainage Connectivity	Comments
					CA[1] Value	LGL[2] Value	Upstream	Downstream					
Y4	Main Branch – Tannery Creek	Yonge St. north of Orchard Heights Blvd. 0622650, 4874123	2 – 4m CSP	EH11, 149, 338	cold – water	cool – water	• natural channel • mean width – 3.5m • morphology – good, mainly riffles • no vegetative canopy • sparse riparian vegetation – cultural meadow • substrate – cobble, gravel, sand, silt	• natural channel • mean width – 4.8m • morphology – mainly runs • no vegetative canopy • sparse riparian vegetation – cultural meadow • substrate – mainly sand, minor amounts of gravel and cobble	II	permanent, moderate high flow	high	ood	southern most culvert is 95% blocked fish community structure similar to crossing Y2 and Y3
Y5	Main Branch – Tannery Creek	West side of Yonge St. at St. John's Sideroad0 622436, 4875003	no crossing of Tannery creek is parallel to Yonge St. at this location, flows under St. John's Sdrd.	143	cold – water	cold – water	• natural channel • mean width – 4-5m • morphology – runs, some riffles • open canopy • riparian vegetation – small trees/shrubs along banks • substrate –mainly sand, equal amounts cobble, rubble, gravel, silt	• natural channel • mean width – 4-5m • morphology – runs, some riffles • open canopy • riparian vegetation – small trees/shrubs along banks • substrate –mainly sand, equal amounts cobble, rubble, gravel, silt	II	permanent, moderate / high flow	high	good	brook trout, mottled sculpin present high potential for significant disruption if roadway is widened west of Yonge ST.
Y6	Main Branch – Tannery Creek	Yonge St. north of St. John's Sideroad Nmkt. / Aurora townline 0622404 4875478	2 – CSP, 4.8m diameter	EH21, .6,148, 210, 212, 213, 344	cold – water	cool – water	• natural channel • mean width – 4.4m • morphology – 80% runs, some riffles • open canopy • riparian vegetation – minimal • substrate – equal amounts gravel, sand and silt, some rubble, clay	• natural channel • mean width – 3.2m • morphology – 80% runs, some riffles • open canopy • riparian vegetation – minimal • substrate – 40% gravel, 20% sand and silt, some rubble, clay	II	permanent, moderate / high flow	high	good	fish species composition indicates coolwater regime but there is potential for cold water refuge areas
Y7	Western Creek – small tributary of East Holland River	Yonge St. north of Eagle St. at Eldred King Gardens 0621886 4878137	concrete open box culvert 2m x 2m	EH20, 343, 358- .205	warm – water	warm – water	• natural channel • mean width – 1-2m • morphology – poor, pools only • open, no canopy • riparian vegetation – minimal • some cattail along edge • substrate – silt	• natural channel • mean width – 2-3m • morphology – riffles, runs, pools • riparian vegetation – shrubs and trees, some shading • substrate – cobble, rubble, gravel, minor amounts of silt/clay	III – u/s II – d/s	permanent, low/moderate flow	low	good	degraded conditions upstream-minimal fish habitat downstream culvert opening is 500m east of Yonge St. very few concerns

Table 3
Fish Habitat Assessment Summary

Crossing Number	Waterbody Name	Location & GPS Position	Type of Crossing	Fish Dot Sampling Stations	Fish Community		Habitat Summary		Habitat Type I, II, III	Flow Conditions	Waterbody Sensitivity	Drainage Connectivity	Comments
					CA[1] Value	LGL[2] Value	Upstream	Downstream					
YGL1	Unnamed tributary of East Holland River	Green Lane – east of Yonge St 0621769 4881219	CPS – 2m diameter	375	warm – water	warm – water	• no defined channel • morphology – poor, • open, no canopy • wetland • substrate – silt	• natural channel • mean width – 1.5m • morphology – poor, • open, no canopy • substrate – silt, rubble	III	low	low	good	degraded fish habitat no catch recorded
YGL2	Unnamed tributary of East Holland River	Green Lane – west of concessio n# 2 0622431 4881431	CPS – 2m diameter	EH26, 316	warm – water	warm – water	• no defined channel • morphology – poor, • open, no canopy • wetland • substrate – silt	• natural channel • mean width – 1.5m • morphology – poor, • open, no canopy • riparian vegetation – meadow • substrate – silt, rubble	III	low	low	good	no concerns
YDD1	Western Creek	Davis Drive – west of Main St. 0623033 4879534	concrete box culvert 2m x 4m	358, .201, .202, .203	warm – water	warm – water	• natural channel • mean width – 2m • morphology – riffles, runs, pools • open, no canopy • riparian vegetation – minimal • substrate – rubble, cobble, gravel	• natural channel • mean width – 3m • morphology – flat runs, pools • open, no canopy • riparian vegetation – minimal • substrate – mainly sand/gravel	II	moderate	low	good	
YDD2	East Holland River	Davis Drive at Main St.	bridge	EH01, 332	warm – water	warm – water	• natural channel • mean width – 10m • morphology – riffles, runs • riparian vegetation – shrubs/trees • substrate – rubble,cobble,gravel	• modified channel • mean width – 10m • morphology – riffles, runs • riparian vegetation – shrubs/trees • substrate – rubble,cobble,gravel	II	Moderate /high	moderate	good	
YDD3	Eastern Creek	Davis Drive - west of Paterson Ave.	3 –CPS 1.5m diameter	EH28, 348	warm – water	warm – water	• modified channel • mean width – 1m • morphology – poor • riparian vegetation – none • substrate – silt	• natural channel • mean width – 1.5m • morphology – poor • riparian vegetation – minimal • substrate – silt	III	low	low	good	only one culvert totally open very degraded habitat

1 – Data from Lake Simcoe Region Conservation Authority
2 – LGL field data & Ministry of Natural Resources data.

The Yonge Street North Rapidway passes through a small portion of both the Rouge River watershed and the East Humber River watershed while the majority crosses through the East Holland River watershed. The Rouge River and the East Humber River are under the stewardship of the Toronto Region Conservation Authority (TRCA) and the East Holland River is under the stewardship of the Lake Simcoe Region Conservation Authority (LSRCA). The TRCA recognizes three classes of aquatic life – cold, cool and warmwater biota in its stream classification system where as the LSRCA recognizes only two classes – cold and warmwater aquatic biota. Temperature criteria for protection of coldwater and coolwater biota are thus considered to be the same by the LSRCA. It should be noted that stream classifications presented in Table 3 have two entries for each stream crossing location. One value reflects the LSRCA classification, the second value is based on fish community structure as determined from catch data provided by MNR.

2.3.2 Watersheds in the Study Area

2.3.2.1 East Holland River Watershed

The main branch of the East Holland River flows north from the Bloomington Road area and generally parallels the Barrie GO line to Green Lane. Several small tributaries and four larger tributaries namely; Tannery Creek, Leslie Creek, Western Creek and Bogart Creek, join the main branch. The surrounding land uses adjacent to these watercourses are predominantly residential/industrial/commercial built-up areas. This has contributed to the degradation of these streams and very few reaches can be classed as having natural aquatic habitat. Consequently, good fisheries habitat is so minimal that very few areas along these watercourses can support any game species. Sportsfish such as largemouth bass, brook trout and pumpkinseed have been recorded as being present in some sections along the main branch and at site specific locations in Tannery Creek, Leslie Creek and Bogart Creek. The only open water marsh/wetland complex in this watershed is represented by the provincially significant (PSW) Aurora McKenzie Marsh. This wetland complex is located on St. John's Sideroad, east of Yonge Street. The marsh provides significant aquatic habitat for resident and migratory species.

2.3.2.2 East Humber River Watershed

The main branch of the East Humber River flows in a westerly direction as it crosses Yonge Street at King Road. West of Yonge Street, between King Road and Bloomington Road, the watercourse is oriented in a north westerly direction as it flows toward Bathurst Street. This section of the East Humber River flows through a predominantly residential built-up area; consequently fisheries habitat is somewhat degraded and supports a baitfish and non- game fish species. The only natural habitat present along this section of the river is a locally significant wetland known as Mallard Marsh. East of Yonge Street the East Humber River watershed is characterized by several provincially significant wetlands (PSW). These include the Oak Ridges Bog, Forester Marsh-Swan Lake Wetland Complex, Wilcox Lake Bog, Wilcox-St. George Wetland Complex, Bond Lake Bog and Philips-Bond-Thompson Wetland Complex. These areas provide the headwaters of the East Humber River and contribute significant aquatic habitat and linkage in an otherwise residential urban environment. The provincially threatened redside dace is known to reside in the East Humber River in the King City area.

Two un-named tributaries of the East Humber are also found in this section of the proposed Transitway. One originates in the Wilcox-St.George Wetland Complex and crosses Yonge Street, in a south westerly direction, at BlackForest Drive. The water flow is conveyed under Yonge Street through a concrete culvert. Upstream of the crossing, the watercourse is undefined. A second tributary originates from the Phillips-Bond-Thompson Wetland Complex, south of Estate Garden Drive west of Yonge Street. The channel flows in a north westerly direction toward the East Humber River. One hundred metres north of

Estate Garden Drive, the watercourse is piped underground to just south of King Road where it emerges and joins the main branch of the East Humber. No part of this tributary crosses or is adjacent to Yonge Street

2.3.2.3 Rouge River Watershed

The southeast section of the study area bounded by Bethesda Road, 19th Avenue, Bathurst Street and Highway 404 is drained by the Rouge River and several tributaries. The vegetated sections along these tributaries are classified as provincially significant wetlands and together form the Rouge River Headwater Wetland Complex. With the exception of these forested areas, the watercourses flow through a rural agricultural or urban environment and would provide minimal aquatic habitat.

One of these tributaries of the Rouge River, specifically Tributary 'C', originates from north of Jefferson Sideroad, west of Yonge Street. The channel flows in a south easterly direction crossing Yonge Street approximately 800m north of Gamble Road at Jefferson Forest Drive/Tower Road. The creek flows under Yonge Street through a 2mx2m concrete box culvert. Tributary 'C' is classed as having a cold water thermal regime; however this is currently under stress from surrounding development and increased sedimentation in the watercourse.

2.3.3 Crossing Locations – Yonge Street

The North Yonge Street corridor alignment crosses a total of 14 watercourses including nine on Yonge Street between 19th Avenue/Gamble Road and Green Lane. Six watercourses are associated with the East Holland River watershed, two are located in the East Humber River watershed and one is found in the Rouge River watershed. Three of the watercourse crossings are on Davis Drive and two are located on Green Lane.

2.3.3.1 Rouge River- Tributary 'C' (YR1)

The Yonge Street alignment crosses the Rouge River approximately 800m north of Gamble Road. The tributary flows under Yonge St. through a 2m x 2m open, concrete box culvert. The natural channel, both upsteam and downstream is approximately 1.5m – 2.5m in width, has a permanent flow and provides good drainage connectivity. There is no riparian stream cover as the creek is bordered by cultural meadow. The TRCA has this reach classified as coldwater, based on the historical presence of brook trout (*Salvelinus fontinalis);* however the present day fish species composition suggests a coolwater thermal regime. Catostomids (white sucker) and coolwater Cyprinids (creek chub, blacknose dace and longnose dace) account for the majority of fish species present.

2.3.3.2East Humber River (Y1)

The Yonge Street alignment crosses the East Humber River at the junction of King Rd. and Yonge St. – Crossing Y1. An existing concrete box culvert measuring 2m x 4m is in place and provides good connectivity between the upstream and downstream reaches of the watercourse. Upstream, the well-defined channel is contiguous with a cattail marsh along its entire length. This watercourse is designated as coolwater by the TRCA and supports a predominately coolwater fish community, however some overlap with warmwater Centrarchids (largemouth bass, pumpkinseed and bluegill) is occurring.

2.3.3.3 East Humber River – Tributary (Y1A)

Crossing Y1A is located at the intersection of Yonge Street with Black Forest Drive. The creek flows under Yonge Street in a south westerly direction through a 1.5m CPS. Upstream of the culvert the

watercourse is undefined as it passes through a wetland complex. Downstream, on west side of Yonge Streeet, there is a short 10m length of creek before it enters another culvert. Prior to entering this culvert the creek is 1m in width and has a low flow condition as it passes over a silt substrate. There is some instream cover provided by cattail vegetation, however only minimal fish habitat is available. This watercourse is designated as coolwater by the TRCA

2.3.3.4 East Branch - Tannery Creek (Y2)

Crossing Y2 is located on Yonge St. between Kennedy Rd. and Church St. in the Town of Aurora. This eastern branch of Tannery creek flows under Yonge St. through a 3m x 3m open, concrete box culvert. The natural channel, both upsteam and downstream is approximately 1.7m – 2.5m in width, has a permanent flow and provides good drainage connectivity. Riffle areas resulting from a cobble/gravel substrate are evident. The LSRCA has this reach classified as coldwater, however the fish species composition suggests a coolwater thermal regime. Catostomids (white sucker) and coolwaterCyprinids (creek chub, blacknose dace and longnose dace) account for the majority of fish species present. Again, overlap with warmwater Centrarchids (pumpkinseed and largemouth bass) as well as warmwater Cyprinids (bluntnose minnow) was evident. The occurrence of these warmwater fish was low.

*2.3.3.5 Main Branch – Tannery Creek (*Y3*)*

Immediately south of Orchard Heights Blvd., the main branch of Tannery Creek is crossed by the Yonge Street alignment. This crossing is designated as Y3. Initially, engineering design criteria required that two adjacent, 4m diameter corrugated steel culverts be installed to maintain flows during normal and/or uncertain storm events. Presently, the northern most culvert is 95% blocked, resulting in all water being channelled through only one culvert. In spite of this, drainage connectivity between the upstream and downstream reaches is adequate. Average channel width upstream is 3.4m with a substrate characterized as being 50% sand and equal portions of gravel and silt. Downstream, the substrate is of a similar composition but the stream has an average width of 5m. The brownish coloration of the creek at this location is attributable to high levels of suspended and dissolved solids. The LSRCA classifies Tannery Creek as a coldwater watercourse. Fish species composition is similar to that at crossing Y2 and suggests a coolwater aquatic biota.

*2.3.3.6 Main Branch – Tannery Creek (*Y4*)*

Approximately 200m north of Orchard Heights Blvd., the alignment again crosses the main branch of Tannery creek. This crossing is identified as Y4. Similar to crossing Y3, two adjacent 4m diameter corrugated steel culverts were installed to accommodate all expected flow conditions for Tannery Creek. Water flow is diverted through the northern culvert only as over 95% of the southern culvert is blocked. Nonetheless, drainage connectivity between the upstream and downstream reaches is good. Mean stream width upstream is 3.5m and the substrate is 60% cobble, 20% gravel and 20% sand/silt. The watercourse is wider downstream, 4.8m, and is best described as having a sand (60%) and gravel (10%) substrate.
This location is only 300m downstream of crossing Y3, consequently the fish community structure and temperature regime are the same.

2.3.3.7 *Main Branch – Tannery Creek – St. John's Sideroad* (Y5)

Immediately west of Yonge St., at the intersection with St. John's Sideroad, Tannery Creek flows parallel to Yonge St. For approximately 50m downstream and 150m upstream of the bridge located on St. John's Sideroad, Tannery creek is within 15m of the Yonge Street alignment. This location is designated as crossing Y5. The mean width of the creek along this section is between 4m – 5m. Substrate is

predominantly sand (50%) with equal amounts of cobble (10%), rubble (10%), gravel (10%) and silt (10%). Drainage is not impeded and connectivity is good.
The LSRCA designation of the aquatic biota at this location is coldwater and this is substantiated by the only catch data available for this site. Species included Salmonids (brook trout) and Cottids (mottled sculpin), both coldwater species.

2.3.3.8 *Main Branch – Tannery Creek – above St. John's Sideroad* (Y6)

The Yonge Street crossing of Tannery creek at this site is identified as crossing Y6 and is located north of St. John's Sideroad, at the Newmarket /Aurora town line. The natural channel upstream and downstream of the crossing is 3.5m – 4.5m in width, has a permanent flow and provides good connectivity between these two reaches of the watercourse. Upstream, the substrate of the watercourse is best described as being composed of approximately equal amounts of gravel, sand and silt while the downstream section is 40% gravel, 20% sand and 15% silt. Fish species community structure was representative of a coolwater aquatic biota. Warmwater species were also observed but in lower numbers. Upsteam of the actual crossing, Armitage creek, a main tributary within this watershed enters Tannery Creek. The presence of mottled sculpins (*Cottus bairdii*) in Armitage Creek indicates that this watercourse supports a coldwater system. It is reasonable to assume that Armitage Creek provides a source of cold water inputs to Tannery creek and it follows that Tannery creek may provide refugia for temperature – sensitive coldwater species at crossing Y6.

2.3.3.9 *Western Creek* (Y7)

The proposed rapidway crosses Western Creek, a minor tributary of the main branch of Tannery Creek, approximately 200m north of the Eagle St. / Yonge St. intersection. This location is identified as crossing Y7. The creek flows in an easterly direction under Yonge St. through a 2m x 2m cement open box culvert. The downstream outlet of the culvert is 500m to the east of Yonge St. while the upstream culvert opening is within 5m of the roadway. At this opening, the culvert is surrounded by a large gabion – basket mattress that would aid in flood control. Immediately upstream of this flood control area the creek passes through a 1.5m x 50m gated corrugated steel culvert. Prior to entering this culvert the creek is 1m – 2m in width and has a low flow condition as it passes over a silt substrate. There is some instream cover provided by cattail vegetation, however only minimal fish habitat habitat is available. Downstream the creek is 2m –3m in width and has a cobble,gravel / sand substrate. The LRSCA categorizes Western creek as warmwater. The few fish catch records that were available indicate the presence of two warmwater Cyprinids (fathead minnow and goldfish).

2.3.4 Crossing Locations - Green Lane

At the northern Newmarket / East Guillimbury town line, the preferred alternative follows an easterly alignment along Green Lane to the GO Transit terminal. The route crosses two unnamed tributaries of the East Holland River. The first tributary is immediately east of Yonge St. and the second tributary is located midway between Yonge Street and Concession2 / Main St.

2.3.4.1 Un-named Tributary - East Holland River (YGL1)

The first tributary, immediately east of Yonge Street, is designated as YGL1. At this location, a 2m corrugated steel culvert provides connectivity between the upstream and downstream reaches of the watercourse. Flow is minimal but is maintained. The substrate is mainly clay / silt and this contributes to the turbid appearance of the water. This tributary provides minimal fish habitat but is classified as having potential for a warmwater fish community. An attempt to determine the fish community structure was unsuccessful as "no catch" was recorded.

2.3.4.2 Un-named Tributary - East Holland River (YGL2)

At location YGL2, connectivity between the upstream and downstream reaches of the tributary is maintained by a 2m diameter corrugated steel culvert. The watercourse is permanent but has a slow moving current associated with it. Downtream, the creek is integrated with an extensive cattail marsh, the channel is not well defined and the substrate is mainly composed of rubble and silt. Upstream, the channel is defined, measures about 1.5m and is characterized as having a rubble and sand / silt substrate. The LSRCA classifies this tributary as having a warmwater thermal regime. The only fish species records available for this location indicate the occurrence of coolwater Cyprinids (creek chub and blacknose dace). This result is not unexpected as both of these fish are tolerant of warmwater conditions.

2.3.5 Crossing Locations - Davis Drive

In addition to the preferred Yonge St. YRT alignment, an alternative route along Davis Drive between Yonge and Harry Walker Parkway is proposed. This route crosses three watercourses; Western creek, East Holland River and an unnamed tributary of the East Holland River. These locations are YDD1, YDD2 and YDD3, respectively.

2.3.5.1 Western Creek (YDD1)

Location YDD1 is located where Davis Drive crosses Western Creek, just west of Main Street. A concrete box culvert measuring 2m(h) x 4m(w) is in place and provides unrestricted flow under Davis Drive. The creek averages 3m in width with an average depth of 0.3m. The upstream substrate is mainly rubble with minor components of gravel, sand and silt. The downstream section is mainly sand and gravel together with minor components of silt and rubble. The LSRCA has designated Western creek as warmwater. Field collection records were only available for a section of the creek approximately 1 to 2 km upstream of the proposed crossing. Very few fish were collected relative to the effort expended. Representative species present included both warmwater and coolwater Cyprinids (fathead minnow, goldfish and creek chub) as well as coolwater Catostomids (white sucker). The presence of coolwater species is not unexpected as both are tolerant of a variety of temperature conditions.

2.3.5.2 Main Branch – East Holland River (YDD2)

Location YDD2 is located east of Main Street where Davis Drive crosses the main branch of the East Holland River. The river is approximately 10m in width as it flows under Davis Drive. Connectivity upstream and downstream of the bridge is unrestricted. The natural channel attributes of the river are maintained in the upstream reach where as along the downstream section, the river embankments are man modified concrete block and brick. A riffle type stream morphology is prevalent along this entire section of the East Holland River; a result of the substrate being composed of bolder, cobble, gravel and sand material.

Field collection records used to evaluate the fish community at YDD2 were obtained from fish sampling stations that were located near the confluence of Bogart creek with the East Holland River. Bogart creek is classed as a coldwater watercourse by the LSRCA. Effects of cool and cold water inputs from Bogart creek to the East Holland River are reflected in the fish community. Warmwater species were represented by warmwater Cyprinids (fathead minnows and bluntnose minnows) and warmwater Centrarchids (largemouth bass and pumpkinseed). Coolwater species included coolwater Cyprinids; (eastern black-nosed dace, longnose dace, common shiner and creek chub), Centrarchids (rock bass), Catostomids (white sucker) and Cottids (mottled sculpin). Although there is considerable overlap with warm and coolwater fish species, the East Holland River, downstream of the confluence with Bogart creek, is classified as having a warmwater temperature regime.

2.3.5.3 Eastern Creek (YDD3)

Eastern Creek, Location YDD3, is located west of Paterson Avenue on Davis Drive. Connectivity between the upstream and downstream reaches is maintained through 3 adjacent 1.5m corrugated steel culverts of which one is open, one is partially blocked and one is totally blocked. The inlet culvert openings are adjacent to Davis Drive and the outlet culvert openings are 300m north of the roadway. Upstream, the channel width is 1m. Downstream the channel is between 0.5 – 1.5 m and covered with debris. This creek is designated as warmwater by the LSRCA. The creek is severely degraded upstream and downstream of the proposed crossing, consequently fish presence is very unlikely. Fish sampling records for this creek were documented as "no catch".

2.3.6 Species at Risk

No species at risk were collected by the TRCA, LSRCA or MNR in any of the watercourses

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 three season reconnaissance level field investigation of natural/semi-natural vegetation was conducted within the study area by LGL staff on May 8, 11, 22, 23, 24, 25 and 28, July 11, 12, 18, and 26, August 2 and 23, and September 7, 18, 19 and 28 of 2007. The investigation included vegetation communities occurring along Young Street between Gamble Road and Green Lane; those occurring along Green Lane between Young Street and the East Gwillimbury GO station; as well as vegetation communities along Davis Drive between Yonge Street and Harry Walker Parkway.

Natural and semi-natural vegetation communities were classified according to the *Ecological Land Classification for Southern Ontario: First Approximation and Its Application* (Lee et al. 1998). Vegetation communities were sampled using a plotless method for the purpose of determining general composition and structure of the vegetation. Plant species status was reviewed for Ontario (Oldham 1999), LSRCA (2003), TRCA (2003), Oak Ridges Moraine Conservation Plan (ORMCP 2001) and York Region (Varga 2000). Vascular plant nomenclature follows Newmaster et al. (1998) with a few exceptions that have been updated to Newmaster 2005.

2.4.1 Vegetation Communities

The majority of the vegetation communities within the study area are anthropogenic in origin and have resulted from past and present land use. The study area is comprised primarily of communities that have resulted from past agricultural land use.

A total of 18 vegetation communities have been identified by LGL within the Yonge Street, Green Lane and Davis Drive corridors. These communities include: cultural meadows, cultural thickets, cultural savannah, cultural woodlands, cultural plantations, coniferous forests, deciduous forests, meadow marshes, shallow marshes, open water aquatic, and shallow aquatic communities. Land use is predominantly medium and high-density residential, commercial and industrial. The vegetation communities are delineated in Figure 3 and described in Table 4.

The deciduous forested communities within the study area are represented by a variety of different forest ecosites. Dry-fresh deciduous forest communities comprised primarily of Manitoba maple (*Acer negundo*) (FOD4) and fresh-moist lowland deciduous forest (FOD7) type communities have the highest occurrence. Other smaller deciduous forest communities occurring within the study area include: willow lowland deciduous forest (FOD7-3), a dry to fresh trembling aspen (*Populus tremuloides*) deciduous forest (FOD3-1) and fresh to moist balsam poplar (*Populus balsamifera* ssp. *balsamifera*) and trembling aspen deciduous forest (FOD8-1). In addition, coniferous forests (FOC) are found at a few locations.

The cultural meadow (CUM1-1) communities, located along the entire study area have established on recently abandoned lands. A number of plantations have been planted through the study area which are mainly composed of scotch pine (*Pinus sylvestris*) (CUP3-3). Smaller plantations consisting of a mixture of coniferous species (CUP3) are also present. Other cultural features occurring within the study area consist of black walnut (*Juglans nigra*) plantations (CUP1-3), cultural savannah (CUS1), mineral cultural woodlands (CUW1), sumac (*Rhus typhina*) cultural thickets (CUT1-1) and buckthorn (*Rhamnus cathartica*) cultural thickets (CUT1).

Two types of wetlands are found along the Yonge corridor alignments. Cattail mineral shallow marshes (MAS2-1) occur at several locations and are generally associated with many of the watercourses within the study area. Reed-canary grass (*Phalaris arundinacea*) meadow marsh type ecosite communities (MAM2-2) are found less frequently and are generally associated with open water aquatic (OAO) areas. Floating-leaved shallow aquatic (SAF1-3) ecosites are also present, near Bond Lake.

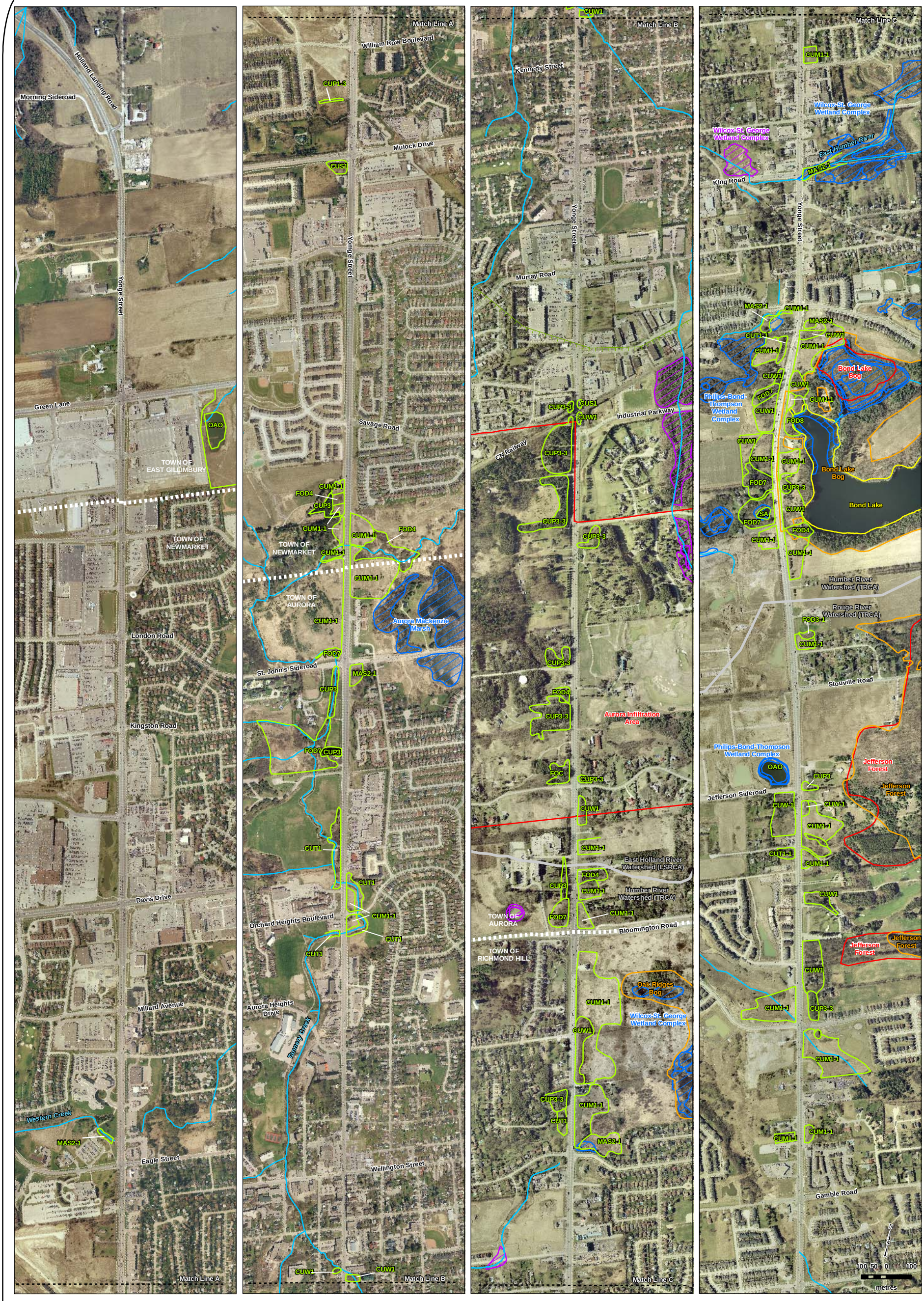
2.4.2 Flora

To date, a total of 291 vascular plant taxa have been recorded within the vicinity of Young Street and Green Lane. One hundred and forty-one (141) taxa, 48.5 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 Appendix A.

2.4.3 Species at Risk

Plant species status was reviewed for Oak Ridges Moraine Conservation Plan (2001), LSRCA jurisdiction (2003), York Region (Varga et al. 2000), TRCA's jurisdiction (TRCA 2003) and Ontario (Oldham 1999). Two species considered significant (endangered and threatened) in Ontario and Canada were noted in Ontario. The Butternut (*Juglans cinerea*) tree is identified as endangered and the Kentucky Coffee-tree (*Gymnocladus dioicus*) is identified as threatened by the Committee on the Status of Endangered Species in Canada (COSEWIC) and the Committee on the Status of Species at Risk in Ontario (COSSARO). These two species, although identified as endangered and threatened, are not regulated by the *Species at Risk Act* or the *Endangered Species Act*. The Kentucky coffee-tree was planted within the right-of-way (ROW) and considered to be in poor condition. The butternut tree is located within the FOD4 community south of Bond Lake and is identified as being outside of the right of way.

Several species considered regionally or locally uncommon or rare and species of concern were noted during field investigations. The status of these species and location within the study area is presented in Table 5. The vegetation communities identified within the study area are considered widespread and common in Ontario and secure globally (NHIC 1997) and locally (TRCA 2003).



LEGEND

- Area of Natural and Scientific Interest
- Environmentally Significant Area
- Provincially Signifcant Wetland
- Locally Signifcant Wetland
- Kettle
- Oak Ridges Moraine
- Municipal Boundary
- Watershed Boundary
- Watercourse
- Vegetation Community Boundary

Vegetation Communities

CUM1-1	Dry-Moist Old Field Meadow Type
CUP1-3	Black Walnut Deciduous Plantation Type
CUP3	Coniferous Plantations
CUP3-3	Scotch Pine Coniferous Plantation Type
CUS1	Mineral Cultural Savannah Ecosite
CUT1	Mineral Cultural Thicket Ecosite
CUT1-1	Sumac Cultural Thicket Type
CUW1	Mineral Cultural Woodland Ecosite
FOC	Coniferous Forest
FOD3-1	Dry-Fresh Poplar Deciduous Forest Type
FOD4	Dry-Fresh Deciduous Forest Ecosite
FOD7	Fresh-Moist Lowland Deciduous Forest Ecosite
FOD8	Fresh-Moist Poplar-Sassafras Deciduous Forest Ecosite
MAS2-1	Cattail Mineral Shallow Marsh Type
SA	Shallow Water
OAO	Open Aquatic

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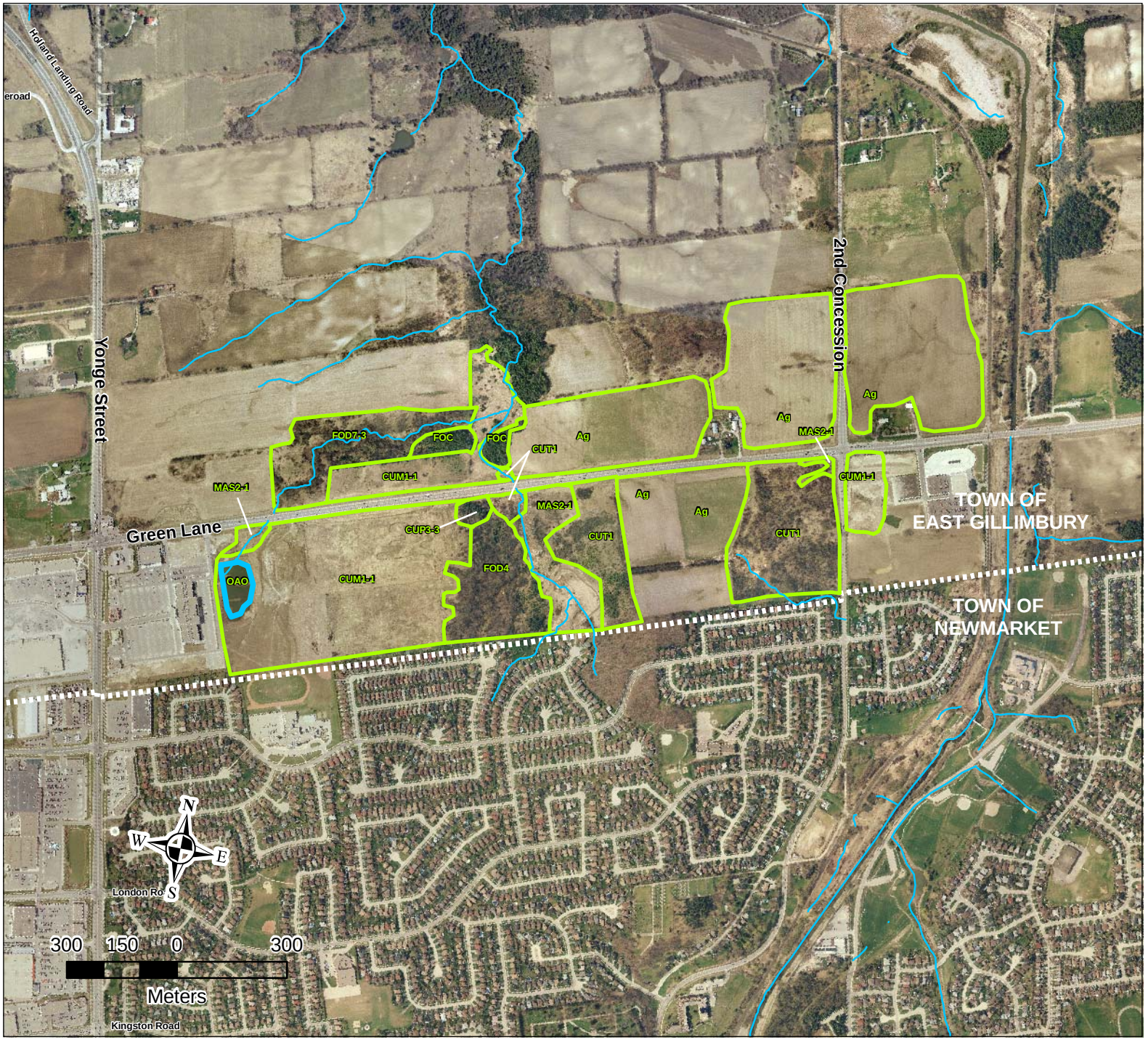
Data Sources: LGL Limited field surveys, Toronto and Region Conservation Authority, Ministry of Natural Resources.

NATURAL HERITAGE

Project:	TA4174	**Figure:**	3a
Date:	December 2008	**Prepared By:**	KDT
Scale:	1 : 15,000	**Checked By:**	GNK



L E G E N D

- Municipal Boundary
- Watercourse
- Vegetation Community Boundary

Vegetation Communities

- CUM1-1 Dry-Moist Old Field Meadow Type
- CUT1 Mineral Cultural Thicket Ecosite
- CUP3-3 Scotch Pine Coniferous Plantation Type
- FOD4 Dry-Fresh Deciduous Forest Ecosite
- MAS2-1 Cattail Mineral Shallow Marsh Type
- FOD7-3 Fresh-Moist Willow Lowland Deciduous Forest Type
- OAO Open Aquatic
- Ag Agricultural Land

Data Source: LGL Ltd. Field surveys, Ministry of Natural Resources.

Natural Heritage - Green Lane

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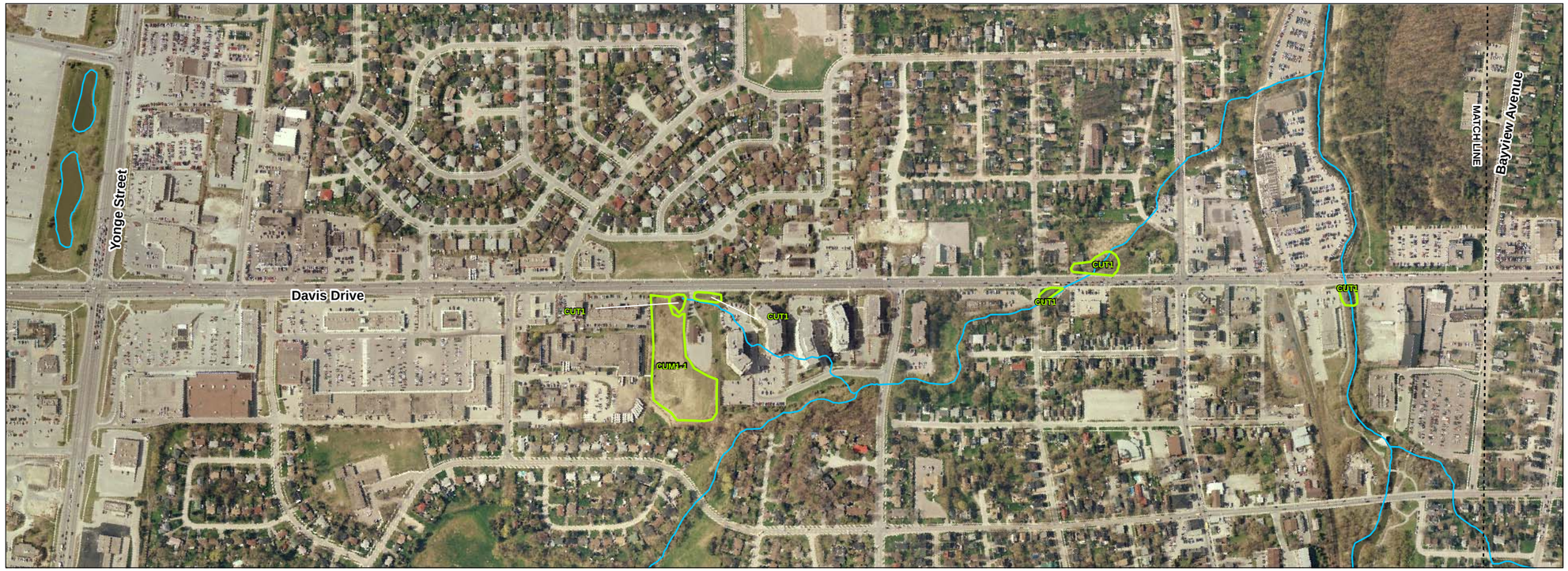
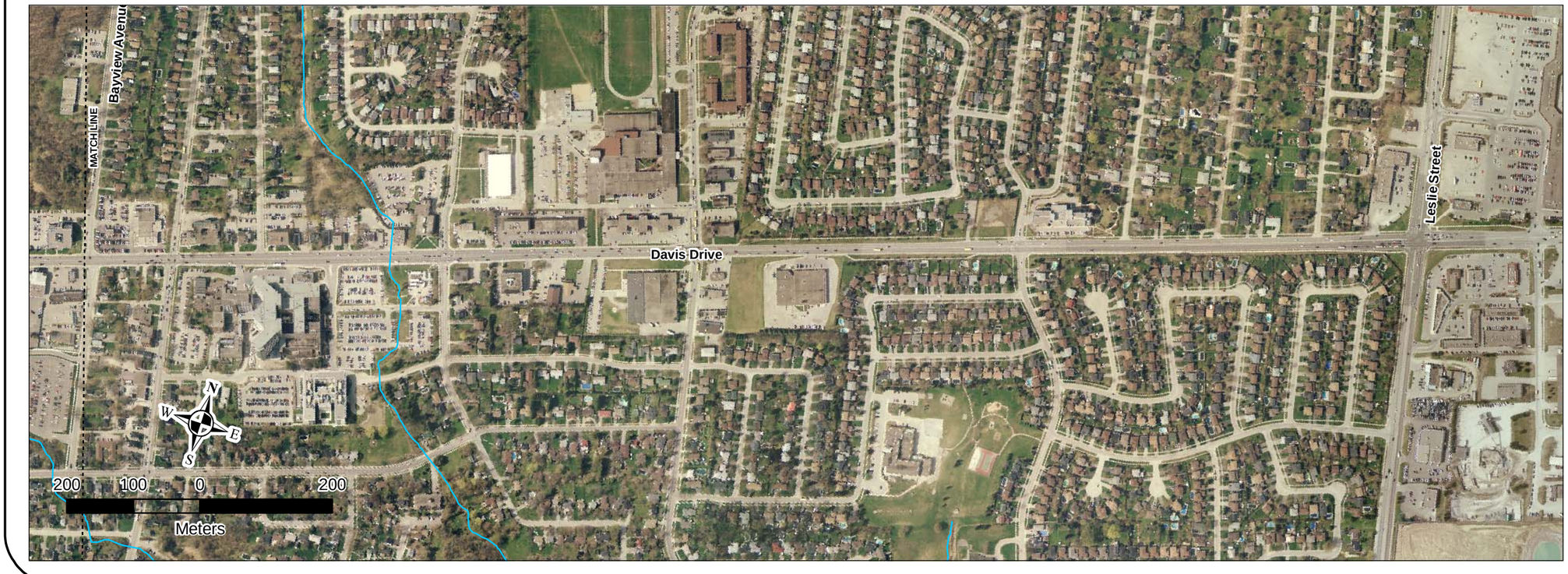
environmental research associates

PROJECT:	TA4174	FIGURE:	3b
DATE:	March 2008	PREPARED BY:	KDT
SCALE:	1: 15,000	CHECKED BY:	GNK





L E G E N D

Watercourse

Vegetation Community Boundary

Vegetation Communities

CUM1-1 Dry-Moist Old Field Meadow Type

CUT1 Mineral Cultural Thicket Ecosite

Data Source: LGL Ltd. field surveys, Ministry of Natural Resources.

Natural Heritage - Davis Drive

LGL LIMITED
environmental research associates

PROJECT:	TA4174	FIGURE:	3c
DATE:	March 2008	PREPARED BY:	KDT
SCALE:	1: 7000	CHECKED BY:	GNK

TABLE 4.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

FEC/ELC Code	Vegetation Type	Species Association	Comments	Location[1]
Terrestrial – Natural/Semi-natural				
FO	FOREST ECOSITE			
FOC	CONIFEROUS FOREST			
FOC	Dry-Fresh Coniferous Forest	**Canopy:** Eastern white cedar (*Thuja occidentalis*), Norway spruce (*Picea abies),* and scoth pine (*Pinus sylvestris*). **Understorey:** choke cherry (*Prunus virginiana var. virginiana*) and common buckthorn (*Rhamnus cathartica*). **Ground Cover:** Quack grass (*Elymus repens*), awnless brome (*Bromus inermis* ssp. *inermis*) wild carrot (*Daucus carota*), common dandelion (*Taraxacum officionale*), Canada goldenrod (*Solidago canadensis*).	• Tree cover >60 (FO). • Coniferous trees > 75% percent of canopy cover (C). • Dry to moderately fresh soil.	
FOD	DECIDUOUS FOREST			
FOD3-1	Dry-Fresh Poplar Deciduous Forest	**Canopy:** Trembling aspen (*Populus tremuloides*) dominant with some black cherry (*Prunus serotina*). **Sub-canopy:** Abundant young trembling aspen and common buckthorn with occasional Manitoba maple (*Acer negundo*) and choke cherry. **Understorey:** Trembling aspen, common buckthorn, staghorn sumac (*Rhus hirta*) and choke cherry. **Ground Cover:** Awnless brome, Tall goldenrod (*Solidago canadensis* ssp. *scabra*), Kentucky bluegrass (*Poa pratensis ssp. pratensis*), and Field horsetail (*Equisetum arvense*).	• Tree cover > 60% (FO). • Deciduous trees >75% of canopy cover (D). • Poplar or White Birch deciduous forest (3). • Trembling Aspen dominant (1). • Early successional community	

TABLE 4.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

FEC/ELC Code	Vegetation Type	Species Association	Comments	Location[1]
FOD4	Dry-Fresh Deciduous Forest Ecosite	**Canopy:** Manitoba maple, Norway maple (Acer platanoides), white elm (*Ulmus americana*) dominant with red ash (*Fraxinus pennsylvanica*) and white birch (*Betula papyrifera*) as associates. **Understorey:** Young red ash and white elm with occasional Norway maple, choke cherry, Manitoba maple, common buckthorn, common lilac (*Syringa vulgaris*) and Japanese knotweed (*Polygonum cuspidatum*). **Ground Cover:** Garlic mustard (*Alliaria petiolata*), lily-of-the-valley (*Convallaria majalis*), creeping Charlie (*Glechoma hederacea*), Heart-leaved aster (*Symphiotrichum cordifolium*), blue-stem goldenrod (*Solidago caesia*), white avens (*Geum canadense*), and yellow avens (*Geum aleppicum*).	• Tree cover > 60% (FO). • Deciduous trees >75% of canopy cover (D). • Uncommon deciduous forest (4). • Almost entirely dominated by Manitoba Maple. • Well to moderately well drained soils.	
FOD7	Fresh-Moist Lowland Deciduous Forest Ecosite	**Canopy:** mixture of black willow (*Salix nigra*), Scotch pine, and red ash (*Fraxinus pennsylvanica*) each dominant with abundant white spruce (Picea glauca), freeman maple (*Acer* X *freemanii*) and occasional black walnut (*Juglans nigra*), Norway spruce (*Picea abies*) and basswood (*Tilia americana*). **Sub-canopy:** red ash, scotch pine, and common buckthorn. **Understorey:** Abundant Scotch pine, common buckthorn and guilder rose (*Viburnum opulus*) with occasional choke cherry, and thimble-berry (*Rubus occidentalis*). **Ground Cover:** Dame's rocket (*Hesperis matronalis*) and Kentucky bluegrass.	• Tree cover > 60% (FO). • Deciduous trees >75% of canopy cover (D). • Lowland deciduous forest (7). • Dominated by a mixture of Black Willow, Scotch Pine and Red Ash. • Associated with riparian zones and terraces. • Rich areas where deposition due to flooding occurs yet drying occurs by mid-to late summer.	
FOD7-3	Fresh-Moist Willow Lowland Deciduous Forest	**Canopy:** Reddish willow (*Salix X rubens*) dominant with occasional white elm. **Understorey:** Choke cherry and riverbank grape (*Vitis riparia*). **Ground Cover:** Flat-topped bushy goldenrod (*Euthamia graminifolia*), tall goldenrod and New England aster (*Symphiotrichum novae-angliae*).	• Tree cover > 60% (FO). • Deciduous trees >75% of canopy cover (D). • Lowland deciduous forest (7). • Willow dominant (3). • Associated with riparian zones and terraces. • Rich areas where deposition due to flooding occurs yet drying occurs by mid-to late summer.	

TABLE 4.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

FEC/ELC Code	Vegetation Type	Species Association	Comments	Location[1]
FOD8-1	Fresh-Moist Poplar Deciduous Forest	**Canopy:** Balsam poplar (*Populus balsamifera* ssp. *balsamifera*) dominant with abundant trembling aspen (*Populus tremuloides*), black willow and white willow (*Salix alba*). **Sub-canopy:** balsam poplar. **Understorey:** Guelder rose, inserted Virginia-creeper (*Parthenocissus vitacea),* balsam poplar, common buckthorn and tartarian honeysuckle (*Lonicera tatarica*). **Ground Cover:** Sparse cover and is dominated by field horsetail.	• Tree cover > 60% (FO). • Deciduous trees >75% of canopy cover (D). • Poplar – Sassafras deciduous forest (8). • Poplar dominant (1). • Associated with riparian zones and terraces. • Rich areas where deposition due to flooding occurs yet drying occurs by mid-to late summer.	
Terrestrial – Cultural				
CUP	CULTURAL PLANTATION			
CUP1-3	Black Walnut Deciduous Platation	**Canopy:** Black walnut is dominant. **Understorey:** Little to no understorey because of grass cutting. **Ground Cover:** Little to no understorey because of grass cutting.	• Cultural communities (CU). • Tree cover > 25 percent (P). • Deciduous species are dominant are (1). • This community can occur on a wide range of soil moisture regimes (Dry-Moist). • Community resulting from, or maintained by, anthropogenic-based influences.	CUP1-3
CUP3	Coniferous Plantation Ecosite	**Canopy:** White spruce, Scotch pine, red pine (*Pinus resinosa*) and trembling aspen. **Understorey:** Trembling aspen, balsam poplar, and common buckthorn and scotch pine saplings. **Ground Cover:** Canada goldenrod, New England aster, reed-canary grass (*Phalaris arundinacea*), wild carrot and bird's-foot trefoil (*Lotus corniculatus*).	• Cultural communities (CU). • Tree cover >25 % (P). • Coniferous species dominant (3). • This community can occur on a wide range of soil moisture regimes (Dry-Moist). • Community resulting from, or maintained by, anthropogenic-based influences.	

TABLE 4.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

FEC/ELC Code	Vegetation Type	Species Association	Comments	Location[1]
CUP3-3	Scotch Pine Coniferous Plantation	**Canopy:** Scotch pine dominant with abundant white pine (*Pinus strobus*), red ash, and sugar maple (*Acer saccharum* var. saccharum). **Understorey:** Young red ash and common buckthorn, Tartarian honeysuckle dominant with choke cherry and wild red raspberry (*Rubus idaeus* ssp. *strigosus*). **Ground Cover:** Garlic mustard and lily-of-the-valley.	• Cultural communities (CU). • Tree cover >25 % (P). • Coniferous species dominant (3). • Dominated by Scotch Pine (3). • This community can occur on a wide range of soil moisture regimes (Dry-Moist). • Community resulting from, or maintained by, anthropogenic-based influences.	
CUM	CULTURAL MEADOW			
CUM1-1	Dry-Moist Old Field Meadow	**Ground Cover:** Kentucky bluegrass, Awnless Brome, orchard grass (*Dactylis glomerata*), Canada blue grass (*Poa compressa*), Timothy (*Phleum pratense*), with blueweed (*Echium vulgare*), old-field cinquefoil (*Potentilla recta*), Canada goldenrod, and Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*) and tufted vetch (*Vicia cracca*).	• Cultural communities (CU). • Tree cover and shrub cover < 25 % (M). • This community can occur on a wide range of soil moisture regimes (Dry-Moist). • Pioneer community resulting from, or maintained by, anthropogenic-based influences. • Dominated by grass and forb species.	
CUT	CULTURAL THICKET			
CUT1	Mineral Cultural Thicket Ecosite	**Canopy:** Common buckthorn, downy hawthorn (*Crataegus mollis*), riverbank grape. **Understorey:** Red ash, inserted Virginia-creeper, common apple (*Malus pumila*) and English hawthorn (*Crataegus monogyna*). **Ground Cover:** Kentucky bluegrass, and awnless brome.	• Cultural communities (CU). • Tree cover <25% and shrub cover > 25 % (T). • This community occurs on mineral soil (1). • Pioneer community resulting from, or maintained by, anthropogenic-based influences. • Dominated by a mixture of Common Buckthorn and other shrubs.	

TABLE 4.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

FEC/ELC Code	Vegetation Type	Species Association	Comments	Location[1]
CUT1-1	Sumac Cultural Thicket	**Canopy:** Staghorn sumac (*Rhus hirta*) dominant with common buckthorn, common apple, and eastern white cedar. **Ground Cover:** garlic mustard, tall goldenrod and Kentucky bluegrass.	• Cultural communities (CU). • Tree cover <25% and shrub cover > 25 % (T). • This community occurs on mineral soil (1). • Staghorn Sumac dominated community (1). • Pioneer community resulting from, or maintained by, anthropogenic-based influences.	
CUS	CULTURAL SAVANNAH			
CUS1	Cultural Savannah Ecosite	**Canopy:** Black walnut dominant. **Understorey:** Limited to no understorey. **Ground Cover:** Limited to no understorey. Area maintained once a year by property owner.	• Cultural communities (CU). • Tree cover between 25% and 35% (S). • This community can occur on a wide range of soil moisture regimes (Dry-Moist). • Pioneer community resulting from, or maintained by, anthropogenic-based influences. • Regeneration after clear cutting. • Dominated by Black Walnut.	

TABLE 4.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

FEC/ELC Code	Vegetation Type	Species Association	Comments	Location[1]
CUW	CULTURAL WOODLAND			
CUW1	Mineral Cultural Woodland Ecosite	**Canopy:** Black walnut, Norway maple, black walnut dominant with Norway spruce, Siberian elm (*Ulmus pumila*), silver maple and black locust (*Robinia pseudo-acacia*) as associates. **Sub-canopy:** Common buckthorn, common lilac, common apple (*Malus pumila*). **Understorey:** Common buckthorn, common lilac, and staghorn sumac. **Ground Cover:** Garlic mustard dominant with associations of Orchard Grass, field horsetail, yellow bedstraw (*Galium verum*), mouse-ear scorpion-grass (*Myosotis scorpioides*), and Kentucky bluegrass.	• Cultural communities (CU). • Tree cover between 35% and 65% (W). • This community can occur on a wide range of soil moisture regimes (Dry-Moist). • Pioneer community resulting from, or maintained by, anthropogenic-based influences. • Regeneration after clear cutting. • Dominated by a mixture of deciduous species.	
Wetland				
MAM	MEADOW MARSH			
MAM2-2	Reed-canary Grass Mineral Marsh	**Ground Cover:** reed canary grass dominant.	• Flooding seasonal dominated by emergent hydrophytic macrophytes (MAM). • Tree and shrub cover ≤ 25%. • Mineral soil (2). • Dominated by a mixture of Reed-canary Grass (2). • Pioneer community. • Represents the wetland – terrestrial interface.	

TABLE 4.
SUMMARY OF ECOLOGICAL LAND CLASSIFICATION VEGETATION COMMUNITIES

FEC/ELC Code	Vegetation Type	Species Association	Comments	Location[1]
MAS	SHALLOW MARSH			
MAS2-1	Cattail Mineral Shallow Marsh	**Ground Cover:** narrow leaved cattail (*Typha angustifolia*) with reed-canary grass and sedges.	• Variable flooding with standing or flowing water for much of the growing season dominated by emergent hydrophytic macrophytes (MAS). • Tree and shrub cover ≤ 25%. • Mineral soil (2). • Dominated by Cattails (1). • Pioneer community. • Represents the wetland – terrestrial interface.	
Aquatic				
OA	OPEN WATER			
OAO	Open Water Aquatic	N/A	• Water >2 m depth, with no macropyte vegetation or canopy cover (OAO)	
SA	SHALLOW WATER			
SAF1-3	Duckweed Floating-leaved Shallow Aquatic	Floating cover: Lesser duckweed (*Lemna minor*) and star duckweed (*Lemna trisulca*) are dominant.	• Water up to 2 m depth • Standing water always present • Dominated >25% floating-leaved macrophytes (SAF)	West of Bond Lake, within Philips-Bond-Thompson Wetland Complex

Table 5
Summary of Species with Regional and Local Status in the Study Area

Scientific Name	Common Name	MNR	COSEWIC	Local Status	Legal Status	Location
Picea glauca	white spruce			L3		FOD4, FOD7, FOD8-1, CUP3, CUP3-3, CUM1-1, CUT1, CUT1-1, CUW1, MAS2-1
Picea mariana	black spruce			R[1], R[3], L2		CUM1-1
Pinus resinosa	red pine			R[1],R[2] L1		FOD7, CUP3, CUT1
Juniperus communis	common juniper			L3		FOD8-1
Juniperus virginiana	eastern red cedar			R[1]		CUP3-3, CUS1, CUW1
Juglans cinerea	Butternut	END	END	L3		FOD4
Juglans nigra	black walnut			R[1], R[2], R[3]		FOD4, FOD7, FOD7-3, FOD8-1, CUP3, CUP3-3, CUM1-1, CUT1, CUT1-1, CUS1, CUW1
Polygonum cilinode	fringed black bindweed			R[1], R[2], R[3], L3		FOD4
Salix nigra	black willow			R[1], R[2], R[3], L3		FOD8-1
Argentia anserina	silverweed			U[3]		CUT1-1
Physocarpus opulifolius	ninebark			R[1], R[2], L3		CUM1-1, CUW1
Spiraea alba	narrow-leaved meadow-sweet			L3		FOD3-1, CUM1-1, SA
Gymnocladus dioicus	Kentucky coffee-tree	THR	THR			ROW - planted and in poor condition
Oenothera biennis	common evening-primrose			U[3]		CUP3-3, CUM1-1, CUT1-1, CUS1, CUW1
Acer nigrum	black maple			R[1], R[2], R[3]		CUT1 along Green Lane
Angelica atropurpurea	dark-purple alexanders			R[1], R[2], R[3], L3		CUM1-1
Cicuta maculata	spotted water-hemlock			U[3]		FOD4, FOD7-3
Apocynum cannabinum	Indian hemp			U[3]		CUM1-1
Monarda fistulosa	wild bergamot			U[3]		CUM1-1, CUT1
Celtis occidentalis	common hackberry			R[1]		CUM1-1
Viburnum acerifolium	maple-leaved viburnum			L3		FOD7, CUP3
Symphyotrichum ciliolatum	ciliolate aster			R[1], R[2], R[3]		ROW, FOD4, FOD7, FOD7-3, CUP3-3, CUM1-1, CUT1, CUW1
Lemna trisulca	star duckweed			U[3], L3		SA
Carex aurea	golden-fruited sedge			U[3]		CUM1-1

*Local Status description refers to Appendix A.

2.5 Wildlife and Wildlife Habitat

Field investigations in the study area were conducted during the months April through September (April 25; May 14,16, 22, 23, 24, 29, 30, 31; June 20, 27; July 3, 6, 10, 11, 12, 20, and September 27, 28) 2007. Over this time period, a total of 16 days were spent in the field. Investigations were made to document wildlife and wildlife habitat and to characterize the nature, extent and significance of animal usage within the project limits. Direct observations, calls, tracks, scats, runways and scents were used to record the wildlife. Breeding evidence was documented according to the criteria described in the Bird Studies Canada's Breeding Bird Atlas. Special attention was given to determining the wildlife corridor usage alongside and across the proposed Yonge Street Rapidway corridor from Gamble Road in Richmond Hill to Green Lane in East Gwillimbury. Two additional corridors, Green Lane from Yonge Street east to the GO bus terminal, and Davis Drive from Yonge Street to Harry Walker Parkway in Newmarket, were investigated. Fifty to 100 meters of habitat on each side of the preferred route were examined.

2.5.1 Wildlife Habitat

The habitats observed along these corridors ranges from large areas of urbanization, agricultural fields and farming residences to isolated and often fragmented natural heritage areas of mature forests, wetlands, riparian zones, cultural thickets and cultural meadows. The most continuous patches of wildlife habitat are located along Yonge Street at the south end of the study area adjacent to and opposite from the Bond Lake area. Other, fragmented parcels of wildlife habitat are present along the east side of Yonge Street north and south of Bloomington Road; south of the CN Railway tracks from Industrial Road to Elderberry Road on the west side of Yonge Street; areas bordering two crossing points of Tannery Creek and Yonge Street near Orchard Heights/Batson Road provide aquatic, riparian and cultural meadow habitat and a large area along Tannery Creek north and south of St. John's Sideroad is locally significant wildlife habitat. Three smaller patches of wildlife habitat are present at two tributary crossings of the East Branch of the Holland River along Green Lane just east of Yonge Street and on the southwest corner of Green Lane and Concession 2. Agricultural fields along Green Lane connect these fragmented natural habitats.

A wildlife habitat assessment summary is presented in Appendix B.

2.5.2 Fauna

One hundred and twelve wildlife species (14 herpetofauna, 78 birds and 20 mammal species) were recorded within the area of investigation. Wildlife was recorded throughout the entire study area, however most of the biodiversity occurred in and around the natural heritage sections. The majority of the breeding bird species observed, the heaviest bird and mammal corridor usage and the strongest herpetofaunal evidence (calls) came form these areas, especially at the south end of the study area along Yonge Street.

2.5.2.1 Herpetofauna

Most of the 14 herpetofauna species recorded were observed around Bond Lake on the east side of Yonge Street and in the small pond opposite Bond Lake on the west side of Yonge Street (Location WY9, Appendix B). Approximately 60 juvenile and adult painted turtles (*Chrysemys picta*) were seen basking at the same time on logs within this small pond. Green frogs (*Rana clamitans*), American toad (*Bufo americanus*) and spring peepers (*Pseudacris crucifer*), seen and heard during the spring and summer seasons, use this pond for breeding and egg deposition. Leopard frogs (*Rana pipiens*) and spring peepers were found in the marsh areas along the Humber River at King Road and in the small marsh and creek along the west side of Yonge Street at Estate Garden Drive. Numerous painted turtles were also observed in the large pond/marsh area on the north side of Jefferson Sideroad.

Only two species of snakes, eastern garter snake (*Thamnophis sirtalis*) and northern red-bellied snake (*Storeria occipitomaculata*), were observed within the study area. Eastern garter snakes were observed in cultural meadows along Green Lane and along the south end of Yonge Street where water was nearby. Northern red-bellied snakes were found in cultural meadows as well as around buildings where debris provided cover. Numerous red-bellied snakes were found along Yonge Street at Harris Road under debris behind the Summit Auto dealership. Although only two species of snakes were observed directly, secondary source records for the study area and habitat types found within the area indicated the probable presence of other species such as Dekay's brown snake (*Storeria dekayi*) and milk snake (*Lampropeltis triangulum*). Marshy areas, creeks and marginal habitat adjacent to old buildings found along Yonge Street, are excellent habitats for these two species.

2.5.2.2 Birds

Numerous breeding bird species were observed during the spring/summer investigations. Evidence of resident status for birds generally characterized as being tolerant of a disturbed human environment was common throughout most of the study area. Nests, nests with eggs or nests with young were observed for variety of local urban species, such as American Robin (*Turdus migratorius),* American Goldfinch (*Carduelis tristis*), Chipping Sparrow (*Spizella passerina*), House Finch (*Carpodacus mexicanus*) and Mourning Dove (*Zenaida macroura*). A significant number of breeding bird species representative of a more natural environment were observed in the natural heritage sections in the study area. A Cedar Waxwing (*Bombycilla cedrorum*) was observed feeding its mate during a courtship display; Bank Swallows (*Riparia riparia*), Rough-winged Swallows (*Stelgidopterix serripennis*), Barn Swallows (*Hirundo rustica*) and Song Sparrows (*Melospiza melodia)* were observed carrying food to their nests. Adults with fledglings and adults feeding their young were also observed in many of the natural areas along the Yonge Street and Green Lane corridors. Adult birds that were seen with their young included: Downy Woodpeckers (*Picoides pubescens*), Baltimore Orioles (*Icterus galbula*), House Finches and Northern Flickers (*Colaptes auratus*). Evidence for resident bird status or breeding bird activity within the natural areas was also observed for species such as American Woodcock (*Scolopax minor*), Red-winged Blackbird (*Agelaius phoeniceus*), Tree Swallow (*Tachycineta bicolor*), Yellow Warbler (*Dendroica petechia*), Eastern Kingbird (*Tyrannus tyrannus*), Eastern Phoebe (*Sayornis phoebe*), Canada Goose (*Branta canadensis*), Mallard (*Anas platyrhynchos*), and Wood Duck (*Aix sponsa*).

Migratory bird species also use the study area as a travel corridor during the spring and fall seasons. The natural heritage areas found along Yonge Street and Green Lane are part of the larger seasonal migration corridor used by birds. The forests, cultural thickets, cultural meadows and wetlands provide a food source and function as temporary landbird/waterbird stopover areas. Species such as American Redstart (*Setophaga ruticilla*), Tennessee, Warbler (*Vermivora peregrina*) and White-throated Sparrow (*Zonotrichia albicollis*) were seen only temporarily, but in greater numbers during the migration seasons. During the spring migration period in April, large numbers of Canada Geese, Mallards, Spotted Sandpipers (*Actitus macularius*), Semipalmated Plovers (*Charadrius semipalmatus*) and Killdeers were observed in and around the stormwater ponds located on Green Lane east of Yonge Street. Larger numbers of waterfowl were also observed using the large pond along Yonge Street at Jefferson Sideroad.

2.5.2.3 Mammals

Mammal species inhabited both urban and natural areas. Species such as raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), gray squirrel (*Sciurus carolinensis*) and eastern chipmunk (*Tamias striatus*) were found often in the urban areas along Yonge Street. Numerous signs, such as dreys, tracks and corridors, indicated their habitual usage.

Evidence for the most regularly used habitats was found in the natural heritage sections of the study area. River crossings surrounded by natural vegetation and fragmented natural habitats, paralleling both sides

of Yonge Street and Green Lane, were the most habitually used areas. Raccoon, skunk, mink (*Mustela vison*) and muskrat (*Ondatra zibethica*) regularly used the culverts under Green Lane where tributaries of the East Branch of the Holland River crossed. Marshes at both sites contained numerous tracks of these species as well as white-tailed deer (*Odocoileus virginianus*). The cultural thicket along Green Lane at Concession 2 also contained these species plus eastern cottontail (*Sylvilagus floridanus*), eastern chipmunk and opossum (*Didelphis virginianus*). Predators, such as coyote (*Canis latrans*) and red fox (*Vulpes vulpes*), used the edges of the agricultural fields and cultural meadows to travel between these areas.

Most of these same species were recorded along Yonge Street using the cultural meadows and riparian vegetation associated with Tannery Creek crossings near Orchard Heights/Batson Road and St. John's Sideroad. The large double culvert on Yonge north of St. John's Sideroad had track evidence for gray squirrel, American beaver (*Castor canadensis*), mink, striped skunk, raccoon and white-tailed deer traveling through them. Numerous deer beds and trails were found in the large cultural meadow along the east side of Yonge Street at this same location. On the west side of Yonge Street at the Humber River crossing at King Road, minimal natural habitat is available however sign of raccoon and mink using the marsh and culvert was evident.

The continuous stretch of natural habitats, from Estate Garden/Old Colony Road down to the south side of Bond Lake, contained the greatest amount of mammal activity. Tracks, feces, calls, trails and regularly used corridors were more evident in this section of the study area than anywhere else. Cultural woodlots, cultural thickets, cultural meadows, marshes, ponds and mature forests, on both sides of Yonge Street, were all connected by regularly used mammal corridors.

An area south of this location, near Jefferson Forest Drive, also provides a contiguous and diverse habitat. The cultural woodlots and meadows on the east side of Yonge Street had red squirrel (*Tamiasciurus hudsonicus*), gray squirrel, eastern cottontail, eastern chipmunk, deer mice (*Peromyscus* sp.) and meadow voles (*Microtus pennsylvanicus*). This woodlot was also used by white-tailed deer as a bedding area and the discovery of a newborn fawn located in the short grasses adjacent to the woodlot along Yonge Street indicated that it was used as a deer birthing area as well.

2.5.2.4 Mammal Corridors

Mammal corridors, either running parallel to the preferred route or perpendicular to it, were found throughout most of the study area. As mentioned above, the majority of culverts along Yonge Street, Green Lane and Davis Drive afford safe passage for mammals traveling between habitats located on either side of the roadways. If however, there were no under highway routes to travel, above ground crossings between natural heritage features were evident. These at grade crossing points were numerous in areas where natural heritage features were found opposite each other along the roadway. For example, six corridors were located between Jefferson Sideroad and Harris Road, connecting cultural meadows, cultural thickets and cultural woodlots on each side of Yonge Street. A significant number of at grade roadway corridors connect the cultural meadows on each side of Yonge Street, north and south of the East Tannery Creek, just north of St. John's Sideroad. Urban areas also had corridors, although less obvious, if there were some fragments of natural heritage features nearby. For example, corridors were found northeast of Bloomington Road, crossing Yonge Street to connect the forest on the east side of Yonge to the fragmented habitat found in front of the Ministry of Natural Resources building which is located on the west side of Yonge Street. Other corridors were recorded in the urban area between Gamble Road/19th Avenue and Jefferson Forest Road. More corridor locations are identified in the wildlife habitat table provided in Appendix B.

If natural heritage features were not present or if the natural heritage features were blocked by some human influence (eg. large in-ground fencing), there was likely no corridor crossing of the specific

section of the roadway. This type of a situation was evident near Bloomington Road. The large cultural meadow found on the southeast side of Bloomington Road had no corridors leading to the west side of Yonge Street since a large wooden in-ground fence made it impossible for east-west wildlife migration.

A summary of the wildlife documented in the study area during field investigations and from secondary source information is presented in Table 7.

2.5.3. Species at Risk

One species recorded along the Yonge Street corridor, the recently designated Chimney Swift (*Chaetura pelagica*), has been ranked as a threatened species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The milk snake, not seen during the investigation but recorded based on previous data for the area and suitable habitat types, is ranked as special concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and by the Ministry of Natural Resources (MNR)/Committee on the Status of Species at Risk in Ontario (COSSARO). *The Migratory Birds Convention Act* (MBCA) protects 64 of the 78 bird species recorded. Eight species are also protected under the *Fish and Wildlife Conservation Act* (FWCA). The FWCA also protects six of the 14 herpetofaunal species recorded and 17 of the 20 mammal species. The Toronto and Region Conservation Authority (TRCA) also considers seven of the herpetofaunal species, 21 of the bird species and three of the mammal species recorded as species of concern in their jurisdiction. Thirty-one of the bird species listed are also recognized as a priority species of conservation for the York Region by Bird Studies Canada. The Lake Simcoe Region Conservation Authority (LSRCA) does not consider any of the herpetofauna, bird or mammal species recorded as species of concern in their jurisdiction.

2.6 Designated Natural Areas

Designated natural areas include areas identified for protection by MNR, TRCA, LSRCA and the Oak Ridges Moraine Conservation Act (ORMCA). All but two of the designated natural areas occurring in the larger, original study area are associated with the Oak Ridges Moraine physiographic region and in most situations, have more than one designation. The name of each complex, its general location and classification are presented below in Table 6. The Aurora McKenzie Marsh and the East Aurora Wetland Complex are not located on the Oak Ridges Moraine. Both of these features are classed as provincially significant wetlands (PSW).

TABLE 6
DESIGNATED NATURAL AREAS

Designated Area	General Location	Classification
Bloomington Wetlands	Bloomington Road, east of Leslie Street	ESA, PSW
Bond Lake Bog and Bond Lake	East side of Yonge Street, north of Stouffville Road	ANSI, ESA, PSW
Forester Marsh	West side of Yonge Street, south of Bloomington Road	ESA, PSW
Glenville Hills Kames	Bathurst Street/Mulock Drive	ANSI
Jefferson Forest	Bayview Avenue/Stouffville Road – south to Jefferson Forest Drive	ANSI, ESA, PSW
Leslie Street Wetland	Vandorf Sideroad, west of Leslie Street	N-PSW
Mallard Marsh	East Humber River, west of Yonge Street	N-PSW
Oak Ridges Bog	East side of Yonge Street, south of Bloomington Road	ANSI, PSW
Philips-Bond-Thompson Wetland Complex	West of Yonge Street, north of Jefferson Road	ANSI, PSW
Rouge River Headwater Wetland Complex	East of Bayview Avenue, north of 19th Avenue	ANSI, ESA, PSW
Simon Lake/Hayes Lake	West of Leslie Street, north of Bethesda Sideroad	ANSI, PSW
Vandorf Kettles	East of Leslie Street, south of Vandorf Sideroad	ANSI, ESA, PSW
Wilcox Lake Bog	East of Bayview Avenue, south of Bethesda Sideroad	ESA, PSW
Wilcox- St. George Wetland Complex	East of Bayview Avenue, north of Bethesda Sideroad – extends west along East Humber River to Yonge Street	ANSI, PSW
Wilcox Lake Wetlands and Uplands	East of Bayview Avenue, south of Bethesda Sideroad	ANSI

Legend:
ANSI - Area of Natural and Scientific Interest
ESA - Environmentally Sensitive Area
PSW - Provincially Significant Wetland
N-PSW – Non-Provincially Significant Wetland

In the Yonge Street corridor study area, three designated natural areas are present. A small pond that is part of the Phillips-Bond-Thompson Wetland Complex (ANSI, PSW) is located west of Yonge Street, north of Jefferson Sideroad. The environs associated with the Bond Lake area are designated as an ESA, a PSW and as an ANSI. A third area, the cattail mineral marsh (MAS2-1) located east of Yonge Street at King Road is linked to the Wilcox-St. George Wetland Complex (ANSI, PSW). All of these areas are situated on the Oak Ridges Moraine.

Table 7
Wildlife Documented in the Study Area by LGL and Others

P50Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status	BBE	Others
Herpetofauna	*Plethodon cinereus*	Eastern Red-backed Salamander				TRCA(L3)/FWCA(P)		*
	Bufo americanus	American Toad						
	Hyla versicolor	Gray Treefrog				TRCA(L2)/FWCA(P)		*
	Pseudacris crucifer	Spring Peeper						
	Rana sylvatica	Wood Frog				TRCA(L2)		*
	Rana pipiens	Northern Leopard Frog				TRCA(L3)		
	Rana clamitans	Green Frog						
	Chelydra serpentina	Snapping Turtle				TRCA(L3)/FWCA(G)		*
	Chrysemys picta marginata	Midland Painted Turtle				FWCA(P)		
	Thamnophis sirtalis	Eastern Gartersnake						
	Storeria dekayi	Dekay's Brown Snake						*
	Storeria occipitomaculata	Northern Red-bellied Snake				TRCA(L3)		
	Opheodrys vernalis	Smooth Greensnake				TRCA(L3)/FWCA(P)		*
	Lampropeltis triangulum	Milk Snake	SC	SC		SARA(1) / FWCA(P)		*
Birds	*Branta canadensis*	Canada Goose				MBCA	FY	
	Aix sponsa	Wood Duck			BSC	TRCA(L3)/MBCA	FY	
	Anas platyrhynchos	Mallard				MBCA	FY	
	Maleagris gallopavo	Wild Turkey				TRCA(L2)/MBCA/FWCA(G)		
	Ardea herodias	Great Blue Heron				TRCA(L3)/MBCA		
	Nycticorax nycticorax	Black-crowned Night Heron			BSC	TRCA(L3)/MBCA		
	Pandion haliaetus	Osprey				TRCA(L3)/FWCA(P)		
	Circus cyaneus	Northern Harrier				TRCA(L3)/FWCA(P)		
	Accipiter striatus	Sharp-shinned Hawk			BSC	TRCA(L3)/FWCA(P)		
	Accipiter cooperii	Cooper's Hawk			BSC	TRCA(L3)/FWCA(P)		*

Table 7
Wildlife Documented in the Study Area by LGL and Others

P50Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status	BBE	Others
	Buteo jamaicensis	Red-tailed Hawk				FWCA(P)		
	Rallus limicola	Virginia Rail			BSC	TRCA(L3)/MBCA		*
	Porzana carolina	Sora			BSC	TRCA(L3)/MBCA		*
	Charadrius semipalmatus	Semipalmated Plover				MBCA		
	Charadrius vociferus	Killdeer				MBCA	A	
	Actitis macularius	Spotted Sandpiper			BSC	MBCA	A	
	Gallinago delicata	Wilson's Snipe			BSC	TRCA(L3)/MBCA		*
	Scolopax minor	American Woodcock			BSC	TRCA(L3)/MBCA	FY	
	Larus delawarensis	Ring-billed Gull				MBCA		
	Columba livia	Rock Pigeon						
	Zenaida macroura	Mourning Dove				MBCA	NE	
	Chaetura pelagica	Chimney Swift	THR			MBCA	T	
	Archilochus colubris	Ruby-throated Hummingbird			BSC	MBCA		*
	Ceryle alcyon	Belted Kingfisher				FWCA(P)	CF	
	Picoides pubescens	Downy Woodpecker				MBCA	CF	
	Picoides villosus	Hairy Woodpecker				MBCA		
	Colaptes auratus	Northern Flicker				MBCA	FY	
	Contopus virens	Eastern Wood Pewee				MBCA	T	
	Empidonax traillii	Willow Flycatcher				MBCA	T	*
	Sayornis phoebe	Eastern Phoebe			BSC	MBCA	NE	
	Myiarchus crinitus	Great Crested Flycatcher				MBCA	T	
	Tyrannus tyrannus	Eastern Kingbird			BSC	MBCA	NE	
	Vireo solitarius	Blue-headed Vireo			BSC	TRCA(L3)/MBCA		
	Vireo gilvus	Warbling Vireo				MBCA	T	
	Vireo olivaceus	Red-eyed Vireo				MBCA	T	
	Cyanocitta cristata	Blue Jay				FWCA(P)		

Table 7
Wildlife Documented in the Study Area by LGL and Others

P50Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status	BBE	Others
	Corvus brachyhrynchos	American Crow					FY	
	Eremophila alpestris	Horned Lark			BSC	MBCA	T	
	Tachycineta bicolor	Tree Swallow				MBCA	NE	
	Stelgidopteryx serripennis	Northern Rough-winged Swallow			BSC	MBCA	CF	
	Riparia riparia	Bank Swallow			BSC	MBCA	CF	
	Petrochelidon pyrrhonota	Cliff Swallow				MBCA	NU	
	Hirundo rustica	Barn Swallow				MBCA	CF	
	Poecile atricapillus	Black-capped Chickadee			BSC	MBCA	FY	
	Sitta canadensis	Red-breasted Nuthatch			BSC	MBCA		
	Sitta carolinensis	White-breasted Nuthatch				MBCA		
	Troglodytes aedon	House Wren				MBCA	NE	*
	Hylocichla mustelina	Wood Thrush			BSC	TRCA(L3)/MBCA	T	
	Turdus migratorius	American Robin				MBCA	NY	
	Dumetella carolinensis	Gray Catbird			BSC	MBCA		
	Mimus polyglottos	Northern Mockingbird			BSC	MBCA		
	Toxostoma rufum	Brown Thrasher				TRCA(L3)/MBCA		*
	Sturnus vulgaris	European Starling					FY	
	Bombycilla cedrorum	Cedar Waxwing				MBCA	H	
	Vermivora peregrina	Tennessee Warbler				MBCA		
	Dendroica petechia	Yellow Warbler				MBCA	NE	
	Dendroica pinus	Pine Warbler			BSC	TRCA(L3)/MBCA	T	
	Mniotilta varia	Black and White Warbler			BSC	TRCA(L3)/MBCA		*
	Setophaga ruticilla	American Redstart			BSC	TRCA(L3)/MBCA		
	Seiurus aurocapilla	Ovenbird			BSC	TRCA(L3)/MBCA		
	Geothlypis trichas	Common Yellowthroat				MBCA	T	

Table 7
Wildlife Documented in the Study Area by LGL and Others

P50Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status	BBE	Others
	Spizella passerina	Chipping Sparrow				MBCA	T	
	Spizella pusilla	Field Sparrow			BSC	TRCA(L3)/MBCA	T	
	Passerculus sandwichensis	Savannah Sparrow			BSC	MBCA	A	
	Melospiza melodia	Song Sparrow				MBCA	CF	
	Melospiza georgiana	Swamp Sparrow			BSC	MBCA	T	
	Zonotrichia albicollis	White-throated Sparrow			BSC	TRCA(L3)/MBCA		
	Cardinalis cardinalis	Northern Cardinal				MBCA	T	
	Pheucticus ludovicianus	Rose-breasted Grosbeak				MBCA	T	
	Passerina cyanea	Indigo Bunting				MBCA	T	
	Agelaius phoeniceus	Red-winged Blackbird					CF	
	Sturnella magna	Eastern Meadowlark			BSC	MBCA		
	Quiscalus quiscula	Common Grackle						
	Molothrus ater	Brown-headed Cowbird					FY	
	Icterus galbula	Baltimore Oriole				MBCA	FY	
	Carpodacus mexicanus	House Finch				MBCA	FY	
	Carduelis tristis	American Goldfinch			BSC	MBCA	NE	
	Passer domesticus	House Sparrow					AB	
Mammals	*Didelphis virginiana*	Virginia Opossum				FWCA(F)		
	Blarina brevicauda	N. Short-tailed Shrew				FWCA(P)		*
	Myotis lucifigus	Little Brown Bat				FWCA(P)		
	Sylvilagus floridanus	Eastern Cottontail				FWCA(G)		
	Tamias striatus	Eastern Chipmunk				FWCA(P)		
	Marmota monax	Groundhog						
	Sciurus carolinensis	Gray Squirrel				FWCA(G)		
	Tamiasciurus hudsonicus	Red Squirrel				FWCA(F)		
	Castor canadensis	Beaver				TRCA(L3)/FWCA(F)		

Table 7
Wildlife Documented in the Study Area by LGL and Others

P50Wildlife	Scientific Name	Common Name	COSEWIC	OMNR	Local	Legal Status	BBE	Others
	Peromyscus sp.	White-footed (Deer) Mouse						
	Microtus pennsylvanicus	Meadow Vole						
	Ondatra zibethica	Muskrat				FWCA(F)		
	Erithizon dorsatum	Porcupine				TRCA(L2)		*
	Canis latrans	Coyote				FWCA(F)		
	Vulpes vulpes	Red Fox				FWCA(F)		
	Procyon lotor	Raccoon				FWCA(F)		
	Mustela vison	American Mink				TRCA(L3)/FWCA(F)		
	Mustela erminea	Short-tailed weasel				TRCA(L3)/FWCA(F)		*
	Mephitis mephitis	Striped Skunk				FWCA(F)		
	Odocoileus virginianus	White-tailed Deer				FWCA(G)		

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
C – 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

3.0 PROJECT DESCRIPTION

The proposed North Yonge Street Rapidway from 19th Avenue/Gamble Road to Green Lane is a bus rapid transit (BRT) system convertible to light rail transit (LRT) located within the Yonge Street, Davis Drive and Green lanes right-of-ways. A total of three different cross-sections are proposed for the North Yonge Street BRT system.

One cross-section consists of a four general traffic lanes with a 4.0 m wide median and one 3.5 m wide dedicated bus lane in each direction located on each side of the median. Rapidway stations will be situated on each side of the bus lane with no centre median. The bus lanes will be identified using coloured asphalt and a rumble strip will be placed between the bus lanes and general traffic in order to discourage the use of the bus lane by private automobiles. In addition, there will be one 1.5 m-bike lane in each direction located alongside the curbs.

The second cross-section for the BRT system consists of a 6-lane cross-section with a 4.0 m wide median including one 3.5 m-dedicated High Occupancy Vehicle (HOV) lane and one 1.5 m-bike lane in each direction located alongside the curbs. Rapidway stations will be situated curbside within the sidewalk provision adjacent to the HOV lanes and not within the median.

The third cross-section for the BRT is to maintain the existing cross-section presently in use. The BRT will operate in a mixed traffic environment. A median will not be present and Rapidway stations will be on the curbside within the sidewalk provision.

Typical cross-sections for the BRT 4 lanes with dedicated bus lanes and 6 lanes including HOV lanes are presented in Figures 4 and 5 respectively.

An overview of the Yonge Street Rapidway alignment by segment follows:

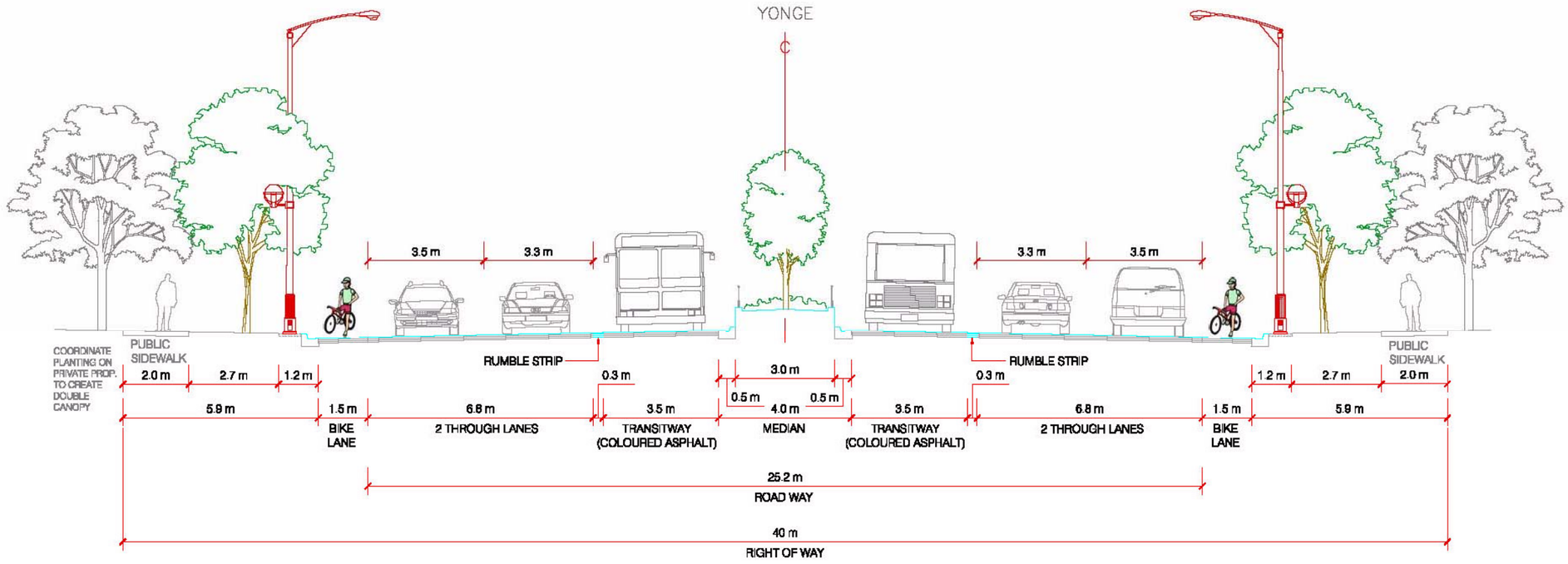
1. Richmond Hill: A 4-lane cross-section having dedicated BRT lanes and a centre median will be implemented from 19th Avenue to Bloomington Avenue. Rapidway stations will be established at Tower Hill Drive, Jefferson Sideroad, the Bond Lake area, King Road, Regatta Avenue and Bloomington Road.

2. Aurora: From Bloomington Road to Henderson Drive/Allaura Boulevard, a 4-lane cross-section with dedicated BRT lanes, a centre median and curb side bike lanes will be established. From this point, through the main section of the Town of Aurora to Orchard Heights Boulevard/Batson Drive, the BRT will operate in mixed traffic. Dedicated BRT lanes or HOV lanes will not be present along this section. From Orchard Heights Boulevard/Batson Drive to St. John's Sideroad, the Rapidway will revert to a 4-lane cross-section with dedicated BRT lanes. Rapidway stations are to be located at Henderson Avenue, Golf Links Drive, Wellington Avenue, Orchard Heights Boulevard and ST. John's Sideroad.

3. Newmarket - Yonge Street Alignment: From St. John's Sideroad to Davis Drive a 4-lane cross-section having dedicated BRT lanes and a centre median will be incorporated in the transit system. Stations are to be located at Savage Road South, Mulock Avenue, Eagle Street, and Davis Drive. From Davis Drive to Green Lane the initial configuration will be a 6-lane cross-section including the curbside HOV lanes with a centre median. Ultimately, the configuration along this section will be 4 lanes with dedicated BRT lanes. Stations are located at London Road and Green Lane.

4. Newmarket - Davis Drive Alignment: The Davis Drive route will have dedicated BRT lanes from Yonge Street to Roxborough Avenue. East of Roxborough to Harry Walker Parkway, the BRT will operate in mixed traffic. Rapidway stations along this segment are located at Longford Drive, Main Street, South Lake Regional Health Centre, Huron Heights Boulevard, and Leslie Street.

5. East Gwillimbury: A dedicated BRT system will be in place on Green Lane from Yonge Street to the East Gwillimbury GO Station. Transit stations are located at Yonge Street, approximately halfway between Yonge and the GO Station and at the East Gwillimbury GO Station.



NORTH YONGE EA
TYPICAL CROSS SECTION AT MID-BLOCK

4 LANES WITH BRT EXCLUSIVE LANES WITH BIKE LANES (40m ROW)

0 1 5

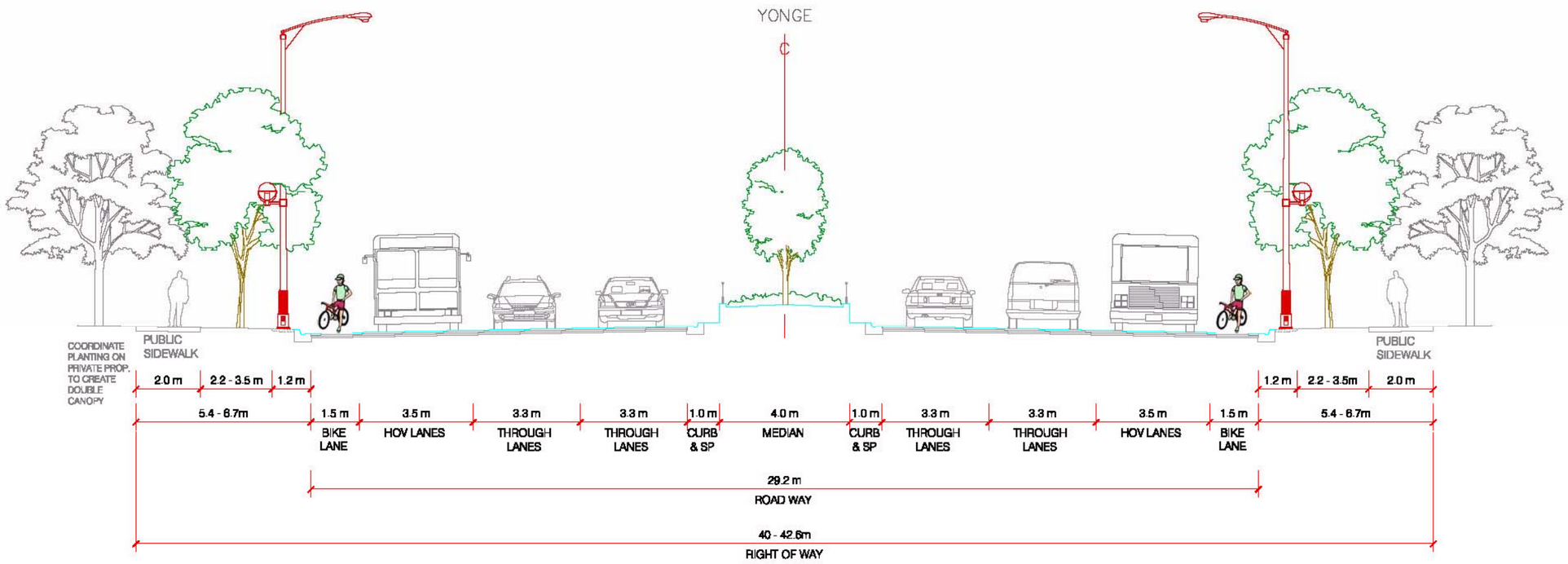
LEGEND

Source: Delcan

Preliminary
Typical Cross Section at Mid-Block

LGL LIMITED
environmental research associates

Project:	TA4174	**Figure:**	4
Date:	March 2008	**Prepared By:**	KDT
Scale:		**Checked By:**	GNK



NORTH YONGE EA
TYPICAL CROSS SECTION AT MID-BLOCK

6 LANES WITH HOV LANES & BIKE LANES

0 1 5

LEGEND

Source: Delcan

Preliminary
Typical Cross Section at Mid-Block

LGL LIMITED
environmental research associates

Project:	TA4174	**Figure:**	5
Date:	March 2008	**Prepared By:**	KDT
Scale:		**Checked By:**	GNK

4.0 IMPACT ASSESSMENT AND ENVIRONMENTAL PROTECTION

4.1 Physiography and Soils

Loam and sandy loam soils located within the project limits are susceptible to erosion. Consequently, soil disturbance associated with cut and fill, grade revisions, drainage modifications, culvert extensions, 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;
- 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 proposed alignment within the Yonge Street corridor has the potential to impact shallow groundwater quality and quantity, recharge/discharge areas and water wells. The potential effects of the alignment on the quality and quantity of the shallow groundwater and the potential impact on water supply wells are discussed in the following section.

4.2.1 Quality of Shallow Groundwater

Shallow groundwater has a high connectivity to surface water systems. Therefore, there is a potential for shallow groundwater quality to be impacted when changes are made to the land use and groundcover. One of the ways that shallow groundwater is connected to surface water systems is the infiltration of runoff during storm events. Storm water that has contacted road surfaces may become affected by substances associated with roads. This generates runoff that has compromised water quality, which, if allowed to infiltrate through the ground surface in adjacent grassed areas or unlined ditches, has the potential to affect the shallow groundwater table. 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 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 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, as discussed in Section 2.2.3, would have greater susceptibility to effects upon shallow groundwater quality since they allow the infiltration of potentially affected storm water runoff. 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 water courses to affect the water quality of the baseflow contribution to the water course. Effects could occur where active water supply wells with shallow construction are present down-gradient of the transit alignment.

There are natural mechanisms that will help to mitigate the potential impact of the affected runoff on the shallow groundwater quality. As storm water contacts and infiltrates the soils surface, and as it moves through the underlying sediments in the unsaturated and saturated soil zones, the water quality will be buffered and filtered by natural processes. However, certain components such as chloride and sodium may persist. The concentrations of these persistent components can be reduced by dilution with unaffected infiltration and/or by dilution with groundwater as the distance increases from the source of the runoff.

In order to minimize the potential impact to shallow groundwater quality, best management practices should be implemented. Best management practices include methods to prevent runoff from reaching infiltration areas and methods to detain or pre-filter water before it has the opportunity to infiltrate. Storm water runoff impacted from contact with roads can be prevented from reaching open soils by curb and gutters along the edge of the road that guide impacted water to storm water management facilities. Detention or pre-treatment infrastructure such as oil and grease separation traps, and/or other components can also be installed. The application of de-icers to the road surface also increases the concentration of certain parameters in surface runoff. In order to reduce these concentrations, the application of road salt should be minimized. Adjustments to road salt application can reduce the amount of road salt that is required. These adjustments can include 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 expensive and should be considered for more sensitive groundwater and surface water receivers.

Certain surficial soil types are more susceptible to quality impacts on the shallow groundwater table. Sandy soils with a higher permeability and associated increased recharge rate to the groundwater table are more susceptible to impacts on the quality of the shallow groundwater. Glaciolacustrine deposits, which make up the southern part of the study area, have a silt and clay texture that is less susceptible than a sandy textured soil, since recharge infiltration is less. Areas of less permeable soil types are a lower priority for best management practices than areas of high permeability, in terms of protecting the shallow groundwater quality.

The quality of the shallow groundwater resource can be managed using a groundwater monitoring network along the proposed traffic alignment. This network can be used to detect and measure any impacts. It is probable that the proposed transit development will result in effects to shallow groundwater quality that are detectable but acceptable with respect to the Ontario Drinking Water Standards for groundwater, and/or the Provincial Water Quality Objectives for surface water.
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4.2.2 Quantity of Shallow Groundwater

The quantity of groundwater that is present in the shallow water table system may be affected by the proposed alignment. The quantity of shallow groundwater is directly related to the infiltration of surface water to the shallow groundwater table. The proposed development of additional or wider traffic lanes has the potential to reduce the quantity of shallow groundwater as the paved road surface will reduce the volume of precipitation that can infiltrate and recharge the groundwater. The greatest impact to the quantity of shallow groundwater will occur when the proposed alignment calls for paving over areas that are currently contributing recharge to the shallow groundwater table, such as open soil or grassed areas.

The typical width of a traffic lane is 3.5 metres. Currently, the roadside lands within about 4 m of the existing curbside along Yonge Street consist of a mix of pervious areas such as grass fields and open soil and impervious areas such as paved parking areas, sidewalks and access driveways. The precise area of open soil and grassed land that are currently present and would be paved by the proposed transit lanes 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 Yonge Street is approximately 75:25, based on aerial photography of the study area. This proportion will vary with location, as some roadside areas are mostly grassed, whereas other areas, such as the urbanized section of Newmarket, are almost completely paved.

The amounts by which recharge may be decreased due to the proposed transitway are considered negligible relative to the total quantity that occurs within the associated catchment areas. The net result is that the paving of the proposed transitway alignment will not likely 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 median proposed for construction along Yonge Street was vegetated with grass to promote recharge.

4.2.3 Potential to Impact Water Supply Wells

The MOE water well database indicates that historically over 900 water supply wells were constructed in the Yonge Street corridor from Gamble Road to Green Lane. Out of these wells, 56 were counted within a 100 m wide corridor along Yonge Street. One result of urbanization and the provision of municipal water supply servicing is that the majority of these wells are now inactive, decommissioned or removed. Only the wells that remain active as water supply wells will potentially have water supply concerns. However, information as to which of the listed wells in the study area remain active is not available. The impact of the proposed alignment on an active 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.

The construction details of supply wells that remain active are not available from the MOE well database. However, comments can be made on the overall susceptibility of certain types of wells to alignment construction. Wells that obtain water from shallow groundwater, such a dug well, will be more susceptible to changes in the shallow groundwater regime than a drilled well that is accessing a deeper aquifer. The MOE water well database indicates that the wells in the study area obtain water from a wide range of depths. The depth of wells relative to ground surface, based on the depth of the top of the screen, ranges from less than 1 to 57 metres below ground level (m bgl), with a median depth of about 10 m bgl.

Geologic conditions are variable within the relevant well depths reported in the MOE water well survey. The water supply aquifer formations at most wells are overlain, or confined, by significant thickness of layers of fine-grained clay and silt sediments that 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 these would be more susceptible to shallow groundwater quality effects. Active wells that are located down-gradient of the proposed transit alignment will also be more susceptible to impact.

In terms of impacting the quality of any remaining active water supply wells, the magnitude of any impact will be determined by the characteristics of the water supply well including it's proximity to the transit alignment, depth and whether it is situated upgradient or downgradient of the transit alignment. The application of additional de-icing chemicals and other road surface contaminants will not be significant and the amount of impacted runoff that will reach adjacent pervious soil will be relatively low. Therefore, the impacts to the quality of the remaining active water supply wells that rely on the shallow groundwater regime are expected to be low. Again, the provision of municipal water has removed most water supply wells that were historically located in the study area and has therefore reduced the number of users that would potentially be affected. Regardless of the reduced risk of impacting the quality of local water supply wells, best management practices for the application of road de-icers should be used, including timing and alternative substances when they are appropriate. The recharge of the local shallow groundwater table can also be promoted by constructing grassed areas on medians and on adjacent roadside lands, where appropriate

4.3 Aquatic Habitats and Communities

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

The TRCA and LSRCA 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 and LSRCA will work with the proponent to suggest ways to mitigate the HADD, and if mitigatable, write Letters of Advice on behalf of DFO. If either of the conservation authorities (CA) determine that the HADD cannot be mitigated, then the CA having jurisdiction of the specific site 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, LSRCA, DFO and MNR during detail design to determine specific requirements related to fish habitat compensation.

4.3.1 Loss of Site-Specific Habitat

The preferred alignment crosses a total of 14 watercourses including nine on Yonge Street between 19th Avenue/Gamble Road and Green Lane. Of these nine watercourses, one is associated with the Rouge River, two are associated with the East Humber River and six are within the East Holland River watershed. Three watercourse crossings are on Davis Drive and two are located on Green Lane, all within the East Holland River watershed.

Five of the watercourse crossings will not require any remedial work: East Humber River-tributary (location Y1A), East Branch of Tannery Creek crossing Yonge between Kennedy and Church streets (location Y2); Main Branch of Tannery Creek parallel to Yonge Street southwest of St. John's Sideroad (location Y5); unnamed tributary of East Holland River crossing Green Lane east of Yonge Street (location YGL 1); and, unnamed tributary of East Holland River crossing Green Lane west Main Street (location YGL 2). Since no remedial work will be required at these watercourses, no adverse effects on the fisheries resources are anticipated resulting in no net environmental effects. The Rouge River – Tributary 'C' crossing (location YR1) will not require any culvert extensions; however construction of a retaining wall to support road expansion will be necessary. No adverse effects on the fisheries resources are anticipated at this location.

At the crossing of the East Holland River on Davis Drive (location YDD 2), a new replacement structure is required since the existing bridge cannot be widened. This section of the river provides Type II fish habitat for a warmwater fisheries community. The potential for alteration, disruption and loss of fish habitat resulting from the construction of a new structure is high, however implementation of acceptable mitigation measures will minimize net environmental effects. LGL recommends that the new structure span the watercourse to avoid/minimize the requirement for in-water work. In the event that in-water work is required the following environmental protection measures should be followed: in-water construction adhere to pre-determined timing restrictions to avoid critical spawning periods; that all in-water work be performed in the dry; that erosion and sedimentation control measures be followed; and, that the existing river substrate of rubble, cobble and gravel be re-established to pre-construction conditions.

The existing culverts located at the remaining watercourses will likely require culvert extensions to accommodate the BRT. At locations Y7 and YDD 3, fish habitat is very degraded and is classed at best as Type III habitat. Viable fish populations are not present at either location, consequently net environmental effects are considered to be minimal. Watercourse crossing locations Y1 (Humber River), Y3 (Tannery Creek), Y4 (Tannery Creek), Y6 (Tannery Creek), YDD1(Western Creek), provide Type II fish habitat and directly support viable fish populations.

The hierarchy of available protection options for the "important" (Type II) fish 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 fish habitat, the first two protection options do not apply. To reduce the potential for alteration of fish habitat, the following environmental mitigation measures will be implemented:

- revise cross-section to reduce footprint area where feasible;
- 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 the fish community present at each location, no in-water work should be permitted from September 15 to June 30 in coldwater / coolwater streams and from April 1 to June 30 in warmwater streams.
- install the culvert extension to match the inverts of the existing culvert and stream bed; if possible, the culvert should be open bottom or countersunk a minimum of 20 % of the culvert height and then backfilled with native substrate;
- 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 fuelling/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.

Since the protection options are not anticipated to eliminate the adverse effects of Rapidway development on fish habitat, compensation will likely be required. A fish habitat compensation plan will be prepared during detail design in consultation with the LSRCA, the TRCA and DFO. A *Fisheries Act* authorization will be secured prior to any in-water work.

A summary of work proposed at watercourses, environmental protection measures and net environmental effects is presented in Table 8.

4.3.2 Changes to Water Quality and Quantity

The BRT has 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 will be collected in storm sewers and conveyed to existing 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 are not anticipated to be significant.

4.3.3 Alterations to Base Flow

The BRT has 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 ground water 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 Yonge Street.

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

TABLE 8.
SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. No.	Waterbody Name	Location	Existing Crossing	Proposed Work	Site-Specific Mitigation	Net Environmental Effects
YR1	Rouge River – Tributary 'C'	Yonge Street north of Gamble Road	2.0 m x 2.0 m concrete box culvert	No culvert extensions required, retaining wall necessary	• provide Level 1 stormwater treatment • erosion and sedimentation control	• no net environmental effects
Y1	East Branch Humber River	Yonge Street at King Road	2.0 m x 4.0 m concrete box culvert	Culvert extension required on both sides of Yonge Street	• revise cross-section to reduce footprint area • use headwalls, wingwalls and guiderail to reduce length of culvert extension • in-water construction timing restriction • perform in-water work in the dry • match inverts of existing culvert • provide Level 1 stormwater treatment • erosion and sedimentation control	• alteration of approximately 10 m^2 of fish habitat at either end of the culvert is anticipated.
Y1A	East Branch Humber River - tributary	Yonge Street at Black Forest Drive	1.5 m CSP	No work required	• erosion and sedimentation control • provide Level 1 stormwater treatment	• no net environmental effects
Y2	East Branch of Tannery Creek	Yonge Street between Kennedy Street and Church Street	3.0 m x 3.0 m concrete box culvert	No work required	• erosion and sedimentation control • provide Level 1 stormwater treatment	• no net environmental effects
Y3	Main Branch Tannery Creek	Yonge Street south of Orchard Heights Boulevard	2 x 4.0 m CSP	Culvert extensions are required both sides of Yonge Street	• revise cross-section to reduce footprint area • use headwalls, wingwalls and guiderail to reduce length of culvert extension • in-water construction timing restriction • perform in-water work in the dry • match inverts of existing culvert • provide Level 1 stormwater treatment • erosion and sedimentation control	• implementation of recommended mitigation will minimize net environmental effects
Y4	Main Branch Tannery Creek	Yonge Street north of Orchard Heights Boulevard	2 x 4.0 m CSP	Culvert extensions are required both sides of Yonge Street	• revise cross-section to reduce footprint area • use headwalls, wingwalls and guiderail to reduce length of culvert extension • in-water construction timing restriction • perform in-water work in the dry • match inverts of existing culvert • provide Level 1 stormwater treatment • erosion and sedimentation control	• implementation of recommended mitigation will minimize net environmental effects
Y5	Main Branch Tannery Creek	West side of Yonge Street at St. John's Sideroad	No crossing; watercourse flows parallel to Yonge Street	No work required	• erosion and sedimentation control • provide Level 1 stormwater treatment	• no net environmental effects

TABLE 8.
SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. No.	Waterbody Name	Location	Existing Crossing	Proposed Work	Site-Specific Mitigation	Net Environmental Effects
Y6	Main Branch Tannery Creek	Yonge Street north of St. John's Sideroad	2 x 4.8 m CSP	Culvert extensions are required both sides of Yonge Street	• revise cross-section to reduce footprint area • use headwalls, wingwalls and guiderail to reduce length of culvert extension • in-water construction timing restriction • perform in-water work in the dry • match inverts of existing culvert • provide Level 1 stormwater treatment • erosion and sedimentation control	• implementation of recommended mitigation will minimize net environmental effects
Y7	Western Creek	Yonge Street north of Eagle Street	2.0 m x 2.0 m concrete open culvert	Culvert extensions probable	• revise cross-section to reduce footprint area • use headwalls, wingwalls and guiderail to reduce length of culvert extension • in-water construction timing restriction • perform in-water work in the dry • match inverts of existing culvert • provide Level 1 stormwater treatment • erosion and sedimentation control	• implementation of recommended mitigation will minimize net environmental effects
YG L1	Unnamed Tributary of East Holland River	Green Lane east of Yonge Street	2.0 m CSP	Culvert Extensions required on both sides of Green Lane	• revise cross-section to reduce footprint area • use headwalls, wingwalls and guiderail to reduce length of culvert extension • in-water construction timing restriction • perform in-water work in the dry • match inverts of existing culvert • provide Level 1 stormwater treatment • erosion and sedimentation control	• alteration of approximately 10 m^2 of fish habitat at either end of the culvert is anticipated. • implementation of recommended mitigation will minimize net environmental effects
YG L2	Unnamed Tributary of East Holland River	Green Lane west of Concession #2	2.0 m CSP	Culvert Extensions required on both sides of Green Lane	• revise cross-section to reduce footprint area • use headwalls, wingwalls and guiderail to reduce length of culvert extension • in-water construction timing restriction • perform in-water work in the dry • match inverts of existing culvert • provide Level 1 stormwater treatment • erosion and sedimentation control	• alteration of approximately 10 m^2 of fish habitat at either end of the culvert is anticipated. • implementation of recommended mitigation will minimize net environmental

TABLE 8.
SUMMARY OF PROPOSED IN-STREAM WORK, MITIGATION MEASURES AND NET ENVIRONMENTAL EFFECTS

Ref. No.	Waterbody Name	Location	Existing Crossing	Proposed Work	Site-Specific Mitigation	Net Environmental Effects
						effects
YD D1	Western Creek	Davis Drive west of Main Street	2.0 m x 4.0 m concrete box culvert	Culvert extension required on both sides of Davis Drive	• revise cross-section to reduce footprint area • use headwalls, wingwalls and guiderail to reduce length of culvert extension • in-water construction timing restriction • perform in-water work in the dry • match inverts of existing culvert • provide Level 1 stormwater treatment • erosion and sedimentation control	• alteration of approximately 10 m^2 of fish habitat at either end of the culvert is anticipated. • implementation of recommended mitigation will minimize net environmental effects
YD D2	East Holland River	Davis Drive at Main Street	bridge	New replacement structure required since existing bridge cannot be widened	• span the watercourse to avoid in-water work • in-water construction timing restriction • perform in-water work in the dry • provide Level 1 stormwater treatment • erosion and sedimentation control	• no long term alteration of fish habitat anticipated •
YD D3	Eastern Creek	Davis Drive west of Paterson Avenue	3 x 1.5 m CSP	Culvert extension required on south side (north side covered by existing pavement)	• revise cross-section to reduce footprint area • use headwalls, wingwalls and guiderail to reduce length of culvert extension • in-water construction timing restriction • perform in-water work in the dry • match inverts of existing culvert • provide Level 1 stormwater treatment • erosion and sedimentation control	• no alteration of fish habitat anticipated • watercourse does not directly support fish habitat at this location

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 has the potential to result in the displacement of and disturbance to vegetation and vegetation communities. Effects on vegetation related to the BRT 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

Some clearing will be required to construct the BRT along the preferred alignments with one exception. Through the main section of the Town of Aurora from just north of Henderson Drive to south of Orchard Heights Boulevard, the BRT will operate in mixed traffic. Dedicated BRT lanes or HOV lanes will not be present along this section consequently; vegetation removal will not be required.

A total of eighteen vegetation community types were identified by LGL within the Yonge Street, Green Lane and Davis Drive corridors. Of these, 12 types are at risk of encroachment by the new right-of-way for the BTR. The quantitative amount of each ELC unit that could be affected was generated by using a simple overlay method. A line defining the outer grading limits of the BRT right-of-way was projected on each ELC polygon and the area of overlap with each ELC polygon was determined. The total amount of vegetation that could potentially be removed for all communities combined is 10.5ha approximately. Individually, these communities and the approximate area affected, (ha.), include: cultural meadows (5.43ha.), cultural woodlots (1.24ha.), cultural thickets (1.27ha.), cultural savannah (0.019 ha.),lowland deciduous forests (0.362 ha.), deciduous forest (0.402 ha.) coniferous plantations (0.077 ha.), Scotch pine plantations (0.369 ha.), cattail shallow marsh (0.537 ha) and open water aquatic (0.126ha.)

4.4.1.1 Displacement of Vegetation – Yonge Street Corridor – Richmond Hill Section

In this section a total of 4.06ha. of vegetation will be affected. This amount is the cumulative total for 42 areas of encroachment, representative of 11 different vegetation community types including: cultural meadows (CUM1-1), cultural thickets (CUT1 and CUT1-1), cultural woodlots (CUW1), cultural plantations (CUP3-3 and CUP3), lowland deciduous forest (FOD7), deciduous forest (FOD4), poplar deciduous forest (FOD8-1), open water aquatic(OAO) and cattail marsh (MAS2-1). Approximately 90% of the vegetation that will be displaced along this section is comprised of culturally disturbed areas including cultural meadows, cultural woodlots, cultural thickets and cultural plantations. In most situations, the amount of vegetation that will be removed is less than or equal to 0.27ha and because these areas have been heavily modified by previous disturbance, removal of vegetation at any one location is considered minor. The open water aquatic area that could be affected is located immediately north of Jefferson Sideroad and is part of the Phillips-Bond-Thompson Wetland Complex. Mitigation to minimize impacts at this location will be identified during the detail design phase of this project.

4.4.1.2 Displacement of Vegetation – Yonge Street Corridor – Town of Aurora Section

As stated above, the BRT will operate in mixed traffic through the main section of the Town of Aurora from just north of Henderson Drive to south of Orchard Heights Blvd. and removal of vegetation through this section will not be necessary. However, there is the potential for removal of 2.4ha approximately, of vegetation communities along the portion where a 4-Lane cross section with dedicated BRT lanes will be constructed. The cumulative total of 2.4 ha is the result of encroachment on 42 different areas representative of nine different vegetation community types including: cultural meadows (CUM1-1), cultural thickets (CUT1 and CUT1-1), cultural plantations (CUP3-3 and CUP3), cultural woodlots (CUW), lowland deciduous forest (FOD7), deciduous forest (FOD4) and cattail marsh (MAS2-1). The areas that will incur the greatest amount of impact (0.67 ha) are the cultural meadows located between St. John's Sideroad and the Aurora/Newmarket municipal boundary. The cultural meadows at this location are vast, in excess of 10 ha., both east and west of Yonge Street and as a result, loss of 0.67 ha. of cultural meadow is considered minor. The quantity of vegetation that will have to be removed at any one of the remaining vegetation communities along this section is less than or equal to approximately 0.15 ha and is considered minor.

4.4.1.3 Displacement of Vegetation – Yonge Street Corridor – Town of Newmarket Section

Between the Newmarket/Aurora municipal boundary and Green Lane, a cumulative total of 0.780 ha approximately of vegetation, representative of five different community types will be affected. Six cultural meadows (CUM1-1), all located just north of the municipal boundary account for approximately 90 percent (0.704ha) of this total. These meadows are contiguous with the large cultural meadows (10ha.) at this location, consequently encroachment will not result in significant impacts. The other four vegetation communities along this section are cultural savannah (CUS1), deciduous forest (FOD4) and two types of cultural plantations. The area potentially affected at any one of these locations is less than 0.04 ha. approximately, and is not considered to be significant.

4.4.1.4 Displacement of Vegetation – Davis Drive Corridor – Town of Newmarket

Five cultural thicket vegetation communities (CUT1) and one cultural meadow (CUM) are present on Davis Drive. The total area affected is less than 0.171 ha. approximately and is considered minor.

4.4.1.5 Displacement of Vegetation – Green Lane Corridor – Town of East Gwillimbury

Initially, the BRT was to operate in mixed traffic along Green Lane from Yonge Street to the Go Transit station and consequently, vegetation removal would be avoided. The mixed traffic option will remain in effect until growth in East Gwillimbury necessitates the implementation of a dedicated BRT system.

When this occurs, vegetation displacement will be required to accommodate widening of Green Lane. A total of 2.40ha. of vegetation and 0.694 ha. of agricultural land will be impacted. Five vegetation community types including cultural meadow (CUM1-1), cultural thicket (CUT1), lowland deciduous forest (FOD7-3) and cultural plantation (CUP3-3) will be at risk. Cultural meadows (1.27 ha.) and cultural thickets (.605 ha.) account for over 60% of the total area that will be affected. These areas are disturbed ecosites resulting from past human interference, and as such, their significance is reduced.

The impacts on the individual vegetation communities outlined above are minimal and in general are not considered to be significant; nonetheless, collectively they do have ecological value. Urban vegetation provides habitat for birds and small mammals, shade, soil stabilization, and carbon cycling through respiration. For these reasons, efforts should be made on a site-specific basis to protect the vegetation communities that do not need to be removed to construct the BRT.

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 footprint to the minimum extent possible;
- reduce grading requirements to the minimum extent possible;
- provide local tree protection including guide rails, 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; and,
- replace trees removed for the BRT with landscape plantings.

4.4.2 Disturbance to Vegetation and Vegetation Communities

Disturbance to vegetation as a result of the BRT is considered negligible since the majority of vegetation located adjacent to the right-of-way has been previously disturbed by urban development.

Minimal clearing will occur in forested areas; therefore, none of the adverse effects associated with creation of new forest edge are anticipated.

The BRT 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 prevailing winds, the frequency and volume of salt applied and the sensitivity of the receiving vegetation to salt.

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

A total of 22 regionally uncommon and/or rare plant species were recorded in the study area. Individual occurrences of these species are generally beyond the zone of influence of this project and it is unlikely that they will be disturbed. During detail design, precise GPS locations for all species will be determined and suitable mitigation to minimize disturbance will be implemented.

One threatened species, Kentucky coffee-tree, was identified within the zone of influence of this project. Since this species was planted and not naturally occurring the significance of its removal is diminished.

One endangered species, butternut, was identified in the deciduous forest (FOD4) located south of Bond Lake. The individual occurrence of this species is well beyond the zone of influence of this project and will therefore not be removed or disturbed.

4.5 Wildlife and Wildlife Habitat

The BRT system has the potential to result in 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.

4.5.1 Displacement of Wildlife and Wildlife Habitat

The BRT will be constructed primarily within the existing right-of-way with several exceptions. The existing 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 will have no significant effect on wildlife and wildlife habitat.

Numerous birds 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 the damaging, destroying, removing or disturbing of nests. 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 eight 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 BRT. The existing barrier posed by Yonge Street will be increased due to the addition of two new bus lanes, a median and a sidewalk. Given the urban nature of the study area, the BRT will have no significant impact on wildlife passage.

4.5.3 Wildlife/Vehicle Conflicts

The addition of the BRT to Yonge Street and Davis Drive will increase the width of the travel surface resulting in an increased risk of mortality for wildlife that elects to cross the road. Yonge Street and Davis Drive currently pose a significant barrier to wildlife movement. As a result, crossing opportunities for terrestrial wildlife are limited to existing culverts located at watercourses. While the increase in width to both roadways resulting from the addition of the BRT increases the 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 Rapidway may provide a refuge for wildlife that elects to cross Yonge Street or Davis Drive.

Opportunities for wildlife to cross under Yonge Street and Davis Drive exist at culverts located within the project limits. The extensions proposed for several of these culverts will have no significant effect on wildlife passage at the specific locations. No culverts will be replaced in strategic locations for wildlife as a result of this project; therefore, there are no opportunities to enhance wildlife passage within the project limits.

A new bridge will be constructed at the crossing of the East Holland River on Davis Drive. Wildlife passage at this location will be temporarily disrupted during construction. Effects are considered to be short term and of minor significance

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, disturbance to wildlife from noise, light and visual intrusion will have no significant adverse effect.

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

No provincially rare, threatened or endangered wildlife were recorded within the study area. No habitat removals will occur in areas that support locally significant species; therefore, there will be no displacement of rare, threatened or endangered species as a result of the Rapidway.

4.6 Designated Natural Areas

The Rapidway will have no adverse effects on designated natural areas within the zone of influence of the project.

5.0 ORMCP

5.1 Relevant Policies

The section of Yonge Street from 19th Avenue/Gamble Road to Indusrial Road is located in the Oak Ridges Moraine and is subject to the Oak Ridges Moraine Conservation Plan (Ontario Regulation 140/02) of the *Oak Ridges Moraine Conservation Act* (S.O. 2001, c.31). The purpose of the Oak Ridges Moraine Conservation Plan is to provide land use and resource management planning direction to provincial ministers, ministries, and agencies, municipalities, municipal planning authorities, landowners and other stakeholders on how to protect the Moraine's ecological and hydrological features and functions.

The section of Yonge Street within the Oak Ridge Moraine is located in all four designated land uses; Natural Core Areas, Natural Linkage Areas, Countryside Areas and Settlement Areas. These different Areas reflect a range of existing communities planned by municipalities to reflect community needs and values. Urban uses and development as set out in municipal official plans is allowed. Specific land use policies applicable: to Natural Core Areas are found in Section 11 (1), (2), and (3); to Natural Linkage Areas in Section 12 (1), (2), and(3); to Countryside Areas in Section 13 (1), (2), and (3); and to Settlement Areas in Section 41(1), (4) and (5) as well as Sections 42 to 47 of the Plan. Transportation uses are permitted in all of the Designated Areas, subject to Section 41 of the Plan.

Section 41(1) of the Plan addresses transportation, infrastructure and utilities, with specific reference to transit lines (Section 41(1)(b)), stormwater management facilities (Section 41(1)(d)), bridges, interchanges, stations and other structures (Section 41(1)(g)) and rights-of-way (Section 41(1)(h)).

Section 41 (2) prohibits all new, upgraded or extended transportation, infrastructure and utilities uses in a Natural Linkage Area unless applicant demonstrates that:

(a) the need for the project has been demonstrated and there is no reasonable alternative;

(b) (1) the area of construction disturbance will be kept to a minimum;

(2) right of way widths will be kept to the minimum that is consistent with other objectives of the project;

(3) the project will allow for wildlife movement;

(4) lighting will be focused downward and away from Natural Linkage Areas; and

(5) the planning , design and construction practices adopted will keep any adverse effects on the ecological integrity of the Plan Area to a minimum.

Section 41 (3) prohibits all new, upgraded or extended transportation, infrastructure and utilities uses in a Natural Core Area unless applicant demonstrates that:

(a) the requirements of subsection (2) have been met;

(b) the project does not include and will not in the future require a highway interchange or a transit or railway station in a Natural Core Area; and

(c) the project is located as close to the edge of a Natural Core Area as possible.

Section 41(4) prohibits all new, upgraded or extended transportation, infrastructure and utilities uses in a key natural heritage feature or a hydrologically sensitive feature except as permitted in Section 41(5). Section 41(5) permits transportation, infrastructure and utilities to cross a key natural heritage feature or a hydrologically sensitive feature if the applicant demonstrates that:

(a) the need for the project has been demonstrated and there is no reasonable alternative;

(b) the planning, design and construction practices adopted will keep any adverse effects on the ecological integrity of the Plan Area to a minimum;

(c) the design practices adopted will maintain, and where possible improve or restore, key ecological and recreational linkages, including the trail system referred to in Section 39;

(d) the landscape design will be adapted to the circumstances of the site and use native plant species as much as possible, especially along rights-of-way; and,

(e) the long term landscape management approaches adopted will maintain, and where possible improve or restore, the health, diversity, size and connectivity of the key natural heritage features or hydrologically sensitive feature.

Key natural heritage features include: wetlands; significant portions of the habitat of rare, threatened or endangered species; fish habitat; life science areas of natural and scientific interest; significant valleylands; significant woodlands; significant wildlife habitat; and, sand barrens, savannahs and tallgrass prairies. Hydrologically sensitive features include: permanent and intermittent streams; wetlands; kettle lakes; and, seepage areas and springs. Tributary 'C' of the Rouge River,the East Humber River and one tributary of the East Humber River are located within the Plan Area. These three watercourses directly or indirectly support fish habitat and are permanent or intermittent streams; therefore, they constitute key natural heritage features and hydrologically sensitive features according to the Plan. As a result, Section 41(5) of the Plan applies. Sections (41) (2) and (3) also apply to the Project.

5.2 Demonstrated Conformity with ORMCP

The relevant sections of the ORMCP and conformity with those sections are presented below.

41(5)(a) The need for the project has been demonstrated in the Yonge Street Transitway Need and Justification Study (York Region 2002), the Yonge Street Transitway Terms of Reference (York Region 2002), the Yonge Street Corridor Public Transit Improvements Environmental Assessment Terms of Reference (York Region 2004). There are no reasonable alternatives to the project that satisfy the need for the project and avoid lands located within the Plan Area.

41(5)(b) The planning, design and construction practices identified in Section 4 of the Natural Sciences Report (NSR) will keep any adverse effects on the ecological integrity of the Plan Area to a minimum.

41(5)(c) The design mitigation practices identified in Section 4 of the Natural Sciences Report will maintain, and where possible improve or restore, key ecological and recreational linkages.

41(5)(d) A landscaping plan will be prepared during detail design. The landscaping plan will be site-sensitive and use native, non-invasive plant species to the extent possible.

41(5)(e) A landscaping plan will be prepared during detail design. The long-term landscape management approaches adopted will maintain, restore and enhance the key natural heritage features and hydrologically sensitive features and their related ecological functions.

41(2)(a) See 41(5)(a)

41 (2)(b)(1) The area of construction disturbance will be kept to a minimum.

41 (2)(b)(2) Right of way widths will be kept to the minimum amount required.

41 (2)(b)(3) Mitigation to maintain or enhance wildlife movement will be implemented.

41 (2)(b)(4) Lighting will be designed to minimize impacts to wildlife

41 (2)(b)(5) The planning, design and construction practices prescribed will keep any adverse effects on the ecological integrity of the Plan Area to a minimum.

41 (3)(a) See 41 (5)(a)

41 (3)(b) A transit station will not be established in any Natural Core Area

41 (3)(c) The new transit alignment follows the existing road alignment through Natural Core Areas adjacent to the existing edge.

Section 42 of the Plan addresses official plan provisions, wellhead protection areas and areas of high aquifer vulnerability. This project is not related to an official plan; therefore, the provisions of this section of the Plan do not apply.

Section 43 of the Plan addresses sewage and water services. This project does not involve sewage and water services; therefore, the provisions of this section of the Plan do not apply.

Section 44 of the Plan addresses partial services. This project does not involve partial services; therefore, the provisions of this section of the Plan do not apply.

Section 45 of the Plan addresses stormwater management. Stormwater management facilities will be required to treat the additional runoff generated by impervious surfaces.

Section 45(1) requires the preparation of a stormwater management plan for major developments. While the proposed project is not defined as a major development under the Plan, the increase in impervious surfaces resulting from this project will require the preparation of a stormwater management plan as prescribed in Section 45(1). A detailed stormwater management plan will be prepared during detail design.
Section 45(2) requires every application for development or site alteration to demonstrate that planning, design and construction practices that protect water resources will be used, including:

(a) keeping the removal of vegetation, grading and soil compaction to a minimum;

(b) keeping all sediment that is eroded during construction within the site;

(c) seeding or sodding exposed soils as soon as possible after construction; and,
(d) keeping chemical applications to suppress dust and control pests and vegetation to a minimum.

The planning, design and construction practices to be implemented will be designed to protect water resources to the extent possible.

Sections 45(3) and 45(4) provide advice to municipalities when considering development applications or preparing development standards; therefore, the provisions of these sections of the Plan do not apply.

Section 45(5) excludes applications for mineral aggregate operations; therefore, the provisions of this section of the Plan do not apply.

Section 45(6) states that the minimum standard for water quality is that 80 % of suspended solids shall be removed from stormwater runoff as a long-term average. The detailed stormwater management plan to be prepared during detail design will identify how this minimum standard will be achieved. A commitment to achieve Level 1 treatment (80 % removal of suspended sediments) for all receiving watercourses within the project limits is presented in Section 4 of the NSR.
Section 45(7) prohibits the discharge of stormwater into kettle lakes. No kettle lakes are located within the study area; therefore, the provisions of this section of the Plan do not apply.

Section 45(8) prohibits the development of new stormwater management ponds in key natural heritage features and hydrologically sensitive features. No new stormwater management ponds will be located in key natural heritage features or hydrologically sensitive features.

Section 46 of the Plan addresses stormwater management plans. A detailed stormwater management plan will be prepared during detail design.

Section 46(1) identifies the objectives of a stormwater management plan including:

(a) maintain groundwater quantity and flow and stream baseflow;

(b) protect water quality;

(c) protect aquatic species and their habitat;

(d) prevent increases in stream channel erosion; and,

(e) prevent any increase in flood risk.

The stormwater management plan to be prepared during detail design will meet these objectives.
Section 46(2) states that a stormwater management plan shall provide for an integrated treatment train approach that uses a planned sequence of methods of controlling stormwater and keeping its impact to a minimum by techniques including, without limitation:

(a) lot level controls such as devices and designs that direct roof discharge to rear yard ponding areas;

(b) conveyance controls such as grassed swales; and,

(c) end-of-pipe controls such as wet ponds at the final discharge stage.

The stormwater management plan to be prepared during detail design will follow this approach to stormwater management to the extent possible.

Section 46(3) requires the stormwater management plan to be prepared in accordance with the applicable watershed plan under Section 24, if one exists. The stormwater management plan will be prepared in accordance with the Rouge River Watershed Management Plan and the East Humber River Management Plan (TRCA)

Section 47(1) prohibits the development of new rapid infiltration basis and columns. The stormwater management plan to be prepared during detail design will not use these facilities within Plan Areas.

6.0 MONITORING

A pre-construction well inspection will be performed at residences and businesses that remain on private wells. The door-to-door inspection will include collection of a water sample for laboratory analysis to establish background parameters.

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.

7.0 REFERENCES

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Appendix A
Working Vascular Plant Checklist

APPENDIX A
WORKING VASCULAR PLANT CHECKLIST

	Scientific Name	Common Name	MNR	COSEWIC	Local Status	Legal Status	ROW	ELC Community																
								FOC	FOD3-1	FOD4	FOD7	FOD7-3	FOD8-1	CUP3	CUP3-3	CUM1-1	CUT1	CUT1-1	CUS1	CUW1	MAM2-2	MAS2-1	OAO	SAF1-3
	EQUISETACEAE	**HORSETAIL FAMILY**																						
	Equisetum arvense	field horsetail							X				X		X	X		X	X	X	X		X	
	DRYOPTERIDACEAE	**WOOD FERN FAMILY**																						
	Athyrium filix-femina var. angustum	northern lady fern									X													
	Dryopteris carthusiana	spinulose wood fern									X													
	Matteuccia struthiopteris var. pensylvanica	ostrich fern							X	X	X									X				
	Onoclea sensibilis	sensitive fern									X													
	PINACEAE	**PINE FAMILY**																						
*	*Larix decidua*	European larch													X									
*	*Picea abies*	Norway spruce					X	X		X	X		X	X	X	X				X				
	Picea glauca	white spruce			L3					X	X		X	X	X	X	X	X		X		X		
	Picea mariana	black spruce			R[1], R[3], L2											X								
*	*Picea pungens*	Colorado spruce												X	X				X					
*	*Pinus nigra*	Austrian pine									X				X	X	X			X				
	Pinus resinosa	red pine			R[1],R[2] L1						X			X			X							
	Pinus strobus	eastern white pine								X	X			X	X	X				X				
*	*Pinus sylvestris*	scotch pine					X	X		X	X		X	X	X	X	X	X		X				
	CUPRESSACEAE	**CEDAR FAMILY**																						
	Juniperus communis	common juniper			L3								X											
	Juniperus virginiana	eastern red cedar			R[1]										X				X	X				
	Thuja occidentalis	eastern white cedar					X	X		X	X	X	X	X	X	X	X	X		X				
	TAXACEAE	**YEW FAMILY**																						
*	*Taxus cuspidata*	Japanese Yew																		X				

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								FOC	FOD3-1	FOD4	FOD7	FOD7-3	FOD8-1	CUP3	CUP3-3	CUM1-1	CUT1	CUT1-1	CUS1	CUW1	MAM2-2	MAS2-1	OAO	SAF1-3
	MAGNOLIACEAE	**MAGNOLIA FAMILY**																						
	Liriodendron tulipifera	tulip tree																		X				
	Actaea pachypoda	white baneberry													X									
	Actaea rubra	red baneberry									X				X									
	Anemone virginiana var. virginiana	thimbleweed										X			X	X	X							
	Ranunculus abortivus	kidney-leaf buttercup									X													X
*	*Ranunculus acris*	tall buttercup							X	X	X		X		X	X				X				
	Ranunculus hispidus var. caricetorum	swamp buttercup								X														
	Ranunculus sceleratus var. sceleratus	cursed buttercup										X												X
	Thalictrum dioicum	early meadow-rue									X													
	BERBERIDACEAE	**BARBERRY FAMILY**																						
*	*Berberis thunbergii*	Japanese barberry											X											
*	*Berberis vulgaris*	common barberry																		X				
	PAPAVERACEAE	**POPPY FAMILY**																						
*	*Chelidonium majus*	celandine								X														
	ULMACEAE	**ELM FAMILY**																						
	Celtis occidentalis	common hackberry			R[1]											X								
	Ulmus americana	white elm								X	X	X	X		X	X	X			X		X		
*	*Ulmus pumila*	Siberian elm																		X				
	URTICACEAE	**NETTLE FAMILY**																						
*	*Urtica dioica ssp. dioica*	European stinging nettle									X									X				X
	JUGLANDACEAE	**WALNUT FAMILY**																						
	Juglans cinerea	butternut	END	END	L3					X														

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	Juglans nigra	black walnut			R^1, R^2, R^3					X	X	X	X	X	X	X	X	X	X	X				
	FAGACEAE	**BEECH FAMILY**																						
*	*Fagus sylvatica*	European beech																		X				
	Quercus macrocarpa	bur oak								X				X		X	X	X						
	Quercus rubra	red oak								X	X					X	X			X				
	BETULACEAE	**BIRCH FAMILY**																						
	Betula papyrifera	white birch																		X				
	Ostrya virginiana	ironwood									X													
	CHENOPODIACEAE	**GOOSEFOOT FAMILY**																						
*	*Chenopodium album var. album*	lamb's quarters								X						X				X	X		X	
	PORTULACACEAE	**PURSLANE FAMILY**																						
	Portulaca oleracea	purslane								X														
	CARYOPHYLLACEAE	**PINK FAMILY**																						
*	*Saponaria officinalis*	bouncing-bet													X				X	X				
*	*Silene vulgaris*	catchfly													X									
*	*Stellaria media*	common chickweed									X					X								
	POLYGONACEAE	**SMARTWEED FAMILY**																						
	Polygonum cilinode	fringed black bindweed			R^1, R^2, R^3 L3					X														
*	*Polygonum cuspidatum*	Japanese knotweed								X							X							
	Polygonum lapathifolium	pale smartweed								X														
*	*Rumex crispus*	curly-leaf dock					X	X		X		X		X	X	X	X			X	X	X	X	
	PAEONIACEAE	**PEONY FAMILY**																						
*	*Paenoia sp.*	peony																		X				
*	*Paeonia officinalis*	peony													X									

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	GUTTIFERAE	**ST. JOHN'S-WORT FAMILY**																							
*	*Hypericum perforatum*	common St. John's-wort							X	X					X	X	X	X	X	X				
	TILIACEAE	**LINDEN FAMILY**																							
	Tilia americana	basswood									X					X	X	X							
	VIOLACEAE	**VIOLET FAMILY**																							
*	*Viola odorata*	sweet violet							X																
	Viola pubescens	downy yellow violet									X														
	Viola sororia	woolly blue violet									X														
	Viola sp.	violet																		X					
	CUCURBITACEAE	**GOURD FAMILY**																							
	Echinocystis lobata	prickly cucumber																	X		X		X	X	
	SALICACEAE	**WILLOW FAMILY**																							
	Populus balsamifera ssp. balsamifera	balsam poplar					X	X					X	X		X				X					
	Populus deltoides ssp. monilifera	cottonwood					X	X							X		X					X			
	Populus grandidentata	large-tooth aspen																		X					
	Populus tremuloides	trembling aspen							X	X	X		X	X	X	X		X		X					
*	*Salix alba*	white willow											X												
	Salix bebbiana	long-beaked willow																		X		X			
	Salix eriocephala	Missouri willow																		X					
	Salix nigra	black willow			R^1, R^2, R^3								X												
	Salix sp.	willow								X										X					
*	*Salix X rubens*	reddish willow							X		X	X		X		X	X	X	X	X		X			
	BRASSICACEAE	**MUSTARD FAMILY**																							

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								FOC	FOD3-1	FOD4	FOD7	FOD7-3	FOD8-1	CUP3	CUP3-3	CUM1-1	CUT1	CUT1-1	CUS1	CUW1	MAM2-2	MAS2-1	OAO	SAF1-3
*	*Alliaria petiolata*	garlic mustard							X	X	X				X	X	X	X		X	X		X	
*	*Barbarea vulgaris*	yellow rocket														X		X		X	X		X	
*	*Brassica nigra*	black mustard									X			X			X				X		X	
*	*Capsella bursa-pastoris*	shepherd's purse															X				X		X	
	Cardamine diphylla	two-leaved toothwort								X														
*	*Erysimum cheiranthoides ssp. cheiranthoides*	wormseed mustard								X														
*	*Hesperis matronalis*	dame's rocket									X		X		X	X		X		X				
*	*Lepidium campestre*	field cress													X	X								
*	*Sisymbrium altissimum*	tall tumble-mustard								X														
*	*Thlaspi arvense*	field penny-cress														X		X		X	X		X	
	PRIMULACEAE	**PRIMROSE FAMILY**																						
*	*Lysimachia nummularia*	moneywort																		X				
	HYDRANGEACEAE	**HYDRANGEA FAMILY**																						
*	*Hydrangea paniculata*	paniculate hydrangea													X									
	GROSSULARIACEAE	**GOOSEBERRY FAMILY**																						
*	*Ribes rubrum*	red currant							X					X					X	X				
	Ribes sp.	currant														X	X							
	CRASSULACEAE	**STONECROP FAMILY**																						
*	*Hylotelephium telephium ssp. fabaria*	sedum purpureum							X															
	ROSACEAE	**ROSE FAMILY**																						
	Agrimonia gryposepala	tall hairy agrimony															X			X				
	Amelanchier ssp.	juneberry														X		X						
	Argentia anserina	silverweed			U[3]													X						
	Crataegus mollis	downy thorn										X					X							
*	*Crataegus monogyna*	English hawthorn														X	X					X		

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WORKING VASCULAR PLANT CHECKLIST

	Scientific Name	Common Name	MNR	COSEWIC	Local Status	Legal Status	ROW	ELC Community																
								FOC	FOD3-1	FOD4	FOD7	FOD7-3	FOD8-1	CUP3	CUP3-3	CUM1-1	CUT1	CUT1-1	CUS1	CUW1	MAM2-2	MAS2-1	OAO	SAF1-3
	Crataegus sp.	hawthorn											X											
	Fragaria virginiana ssp. virginiana	scarlet strawberry							X				X			X		X		X				
	Geum aleppicum	yellow avens							X	X	X	X			X	X		X		X				
	Geum canadense	white avens							X	X	X				X					X				
*	*Malus baccata*	Siberian crabapple									X				X			X		X				
*	*Malus pumila*	common apple								X	X		X		X	X	X	X		X				
	Physocarpus opulifolius	ninebark			R^1, R^2, L3											X				X				
	Potentilla norvegica ssp. norvegica	cinquefoil								X														
*	*Potentilla recta*	rough-fruited cinquefoil														X				X				
*	*Prunus avium*	sweet cherry							X								X							
	Prunus serotina	black cherry							X	X	X				X	X	X			X				
	Prunus virginiana var. virginiana	choke cherry					X	X	X	X	X	X	X		X	X	X	X		X				
*	*Pyrus communis*	common pear																		X				
	Rubus allegheniensis	alleghany blackberry									X					X	X	X						
	Rubus idaeus ssp. strigosus	wild red raspberry							X		X		X		X				X	X				
	Rubus occidentalis	thimble-berry								X	X	X								X				
	Rubus odoratus	purple flowering raspberry																		X				
*	*Sorbus aucuparia*	European mountain-ash												X										
	Spiraea alba	narrow-leaved meadow-sweet			L3				X							X								X
	FABACEAE	**PEA FAMILY**																						
*	*Coronilla varia*	variable crown-vetch													X									

APPENDIX A
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	Gleditsia triacanthos	honey locust								X	X						X							
	Gymnocladus dioicus	Kentucky coffee-tree	THR	THR																				
*	*Lathyrus latifolius*	everlasting pea													X									
*	*Lotus corniculatus*	bird's-foot trefoil								X	X			X		X	X	X	X	X		X		
*	*Medicago lupulina*	black medick					X	X		X	X					X								
*	*Medicago sativa ssp. sativa*	alfalfa											X		X									
*	*Melilotus alba*	white sweet-clover								X	X				X	X	X		X	X	X	X	X	
*	*Melilotus officinalis*	yellow sweet-clover														X	X			X				
*	*Robinia pseudo-acacia*	black locust								X	X			X	X	X				X				
*	*Trifolium hybridum ssp. elegans*	alsike clover														X								
*	*Trifolium pratense*	red clover													X	X	X	X		X				
*	*Trifolium repens*	white clover					X	X							X	X		X			X		X	
*	*Vicia cracca*	tufted vetch					X	X	X		X			X	X	X	X	X		X	X	X	X	
	ELAEAGNACEAE	**OLEASTER FAMILY**																						
*	*Elaeagnus angustifolia*	Russian olive														X								
*	*Elaeagnus sp.*	olive																		X				
*	*Elaeagnus umbellata*	Russian olive								X	X					X	X							
	LYTHRACEAE	**LOOSESTRIFE FAMILY**																						
*	*Lythrum salicaria*	purple loosestrife														X	X					X		
	ONAGRACEAE	**EVENING-PRIMROSE FAMILY**																						
	Circaea lutetiana ssp. canadensis	yellowish enchanter's nightshade							X		X			X	X					X				
	Epilobium ciliatum ssp. ciliatum	ciliate willow-herb								X						X								

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* *Epilobium hirsutum*	great hairy willow-herb										X												
Oenothera biennis	common evening-primrose			U[3]										X	X		X	X	X				
CORNACEAE	**DOGWOOD FAMILY**																						
Cornus alternifolia	alternate-leaved dogwood													X									
Cornus sericea ssp. sericea	red-osier dogwood											X			X	X	X		X	X			X
CELASTRACEAE	**STAFF-TREE FAMILY**																						
* *Celastrus orbiculatus*	Oriental bittersweet														X								
EUPHORBIACEAE	**SPURGE FAMILY**																						
* *Euphorbia cyparissias*	cypress spurge														X								
RHAMNACEAE	**BUCKTHORN FAMILY**																						
* *Rhamnus cathartica*	common buckthorn					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
VITACEAE	**GRAPE FAMILY**																						
Parthenocissus quinquefolia	five-leaved Virginia-creeper								X				X	X	X	X							
Parthenocissus vitacea	inserted Virginia-creeper							X		X		X			X	X	X	X	X	X			
Vitis riparia	riverbank grape								X	X	X	X	X	X	X	X	X		X		X		
HIPPOCASTANACEAE	**BUCKEYE FAMILY**																						
* *Aesculus hippocastanum*	horse chestnut														X								
ACERACEAE	**MAPLE FAMILY**																						
* *Acer campestre*	hedge maple														X								
* *Acer ginnala*	amur maple														X								
Acer negundo	manitoba maple					X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X
Acer nigrum	black maple			R[1], R[2], R[3]												X							
* *Acer platanoides*	norway maple							X	X			X	X	X	X	X	X		X				
Acer rubrum	red maple												X										

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	Acer saccharinum	silver maple											X		X			X				X		
	Acer saccharum var. saccharum	sugar maple																		X				
	Acer X freemanii	freeman's maple									X					X	X	X		X				
	ANACARDIACEAE	**SUMAC FAMILY**																						
*	*Cotinus coggygria*	smoke-tree																		X				
	Rhus hirta	staghorn sumac							X	X			X	X	X	X	X	X	X	X		X		
	Toxicodendron rydbergii	western poison-ivy													X	X				X				
	GERANIACEAE	**GERANIUM FAMILY**																						
*	*Geranium robertianum*	herb-robert									X				X									
	BALSAMINACEAE	**TOUCH-ME-NOT FAMILY**																						
	Impatiens capensis	spotted touch-me-not								X	X					X				X				X
*	*Impatiens glandulifera*	glandular touch-me-not														X	X							
	APIACEAE	**PARSLEY FAMILY**																						
*	*Aegopodium podagraria*	goutweed							X		X					X		X		X				
	Angelica atropurpurea	dark-purple alexanders			R[1], R[2], R[3], L3											X								
	Cicuta maculata	spotted water-hemlock			U[3]					X		X												
*	*Daucus carota*	wild carrot					X	X	X	X	X		X	X	X	X	X	X		X		X		
	APOCYNACEAE	**DOGBANE FAMILY**																						
	Apocynum androsaemifolium ssp. androsaemifolium	spreading dogbane										X				X								
	Apocynum cannabinum	Indian hemp			U[3]											X								
*	*Vinca minor*	periwinkle								X					X									

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	ASCLEPIADACEAE	**MILKWEED FAMILY**																						
	Asclepias syriaca	common milkweed														X	X		X	X		X		
*	*Cynanchum rossicum*	swallow-wort													X				X					
	SOLANACEAE	**POTATO FAMILY**																						
*	*Physalis alkekengi*	Chinese lantern																		X				
*	*Solanum dulcamara*	bitter nightshade								X	X								X	X	X		X	X
	CONVOLVULACEAE	**MORNING-GLORY FAMILY**																						
	Calystegia sepium ssp. americana	hedge bindweed								X														
*	*Convolvulus arvensis*	field bindweed								X	X	X				X								
	HYDROPHYLLACEAE	**WATER-LEAF FAMILY**																						
	Hydrophyllum virginianum	Virginia water-leaf									X									X				
	BORAGINACEAE	**BORAGE FAMILY**																						
*	*Cynoglossum officinale*	hound's-tongue													X					X				
*	*Echium vulgare*	blueweed									X				X	X	X							
*	*Myosotis scorpioides*	mouse-ear scorpion-grass							X		X		X			X				X				X
	PHRYMACEAE	**LOPSEED FAMILY**																						
	Phryma leptostachya	lopseed													X									
	VERBENACEAE	**VERVAIN FAMILY**																						
	Verbena hastata	blue vervain										X												
	Verbena urticifolia	white vervain													X									
	LAMIACEAE	**MINT FAMILY**																						
*	*Ajuga reptans*	creeping bugleweed									X													
*	*Glechoma hederacea*	creeping Charlie								X						X	X	X		X				
*	*Lamium purpureum*	purple dead-nettle																		X				

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*	*Leonurus cardiaca ssp. cardiaca*	common motherwort																		X				
	Mentha arvensis	American wild mint																			X		X	
*	*Mentha spicata*	spear mint								X														
	Monarda fistulosa	wild bergamot			U[3]											X	X							
*	*Nepeta cataria*	catnip							X	X						X			X	X				
*	*Prunella vulgaris ssp. vulgaris*	common heal-all													X	X	X							
	PLANTAGINACEAE	**PLANTAIN FAMILY**																						
*	*Plantago lanceolata*	ribgrass													X	X				X				
*	*Plantago major*	common plantain								X						X					X		X	
	OLEACEAE	**OLIVE FAMILY**																						
*	*Forsythia viridissima*	golden-bells											X		X			X		X				
	Fraxinus americana	white ash									X				X	X	X			X				
	Fraxinus pennsylvanica	red ash								X	X		X		X	X	X	X		X		X		
*	*Syringa reticulata*	Japanese tree lilac														X								
*	*Syringa vulgaris*	common lilac								X	X		X	X	X	X	X	X		X				
	SCROPHULARIACEAE	**FIGWORT FAMILY**																						
*	*Linaria vulgaris*	butter-and-eggs								X	X				X	X	X	X						
*	*Verbascum thapsus*	common mullein					X	X							X	X		X	X	X				
	BIGNONIACEAE	**TRUMPET-CREEPER FAMILY**																						
*	*Catalpa speciosa*	northern catalpa													X									
	CAMPANULACEAE	**BLUEBELL FAMILY**																						
*	*Campanula rapunculoides*	creeping bellflower								X			X		X					X				
	RUBIACEAE	**MADDER FAMILY**																						

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*	*Galium mollugo*	white bedstraw														X		X		X				
	Galium palustre	marsh bedstraw														X								
*	*Galium verum*	yellow bedstraw							X				X		X	X		X		X				
	CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**																						
	Diervilla lonicera	bush honeysuckle																		X				
*	*Lonicera tatarica*	tartarian honeysuckle					X	X		X	X		X		X	X	X	X	X	X		X		
	Sambucus nigra ssp. canadensis	common elderberry															X							
	Sambucus racemosa var. racemosa	red-berried elderberry									X					X		X		X				
	Viburnum acerifolium	maple-leaved viburnum			L3						X			X										
*	*Viburnum lantana*	bending wayfaring-tree								X						X				X				
	Viburnum lentago	nannyberry									X		X		X	X	X			X				
*	*Viburnum opulus*	guelder rose							X		X		X		X	X	X	X		X		X		
	DIPSACACEAE	**TEASEL FAMILY**																						
*	*Dipsacus fullonum ssp. sylvestris*	wild teasel									X	X				X	X					X		
	ASTERACEAE	**ASTER FAMILY**																						
*	*Achillea millefolium var. millefolium*	common yarrow										X			X	X	X	X		X				
	Ambrosia artemisiifolia	common ragweed								X				X		X								
*	*Anthemis arvensis*	corn chamomille														X								
*	*Anthemis cotula*	stinking mayweed																						
*	*Arctium minus*	common burdock							X	X	X		X	X	X	X	X	X		X	X		X	
*	*Arctium tomentosum*	tomentose burdock									X					X	X	X						
*	*Artemisia vulgaris*	common mugwort													X									

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	Aster ericoides var. ericoides	white heath aster					X	X		X						X				X				
	Aster lanceolatus ssp. lanceolatus	tall white aster								X					X							X		
	Aster puniceus var. puniceus	purple-stemmed aster								X		X				X								
	Aster sp.	aster								X														
	Bidens frondosa	devil's beggar-ticks								X														
*	*Centaurea jacea*	brown knapweed														X								
*	*Centaurea nigra*	black knapweed									X					X								
*	*Cichorium intybus*	chicory					X	X		X						X	X	X						
*	*Cirsium arvense*	Canada thistle					X	X	X	X	X			X	X	X	X	X	X	X	X	X	X	
*	*Cirsium vulgare*	bull thistle								X	X			X	X	X	X		X	X	X	X	X	
	Erigeron annuus	daisy fleabane								X					X		X							
	Erigeron philadelphicus var. philadelphicus	Philadelphia fleabane									X						X					X		
	Erigeron strigosus	daisy fleabane														X								
	Euthamia graminifolia	flat-topped bushy goldenrod										X				X	X				X		X	
*	*Helianthus tuberosus*	Jerusalem artichoke														X	X							
*	*Hieracium caespitosum*	field hawkweed													X	X								
*	*Inula helenium*	elecampane									X	X				X								
*	*Lactuca serriola*	prickly lettuce					X	X		X					X	X	X					X		
*	*Lapsana communis*	nipplewort								X														
*	*Leucanthemum vulgare*	ox-eye daisy							X		X			X	X	X	X		X	X		X		
*	*Matricaria maritima ssp. maritima*	seaside camomile								X														
	Rudbeckia hirta	black-eyed Susan									X	X			X	X	X							

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	Solidago caesia	blue-stem goldenrod								X														
	Solidago canadensis	canada goldenrod					X	X	X	X	X	X		X	X	X	X	X	X	X		X		X
	Solidago canadensis var. scabra	tall goldenrod					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	
	Solidago nemoralis var. nemoralis	gray goldenrod														X								
	Solidago rugosa ssp. rugosa	rough goldenrod										X					X							
	Solidago sp.	goldenrod								X												X		
*	*Sonchus arvensis ssp. arvensis*	field sow-thistle										X				X								
*	*Sonchus asper ssp. asper*	spiny-leaved sow-thistle																						
*	*Sonchus oleraceus*	common sow-thistle																		X				
	Symphyotrichum ciliolatum	ciliolate aster			R^1, R^2, R^3					X	X	X			X	X	X			X				
	Symphyotrichum cordifolium	heart-leaved aster								X	X		X		X			X		X				
	Symphyotrichum novae-angliae	New England aster					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*	*Tanacetum vulgare*	common tansy					X	X	X		X				X	X	X		X	X		X		
*	*Taraxacum officinale*	common dandelion					X	X	X	X	X		X	X	X	X	X	X		X				
*	*Tragopogon dubius*	doubtful goat's-beard														X	X							
*	*Tussilago farfara*	coltsfoot								X	X	X				X					X		X	
	ALISMATACEAE	**WATER-PLANTAIN FAMILY**																						
	Alisma plantago-aquatica	common water-plantain														X								
	Sagittaria latifolia	broad-leaved arrowhead								X											X		X	

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	POTAMOGETONACEAE	**PONDWEED FAMILY**																						
	Potamogeton sp.	pondweed																			X		X	
	LEMNACEAE	**DUCKWEED FAMILY**																						
	Lemna minor	lesser duckweed											X											X
	Lemna trisulca	star duckweed			U[3], L3																			X
	CYPERACEAE	**SEDGE FAMILY**																						
	Carex aurea	golden-fruited sedge			U[3]											X								
	Carex bebbii	Bebb's sedge															X							
	Carex pedunculata	long-stalked sedge							X															
	Carex pensylvanica	Pennsylvania sedge								X														
	Carex pseudo-cyperus	cypress-like sedge														X								
	Carex sp.	sedge									X										X		X	X
	Carex stipata	awl-fruited sedge														X								
	Eleocharis erythropoda	red-footed spike-rush																			X		X	
	Scirpus atrovirens	dark-green bulrush														X	X							
	POACEAE	**GRASS FAMILY**																						
*	*Agrostis gigantea*	red-top										X		X	X	X	X							
*	*Bromus inermis ssp. inermis*	awnless brome					X	X	X	X	X			X	X	X	X	X	X	X		X		
*	*Bromus tectorum*	downy chess																						
*	*Dactylis glomerata*	orchard grass							X	X	X				X	X	X	X		X	X	X	X	
*	*Elymus repens*	quack grass					X	X		X	X				X	X	X		X	X		X		
	Festuca sp.	fescue													X									
	Glyceria sp.	manna grass														X								
	Glyceria striata	fowl meadow grass								X	X									X				
*	*Hordeum jubatum ssp. jubatum*	squirrel-tail grass													X	X	X							

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* *Lolium pratense*	meadow fescue																	X	X				
Phalaris arundinacea	reed canary grass					X	X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
* *Phleum pratense*	timothy											X		X	X	X			X				
Phragmites australis	common reed														X	X					X		
Poa compressa	Canada blue grass													X	X						X		
Poa pratensis ssp. pratensis	Kentucky bluegrass							X	X	X		X	X	X	X	X	X		X		X		
* *Setaria viridis*	green foxtail													X									
TYPHACEAE	**CATTAIL FAMILY**																						
Typha angustifolia	narrow-leaved cattail														X						X		
Typha latifolia	broad-leaved cattail								X	X	X	X			X	X				X	X		X
LILIACEAE	**LILY FAMILY**																						
Alliumssp.								X															
* *Asparagus officinalis*	garden asparagus													X					X				
* *Convallaria majalis*	lily-of-the-valley							X						X	X				X				
Erythronium americanum ssp. americanum	yellow dog's-tooth violet															X							
* *Hemerocallis fulva*	orange day-lily							X	X					X	X		X		X				
Maianthemum racemosum ssp. racemosum	false Solomon's seal								X	X				X									
* *Tulipa sp.*	tulip																		X				
IRIDACEAE	**IRIS FAMILY**																						
Iris sp.	Iris																						

**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

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

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

[1] – Oak Ridges Moraine Conservation Plan (2002)
[2]- Lake Simcoe Region Conservation Authority (2003)
[3]- York Region (Varga *et al*. 2000)
L1 to L3 – Toronto and Region Conservation Authority (2003)

Appendix B
Wildlife Habitat Summary

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Wildlife Habitat Assessment Summary – Yonge Street Corridor

Reference Number	Feature Name	GPS Location (NAD 83)	Type of Habitat	Significant Wildlife Habitat				**Comments**
				Seasonal Concentration of Animals	Rare Vegetation Communities or Specialised Habitats to Wildlife	Species of Conservation Concern (BSC & TRCA)	Animal Movement Corridors	
WY1	Gamble Road / 19th Avenue	0624750 4862855	Urban, CUM1-1	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Black-capped Chickadee	• mammal corridor through culvert under Gamble Road • white-tail deer corridors through cultural meadow on northwest side of Yonge Street and Gamble Road.	• area consists of residences and businesses • most wildlife evidence along Rouge River tributary west of Yonge Street on north side of Gamble Road
WY2	Summit Motel area	0624706 4863148	Urban, CUM1-1	• none recorded	• breeding population of Savannah Sparrows in meadow on north side of Summit Motel along west side of Yonge Street	• American Goldfinch • Black-capped Chickadee • Eastern Phoebe • Savannah Sparrow	• Two mammal corridors along north and south sides of Summit Motel leading across Yonge Street to cultural meadow and lowland valley on east side of Yonge Street (connects valley east of Yonge St to Rouge River west of Summit Motel).	• Breeding colony of Savannah Sparrows in cultural meadow on north side of Summit Motel • Most wildlife found in cultural meadow on north side of Summit Motel and in the lowland area on east side of Yonge.
WY3	Jefferson Forest/Tower Hill Road	0624633 4863521	Urban, CUM1-1, CUP 3-3	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Black-capped Chickadee • Eastern Kingbird • Northern Mockingbird	• northwest-southeast creek valleys on both sides of Yonge Street being used as mammal corridor via culvert under Yonge Street • woodlots part of larger bird migration corridor	• ~ 20-40 m clear cut zones on each side of Yonge Street • concrete culverts are covered by metal grates therefore limiting use as corridor • remove coverings, if possible, to allow use as better wildlife corridor • entire southwest corner levelled and under construction
WY4	Townwood Drive	0624635 4863760	Urban, CUW1	• none recorded	• cultural woodlot area on east side of Yonge Street provides breeding territories for numerous species of birds	• American Goldfinch • Black-capped Chickadee • Eastern Kingbird • Eastern Phoebe • Gray Catbird	• Woodlot area is part of larger north-south bird migration corridor • north-south mammal corridors through cultural woodlot but no evidence of corridors crossing Yonge Street	• condominiums along west side of Yonge Street • chimney swifts observed around old silo next to abandoned house on east side of Yonge Street • bedding areas and birthing area for white-tailed deer in cultural woodlot on east side of Yonge Street

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WY5	Summit Golf Course	0624600 4863985	Urban, CUW1	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Black-capped Chickadee	• single north-south mammal corridor through cultural woodlot on north side of golf course	• west side of Yonge Street is condominiums • east side of Yonge Street is manicured grasses of golf course property with small wooded area on its north side • no noticeable mammal corridors crossing Yonge Street
WY6	Harris Road	0624536 4864206	Urban, CUM1-1, CUT1, and CUW1	• none recorded	• no areas that would contain wildlife uncommon or rare	• **northern red-bellied snake** • American Goldfinch • Black-capped Chickadee • Eastern Kingbird • Savannah Sparrow	• Woodlots and thicket areas are part of larger north/south bird migration corridor • three east-west mammal corridors crossing Yonge Street connecting habitat on both sides of Yonge Street • north-south mammal corridors on east side of Yonge St. connecting lowland cultural thickets to adjacent cultural meadows.	• Existing habitat provides breeding areas for numerous species of birds • natural features on both sides of Yonge Street in this area makes it a major crossing point for mammals (road kills found during each of several visits). • snakes using disposal area behind Summit Auto for overnight resting areas • deer bedding areas along lowland slopes
WY7	Jefferson Sideroad	0624450 4864440	Urban, MAS2-1 pond, CUW1, CUP3-3	• large pond and marsh on northwest corner of Jefferson Sideroad and Yonge Street is potential waterfowl staging area during spring/fall migrations	• no areas that would contain wildlife uncommon or rare	• **snapping turtle** • American Goldfinch • Barn Swallow • Black-capped Chickadee • Eastern Kingbird • Pine Warbler	• east-west mammal corridor linking cultural thickets on east and west side of Yonge Street, just south of Jefferson Sideroad	• pond and surrounding marsh is breeding area for numerous species of wildlife (Canada Geese, Mallard, Song Sparrow, Red-winged Blackbird, muskrat, painted turtle) • pond is feeding area for Great Blue Heron, Barn Swallow, Ring-billed Gull.

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WY8	Stouffville Road	0624405 4864848	Urban	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Horned Lark • Savannah Sparrow	• none recorded	• northeast side of Stouffville Road at Yonge Street is all residential • southwest side of Stouffville Road at Yonge Street is an agricultural field supporting breeding birds during spring season (chimney swift feeding area) • west side of Yonge Street presently under development
WY9	Bond Lake	0624190 4865545	Residences, CUM1-1, CUW1, CUP3-3, FOD7, FOD8, SA and lake	• pond on west side of Yonge Street and lake on east side recorded as potential staging areas for waterfowl during migration • habitat diversity provides good landbird migratory stopover area	• no areas that would contain wildlife uncommon or rare • good habitat diversity and wildlife diversity	• spring peeper • **snapping turtle** • American Goldfinch • Black-capped Chickadee • Eastern Kingbird • Eastern Phoebe • Field Sparrow • Ovenbird • Red-breasted Nuthatch • Wood Duck • Wood Thrush	• woodlots on both sides of Yonge Street are part of larger north-south bird migration corridor. • mammal corridors from wooded areas at south end of Bond Lake across Yonge Street to wooded areas and small pond on west side.	• high wildlife biodiversity and several mammal corridors crossing this section of Yonge Street due to the diversity of natural habitats found on both sides of Yonge Street.
WY10	Oak Ridges Moraine Trail / north end of Bond Lake	0624102 4865835	FOD7, FOD8, CUT1, CUM1-1 and CUW1	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Eastern Kingbird • Savannah Sparrow • Wood Thrush	• Local diverse habitat part of larger north-south bird migration corridor • mammal corridor from wooded area at north end of Bond Lake on east side of Yonge Street to Oak Ridges Moraine trail on west side	• mammals (such as red fox, coyote and raccoon) using artificial walking trail through Oak Ridges Moraine on west side of Yonge Street as travel corridor.

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WY11	Area around jersey barrier	0624100 4866100	CUT1, CUW1 and CUM1-1	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Black-capped Chickadee • Pine Warbler	• east side of Yonge Street has numerous east-west mammal trails, through the cultural meadow and adjacent northern edge of the cultural woodlot, converging into a single corridor that crosses Yonge Street. The corridor continues west, past a jersey barrier, with trails spreading through the meadow and woodlot areas.	• natural heritage features on both sides of Yonge Street create necessity for wildlife to cross Yonge street at this point.
WY12	Estate Garden Dr / Old Colony Rd	0624090 4866342	Urban, CUW1, CUM1-1, and MAS2-1	• none recorded	• no areas that would contain wildlife uncommon or rare	• spring peeper • American Goldfinch • Black-capped Chickadee	• small corridor from cultural meadow and marsh area on southeast side of Yonge Street and Old Colony Road to west side of Yonge Street along south edge of Estate Garden Road to creek and marsh	• seasonal creek running through concrete box culvert under Estate Garden Dr into cattail marsh south of Estate Garden Drive ~ 100 m west of Yonge Street • chimney swifts flying the area • north-south mammal corridors continue along east side of Yonge Street from large cultural meadow at north end of Bond Lake to woodlot and marsh on south side of Old Colony Road.
WY13	King Road	0624027 4866858	MAS 2-1, East Humber River, and commercial	• potential waterfowl staging area in marsh along river on east side of Yonge Street	• no areas that would contain wildlife uncommon or rare • river surrounded by large cattail marsh	• leopard frog • American Goldfinch • Barn Swallow • Black-capped Chickadee • Black-crowned Night Heron • Gray Catbird • Swamp Sparrow • Wood Duck • mink	• amphibian presence and mammal track evidence indicates box culvert used as east-west wildlife corridor under Yonge St • culvert connects marshes on both sides of Yonge Street	• box culvert openings ~ 10 m in from Yonge Street • riparian vegetation makes up most of the areas natural heritage features surrounded by urbanization • migratory bird nest (Barn Swallow) on north wall at east end of culvert • river water high in culvert

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WY14	Aubrey / North Lake to Maple Grove / Ashfield	0623960 4867203	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• mostly business malls on both sides of Yonge Street • only found signs of wildlife related to human disturbance and no obvious mammal corridors
WY15	Elm Grove Avenue	0623897 4867560	Urban	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch	• none recorded	• no evidence for mammal corridors anywhere east or west side of Yonge Street
WY16	Black Forest Dr / Worthington Ave	0623788 4868145	Urban, CUM1-1, CUT1, CUP3-3, and MAS 2-1	• none recorded	• no areas that would contain wildlife uncommon or rare • CUM and cattail marsh	• American Goldfinch • Black-capped Chickadee • Eastern Kingbird • Savannah Sparrow	• large cultural meadow and marsh north of Worthington Avenue has numerous east-west mammal trails indicating random crossings over Yonge Street to residential area and pine woodlot west of Yonge St.	• large open area south of Black Forest Drive just north of Regatta Avenue has been levelled and is in preconstruction • lots of breeding bird habitat in and around marsh
WY17	Coon's Road	0623693E 4868712N	Urban, CUM1-1, and CUW1	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Black-capped Chickadee • Gray Catbird	• north-south corridors through woodlot and meadow habitat on east side of Yonge Street • no east-west corridors noted across Yonge Street.	• removing bars over culvert openings and creating ramp to its perched position could attract mammals to use culvert as the only safe corridor in area across Yonge Street

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WY18	Bloomington Road	0623696 4868668	Urban, FOD7, CUM1-1, and CUT1	• large meadow and thicket area southeast of Bloomington and Yonge Street is good habitat for landbird migratory stopover area	• no areas that would contain wildlife uncommon or rare	• none recorded	• no east-west mammal corridors recorded across Yonge Street south of Bloomington Rd • east-west mammal corridor recorded on north side of Bloomington Road from small lowland wooded area on east side of Yonge Street to similar habitat on west side.	• large solid wooden fence on west side of Yonge Street, south of Bloomington, blocks mammal access to residences • most wildlife activity on east side of Yonge Street (nesting and corridors) • creating ecopassages (ie. culvert under Yonge Street north of Bloomington) would eliminate potential deaths to wildlife crossing Yonge Street.
WY19	MNR / OPP	0623600 4869176	Urban, FOD4, CUM1-1, and CUP3	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch	• east-west corridor from desiduous woods on east side of Yonge Street to conifer tree row on west side. • north-south corridors through wooded areas and meadow on east side of Yonge Street. • this area is part of larger north-south bird migration corridor.	• Deer beds on north side of deciduous woods opposite MNR building, east side of Yonge Street
WY20	Elderberry Trail / Hunter's Glen	0623536 4869510	Urban, CUM1-1, FOC, CUP3-3	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Bank Swallow • Barn Swallow	• none recorded crossing Yonge Street	• cultural meadow on south side of Elderberry, west of Yonge Street, is sparse due to human disturbance. • large open area north of coniferous forest on north side of Elderberry under construction • most wildlife activity in this area found around dried creek on north Side of Elderberry

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WY21	Ridge Road	0623445 4869977	FOD, manicured grass (cemetery)	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch	• two sets of large twin csp's crossing under Yonge Street are being used as amphibian and mammal corridors • csp's connecting habitat on both sides of Yonge Street	• cultural meadow surrounding creek going north-south on east side of Yonge Street surrounded by residences • area around creek on west side of Yonge street is primarily urban (businesses) • water flowing through csp's at both locations
WY22	Gilbert	0623340 4870550	CUP3-3, manicured grass (cemetery) and residential	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded crossing Yonge Street	• fence line perimeter at cemetery blocks mammal movements across Yonge Street
WY23	Industrial / Railroad Tracks	0623260 4870985	CUP3-3, CUW1, CUS1, Commercial and residential	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded crossing Yonge Street	• no birds nesting on bridge
WY24	Henderson/Allaura	0623218 4871206	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• no natural heritage features

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WY25	Murray?Edward	0623150 4871535	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• no natural heritage features
WY26	Golf Links/Dunning	0623068 4871950	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• no natural heritage features
WY27	Kennedy	0622990 4872373	Commercial and Residential	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• no natural heritage features
WY28	Tannery Creek just south of Church Street	0622950 4872580	CUW1, river, commercial and residential	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• very narrow riparian zone (CUT1) around river on east and west side of Yonge Street • large CSP is possible corridor but no direct evidence was found

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WY29	Wellington Road	0622866 4872975	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• no natural heritage features
WY30	Maple Street	0622800 4873330	Residential	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• no natural heritage features
WY31	East Tannery Creek, just south of Orchard Heights /Batson Road	0622645 4873936	CUM1-1, CUT1, creek and commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • **mink**	• mammal corridor through double csp (dried one) connecting habitat on either side of Yonge Street • north-south mammal corridor through cultural meadow on east side of Yonge Street connecting habitat north and south of Batson Road.	• No migratory bird nests in csp's
WY32	East Tannery Creek, just north of Orchard Heights /Batson Road	0622690 4874130	CUM1-1, CUT1, creek and commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • **mink**	• mammal corridor through double csp (dried one) connecting habitat on east side of Yonge Street to habitat on west side of Yonge. •	• No migratory bird nests in csp's

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WY33	St. Andrew's College	0622570 4874590	CUP3, creek and associated cattail vegetation, manicured grass and commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Black-capped Chickadee • **mink** • **weasel**	• mammals crossing over Yonge Street along north edge of cultural plantation • possible corridor under Yonge St. through concrete round culvert on north side of St. Andrew's College entrance	• very urbanized area so wildlife is limited to a few opportunistic species.
WY34	St. John's Sideroad	0622465 4874995	MAS2-1,CUP3, FOD7, river, bridge and urban	• none recorded	• swallow colony under bridge on St. John's SR along west side of Yonge Street.	• American Goldfinch • Barn Swallow • Black-capped Chickadee • Cliff Swallow • **mink** • weasel	• regularly used mammal corridor along river and under St. John's S.R. bridge (~10 m west of Yonge Street) • two smaller corridors crossing Yonge Street, south of St. John's S.R., connecting marsh to river • forested areas on both sides of Yonge St are north-south bird migration corridors.	• swallow colony under bridge comprised of 52 barn swallow nests and one cliff swallow nest. • track evidence under bridge shows raccoon, mink, weasel, gray squirrel and opossum use it as corridor.
WY35	Cultural meadow north of St. John's Sideroad	0622434 4875150	CUM1-1 on west side of Yonge and urban on east side of Yonge Street.	• none recorded	• no areas that would contain wildlife uncommon or rare	• **mink**	• mammal corridors crossing Yonge Street north and south of Hadley Grange retirement building, corridors connect forest behind and east of the Hadley building to large cultural meadow on west side of Yonge Street	• mink road kill along north corridor verifies usage.

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WY36	Tannery Creek,just north of St. John's Sideroad	0622400 4875475	CUM1-1, FOD4, cattail vegetation along creek edge and urban	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Black-capped Chickadee • Blue-headed Vireo • Gray Catbird • **American beaver** • **mink**	• major mammal corridor through large double csp where river crosses Yonge Street connecting habitat on either side of Yonge Street, • three other mammal corridors cross over Yonge Street in the area • cultural meadows and forested areas are part of continuous north-south bird migration corridors	• most mammal movements occur through south csp where it is dry; north csp has river flowing east • white-tailed deer, raccoon, mink, skunk and squirrel use corridors • besides tracks and trails, road kill mink and skunk verify corridor usage over Yonge Street in this area • no migratory bird nests in csp's
WY37	Joe Persechini / Savage Road	0622316 4875955	Residential	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• no natural heritage features • grassed area, 15-20 m wide on each side of Yonge Street
WY38	Sawmill Valley / Savage Road	0622185 4876670	Commercial and Residential	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• no natural heritage features • grassed area 15-20 m wide on each side of Yonge Street
WY39	Mulock Drive	0622120 4877050	Commercial and Residential	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch	• none recorded	• primarily urban business area • small cattail marsh on southwest corner of Mulock Drive and Yonge Street totally encroached by development • all previous watercourses in the area are piped underground

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WY40	Clearmeadow / William Roe	0622040 4877450	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• Existing cultural meadows on west side are being cleared for future development.
WY41	Eagle Street / Western Creek	0621925 4878045	Commercial, man-made park MAS2-1 and creek.	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch	• none recorded	• creek piped underground on east side of Yonge Street and culvert opening on the west side of Yonge is barred. • minimal riparian vegetation around creek • water is flowing through culvert • could increase riparian zone another 5-10 m for wildlife protection around creek
WY42	Millard Avenue	0621810 4878656	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• no natural heritage features
WY43	Davis Drive and Yonge Street	0621724 4879087	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• highly urbanized intersection with man-made pond on northwest corner at Upper Canada Mall.

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WY44	Dawson Manor Blvd. / Kingston Road	0621600 4879786	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• highly urbanized intersection
WY45	Bonshaw Avenue / London Road	0621525 4880157	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• highly urbanized intersection
WY46	Aspenwood Drive/ Bristol Road	0621450 4880537	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• none recorded	• highly urbanized intersection
WY47	Green Lane and Yonge Street	0621333 4881095	Commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• Barn Swallow	• none recorded	• highly urbanized intersection

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WGL1	Storm water ponds behind Famous Players on Green Lane	0621770 4881230	MAS2-1, FOD7-3, CUM1-1, creek, and storm water ponds	• Bank Swallow nesting colony and Belted Kingfisher nest hole on large man-made hill just east of storm water ponds • staging area at storm water ponds for shorebirds and waterbirds during migration	• large hillside next to storm water ponds is nesting area for Kingfisher and Bank Swallow colony	• American Goldfinch • Bank Swallow • Barn Swallow • Spotted Sandpiper • **Mink**	• north-south corridor along creek through csp under Green Lane connecting marsh and storm water pond south of Green Line to deciduous woods on north side • numerous east-west corridors connecting stormwater ponds and marsh to surrounding cultural meadow habitat.	• pond and marsh used as amphibian, bird and mammal breeding area • note that mammals are crossing Green Lane above the creek and csp as well as through it
WGL2	Large cultural meadow along Green Lane	0621990 4881310	CUM1-1	• none recorded	• area provides habitat and breeding grounds for area sensitive American Goldfinch, Eastern Kingbird and Savannah Sparrow	• **Northern red-bellied snake** • American Goldfinch • Eastern Kingbird • Savannah Sparrow	• east-west corridors south of Green Lane on biker trails through cultural meadow. • no obvious north-south corridors across Green Lane	• human influenced area
WGL3	Tributary of Holland River, midway between Yonge Street and Concession 2	0622425 4881455	MAS2-1, CUM1-1, CUT1, CUP3-3	• none recorded	• cattail marsh bordered by cultural meadows, cultural thickets and deciduous forest have high species diversity • species such as Eastern Kingbird, Swamp Sparrow and American Woodcock are area-sensitive.	• American Goldfinch • American Woodcock • Eastern Kingbird • Gray Catbird • Swamp Sparrow	• numerous east-west corridors through marsh connecting habitat on both sides of wetland area. • north south corridors along each side of marsh • north-south corridor through large csp under Green Lane connecting marsh on south side to wooded areas on north side of Green Lane.	• willow patch on southeast side of marsh provides good breeding bird habitat • deer corridors crossing through center of marsh.

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				Seasonal Concentration of Animals	Rare Vegetation Communities or Specialised Habitats to Wildlife	Species of Conservation Concern (BSC & TRCA)	Animal Movement Corridors	
WGL4	Agricultural Fields along Green Lane	0622835 4881585	Agricultural and residence	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Barn Swallow • Eastern Phoebe • Savannah Sparrow	• east-west corridor, south of and parallel to Green Lane through agricultural fields providing a link between habitat bordering the agricultural fields. • north-south corridors along east and west sides of agricultural fields	• migratory birds breed in agricultural fields before crops mature • no obvious corridors across Green Lane
WGL5	Green Lane at Concession 2 (Main Street)	0623265 4881720	Agricultural, CUT1, CUM1-1, MAS2-1and commercial	• none recorded	• habitats within the vegetation communities present have high species diversity. • species such as Eastern Kingbird, Savannah Sparrow and Spotted Sandpiper are area-sensitive.	• American Goldfinch • Barn Swallow • Black-capped Chickadee • Eastern Kingbird • Gray Catbird • Savannah Sparrow • Spotted Sandpiper • Wood Thrush	• small east-west corridor, south of Green Lane, through csp under Main St connecting cultural meadow east of Main Street to marsh and cultural thicket, west of Main Street. • numerous east-west corridors through cultural thick on SW side of intersection.	• most wildlife activity in natural heritage area on SW corner of intersection • exposed ground and meadow on SE corner of intersection are breeding grounds for Killdeer, Spotted Sandpipers and Savannah Sparrows • road kill indicated potential corridor for wildlife crossing Green Line from agricultural fields on the north side to cultural thicket habitat located south of Green Lane.
WGL6	East Branch of Holland River at Go Train Station	0623700 4881672	Commercail, river, and riparian habitat	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Barn Swallow • Cliff Swallow • Eastern Phoebe • Northern Rough-winged Swallow	• corridor for mammals such as raccoon, skunk, mink,, fox, etc.	• although it is heavily influenced by human activity, numerous species of wildlife have acclimated to using this bridge for nesting and as a safe crossing corridor under Davis Drive. • bird nests on bridge from Cliff Swallow, Barn Swallow, Northern Rough-winged Swallow and Eastern Phoebe

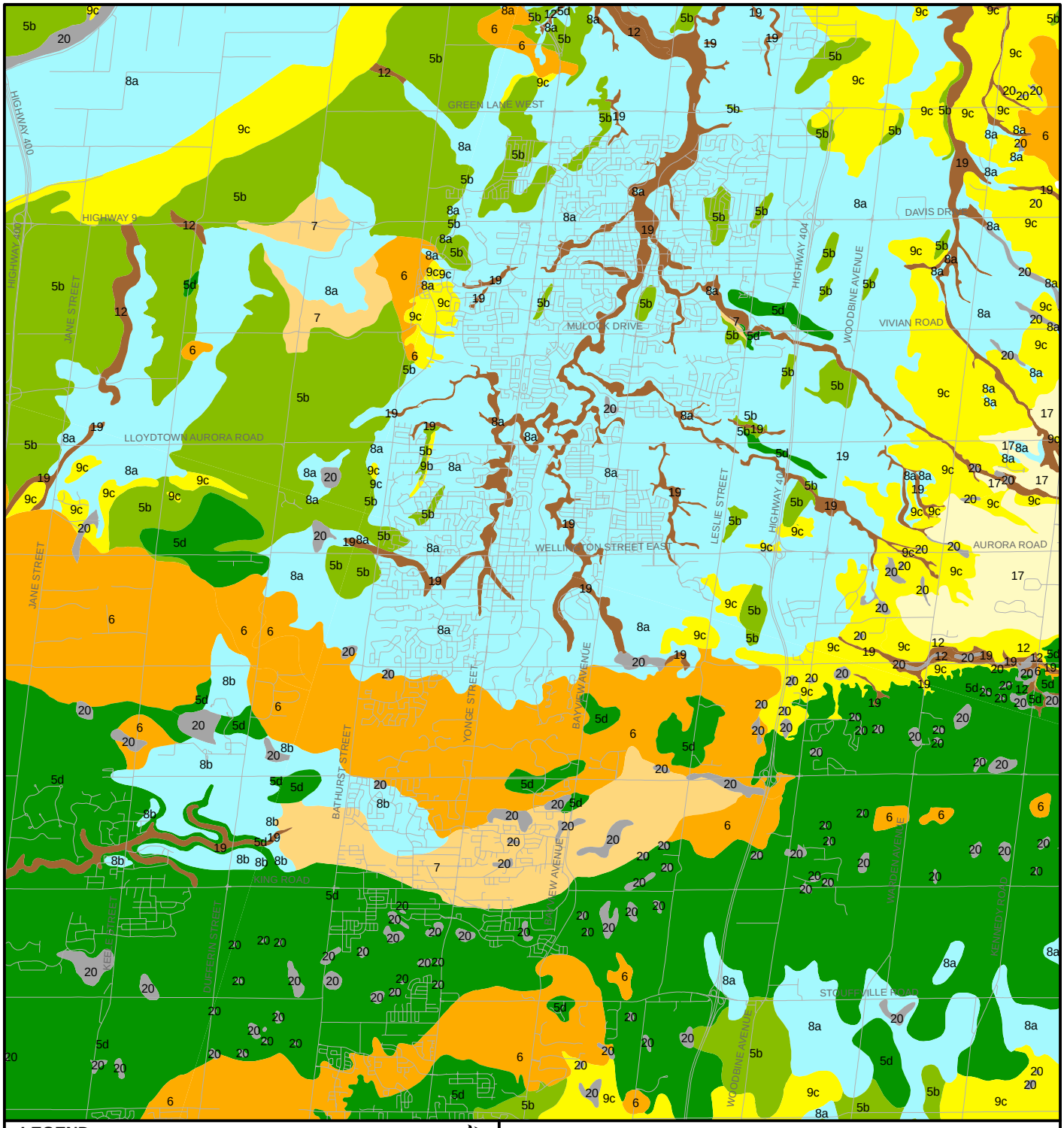
APPENDIX B

Wildlife Habitat Assessment Summary – Yonge Street Corridor

Reference Number	Feature Name	GPS Location (NAD 83)	Type of Habitat	Significant Wildlife Habitat				**Comments**
				Seasonal Concentration of Animals	Rare Vegetation Communities or Specialised Habitats to Wildlife	Species of Conservation Concern (BSC & TRCA)	Animal Movement Corridors	
WDD1	Church of Christ entrance	0622564 4879357	Residential, manicured grass, CUT1, CUM1-1, and creek	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• possible crossing point over Yonge Street since culvert piped underground	• small creek parallel to and ~20 m south of Davis Drive • creek piped underground (under small park of manicured grass) on north side of Davie Drive • no bird nests in box culvert • mammals travelling riparian area along creek
WDD2	Western Creek just west of Main Street	0623108 4879540	CUT1, creek, residential, and commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• American Goldfinch • Black-capped Chickadee	• track evidence shows culvert under Davis Drive being used as mammal corridor	• creek heavily influenced by human activity (ie. garbage) • other than a few raccoon tracks, the area in and around the creek appears to be very in-active.
WDD3	Main Branch of East Holland River (east of Main Street)	0623810 4879660	man-made park, commercial, river, CUT1, and riparian vegetation.	• none recorded	• no areas that would contain wildlife uncommon or rare	• Barn Swallow • Cliff Swallow	• regularly used mammal corridor (opossum, muskrat, raccoon, skunk, mink, and fox) under bridge connecting park and riparian woodlot on each side of Yonge Street	• bird nests of Barn Swallow and Cliff Swallow found on ceiling of bridge.
WDD4	Tributary of East Branch of Holland River (east of Main Street)	0624104 4879875	creek, manicured grass and commercial	• none recorded	• no areas that would contain wildlife uncommon or rare	• none recorded	• Mammals using csp as travel corridor to cross under Yonge Street • Up-stream culvert opening located 300m north of Davis Drive.	• No nests found in csp.

* Above Table Abbreviations**:** Reference Numbers: WDD – Davis Drive; WGL – Green Lane; WY–Yonge Street NAD – North American Datum, BSC – Bird Studies Canada, **TRCA – Toronto and Region Conservation Authority**

Appendix C
North Yonge Street
Surficial Geology



LEGEND

- 5b: Stone-poor, carbonate-derived silty to sandy till
- 5d: Glaciolacustrine-derived silty to clayey till
- 6: Ice-contact stratified deposits
- 7: Glaciofluvial deposits
- 8a: Massive-well laminated
- 8b: Interbedded flow till, rainout deposits and silt and clay
- 9b: Littoral-foreshore deposits
- 9c: Foreshore-basinal deposits
- 12: Older alluvial deposits
- 17: Eolian deposits
- 19: Modern alluvial deposits
- 20: Organic deposits

Data Source: Ministry of Natural Resources, Ontario Base Mapping, January 2008.
Surficial Geology of Southern Ontario, MRD 128, Ministry of Northern Development and Mines.

1,000 500 0 1,000 Metres

NORTH YONGE STREET EA - SURFICIAL GEOLOGY

YORK REGION TRANSIT PLAN - HYDROGEOLOGY
For LGL Limited

DATE: JULY 2008	SCALE: 1:105000
PROJECT: 00-021516.04	FILE. NO.:00-02151604F6

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FIGURE 6