4. EXISTING CONDITIONS

Since EAR 2005, various aspects of the existing socio-economic, cultural and natural environment within the Study Area have changed due to recent development, implementation of infrastructure, change in policies, and other matters. Through a review of current Official Plans, Transportation Master Plans, relevant planning documents, and field review, Sections 4.1 and 4.3 provide an update, where necessary, of the socio-economic environment and natural environment, respectively outlining what changes have occurred since 2005.

Section 4.2 documents the existing cultural environment of the Study Area; there has been no change since EAR 2005 as there have not been any new designations of heritage properties and the previous archaeological assessment already confirmed that there are no known archaeological sites within the Study Area.

Section 4.3 documents natural heritage existing conditions, including discussion of scoped field surveys completed in 2009, 2010 and 2011. Natural heritage conditions are generally consistent with descriptions provided in the EAR 2005, with minor refinements based on the updated field work.

Section 4.4 provides a general overview of existing agricultural existing conditions and related issues. Agricultural issues have not changed since the filing of the EAR 2005.

Existing transportation conditions in Section 4.5 were updated based on the background information collected as part of the additional traffic analysis documented in Section 3.3, and also based on review of current Official Plans, Transportation Master Plans, and relevant planning documents. The updates included infrastructure and transit initiatives that have been implemented since EAR 2005, as well as future planned roadway and transit improvements.

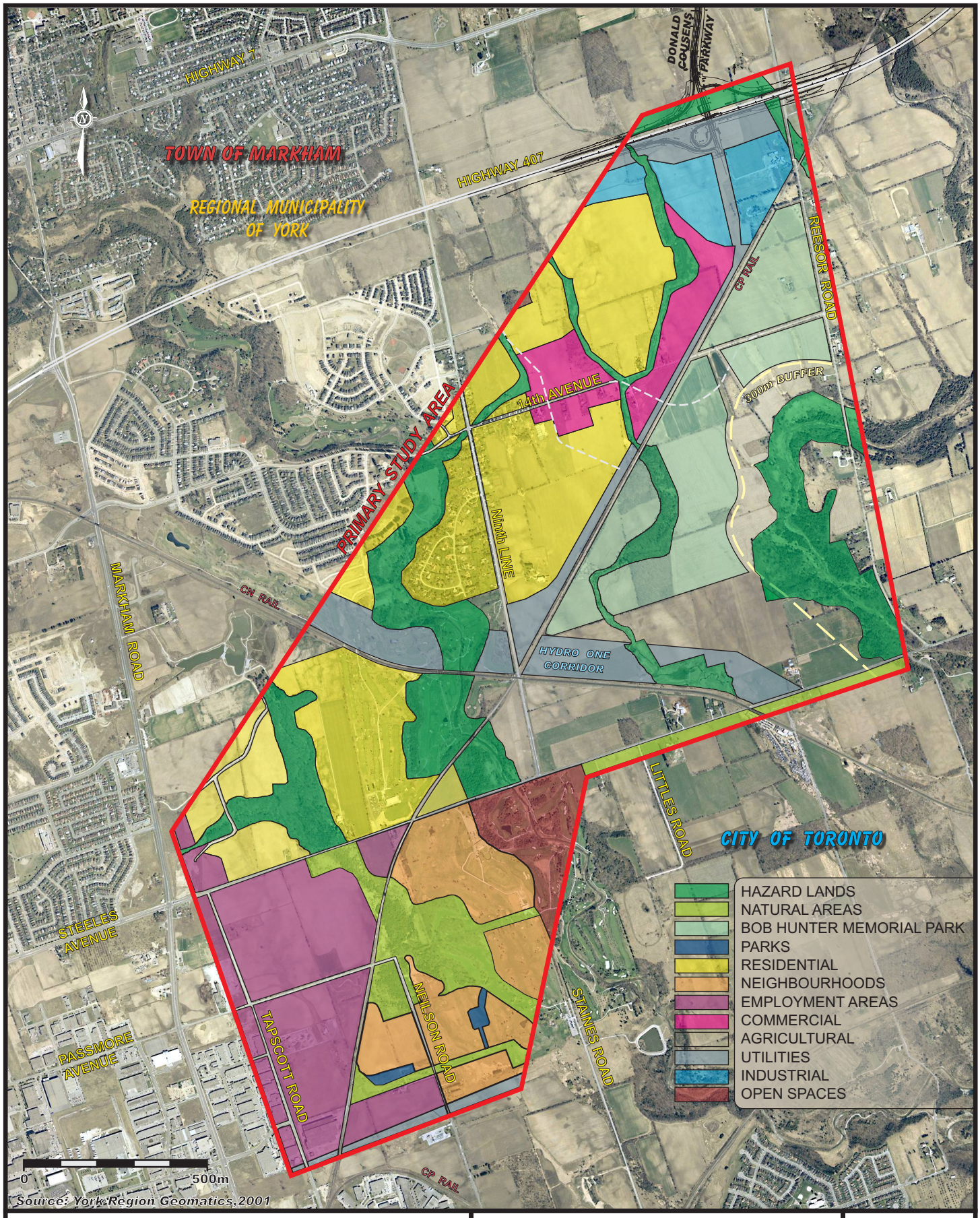
4.1 Socio-Economic Environment

The socio-economic environment is the component of the environment that is 'man made'. The following provides a brief overview of the socio-economic environment within the Study Area, including existing and future land uses. Section 4.1 from EAR 2005 has been updated based on a review of the most current Official Plans and other relevant planning documents.

4.1.1 Existing and Future Land Uses

The Study Area includes a mix of land uses that are shown on Exhibit 4-1, which is briefly described below and described in more detail in the following sections.

In the City of Toronto, the land use northwest of the CP Rail Havelock Subdivision is designated mainly as a future employment area known as the Tapscott Employment District with a small natural area for the Morningside Tributary. Within this area is the Morningside Avenue extension corridor between Finch Avenue to Steeles Avenue was identified in the City of Toronto Official Plan (July 2006), Schedule 2 . The *Morningside Heights Secondary Plan* provides for the Buffer Reserve southeast of the CP Rail Havelock Subdivision. Southeast of the CP Rail Havelock Subdivision, Morningside Heights is designated as neighbourhood, and open space, which includes a small portion of the Cedar Brae Golf and Country Club and a number of natural areas and parks.



TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
(formerly Transportation Improvements
in the Markham Bypass Corridor South of Highway 407)
ENVIRONMENTAL ASSESSMENT

LAND USE

EXHIBIT
4-1

Morningside Heights is a new residential development and construction is essentially complete within the Study Area.

According to the City of Toronto Tapscott Employment District Profile 2007, approximately $196.5 million was invested in the Tapscott Employment District between 2000 and 2007, providing over 4,400 jobs and adding / retaining over 3.2 million square feet of floor space.

The Morningside Heights Secondary Plan Land Use Plan (June 2006) indicated that the designated land use in the Morningside Heights area remains the same as that noted in EAR 2005.

In the Town of Markham, the land use west of Ninth Line includes residential, utilities and hazard lands. The area with the designation "Utilities" is the Hydro One Corridor and the area designated as Hazard Lands includes the Rouge River and the Morningside Tributary. The Parkview Golf Course is within the area designated as residential.

East of Ninth Line the existing land uses are predominantly agriculture / open space with some rural residential houses and the Bob Hunter Memorial Park. Hazard lands include the Little Rouge Creek and one of its tributaries. The Hydro One corridor continues through this section of the Study Area. The Box Grove Planning District is located to the north of the Hydro One corridor. The future land uses within the Box Grove Development include; residential, industrial, commercial, transportation and utility, Hazard Land, and Environmental Protection Area. The land use plan for the Box Grove Planning District Secondary Plan is shown on Exhibit 4-1.

There has been no change in the Town of Markham land use designation west of Ninth Line, and in the Box Grove Planning District. The development in the Box Grove Community has proceeded.

4.1.1.1 Residential - Town of Markham

Existing

The existing land uses within the Study Area in the Town of Markham may be characterized as being primarily residential to the west of Ninth Line and rural to the east of Ninth Line with intermittent rural residential houses located along Reesor Road and Steeles Avenue. Immediately east and west of Ninth Line in the vicinity of 14th Avenue is the Box Grove Community, which is a mature rural residential area. To the south of the Box Grove Community is an enclave of approximately 49 rural estate residential homes located on large lots adjacent to Ninth Line, RidgeVale Drive and Rouge River Circle.

Further to the west is a new residential subdivision located both north and south of 14th Avenue known as the Legacy Community.

The rural area bounded by Ninth Line to the west, the CP Havelock Subdivision to the east, Highway 407 to the north and the CN York Subdivision to the south is part of the approved Box Grove Secondary Plan Area. The land uses within this area include residential, industrial, commercial, transportation and utility, hazard land and environmental protection area. As noted the CP Havelock subdivision is the easterly limit of the secondary plan area and is the proposed boundary between urban and rural

development in southeastern Town of Markham within the Study Area. Draft plans of subdivision of the areas both north and south of 14th Avenue are shown on Exhibit 4-2a.

Construction in the Box Grove development has since taken place – see Exhibit 4-2b.

The residential land uses east of Ninth Line, and on Ridge Vale Drive and Rouge River Circle remain the same. Lands in the Box Grove Planning District, west of Ninth Line, have been developed into a local residential community. Ninth Line has also been realigned south of Highway 407 and connects to the Box Grove Bypass. The original Ninth Line now terminates north of Rouge Bank Drive and south of Sandres Drive. According to the Town of Markham Home Buyers Guide (2006), the Box Grove Community will provide approximately 2,600 homes when completed.

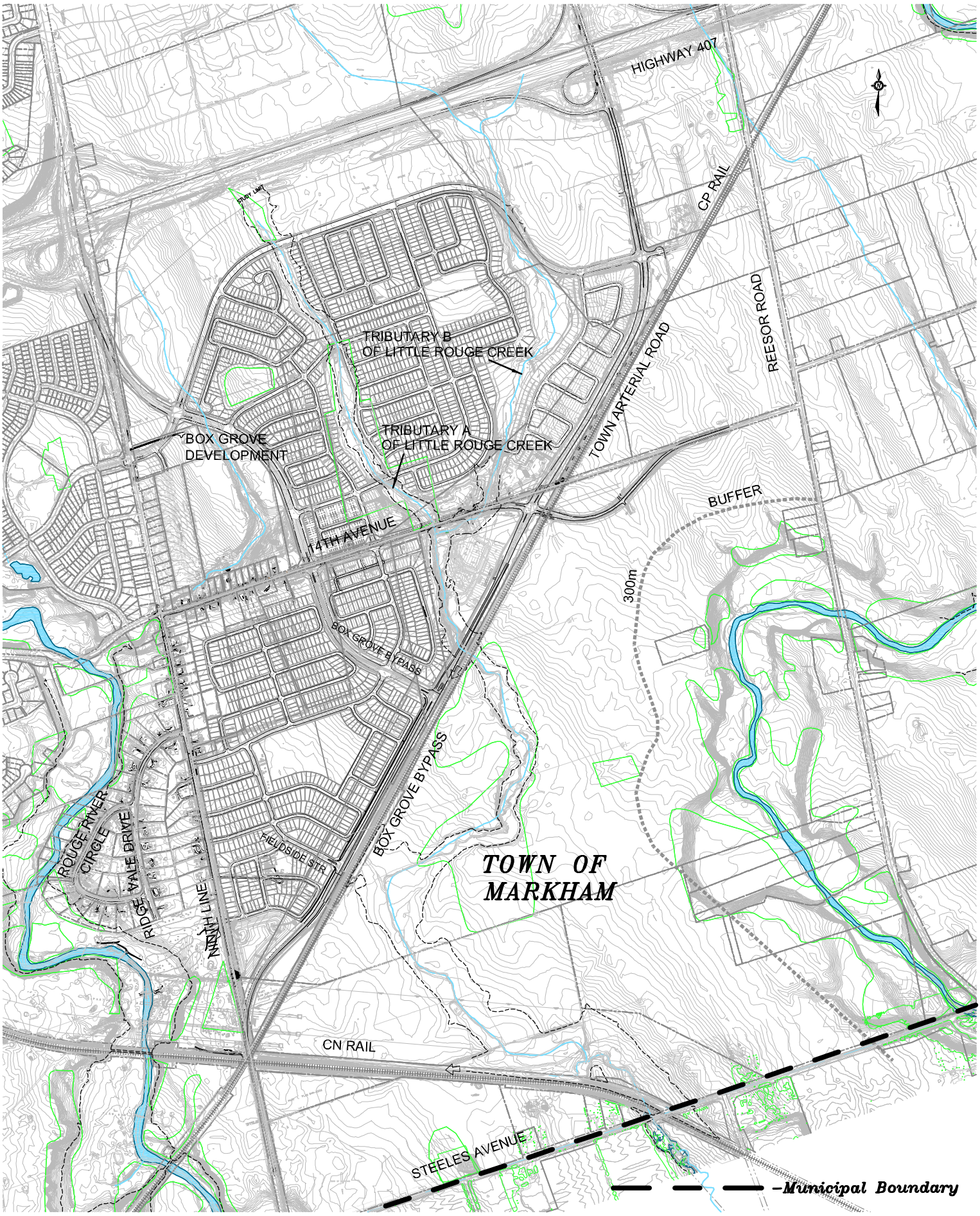
Immediately west of the Morningside Tributary and north of Steeles Avenue is a residential subdivision (Village of Fairtree East). A copy of the plan received during the Study is included as Exhibit 4-3a.

The West Village and the South Village of the Village of Fairtree development had proceeded prior to filing of EAR 2005. (See Exhibit 4-3b.) The Village of Fairtree development east of the Morningside Tributary is currently being planned but had not proceeded to construction at the time of this EA Amendment.

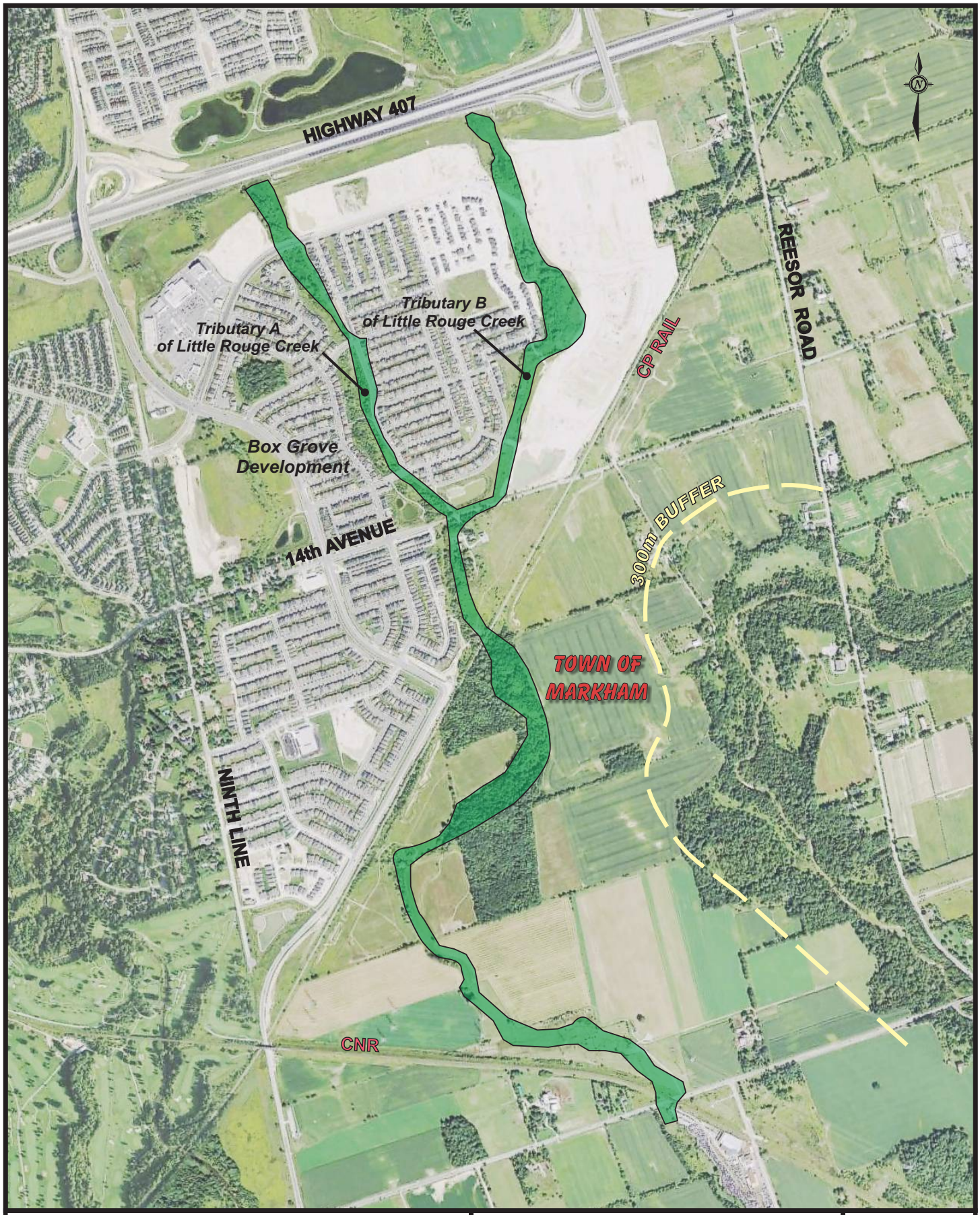
4.1.1.2 Residential – City of Toronto

The residential area south of Steeles Avenue is known as Morningside Heights and has been undergoing development as shown on Exhibits 4-4a and 4-4b. The majority of construction has been completed for the residential area. Along the westerly limit of the subdivision, there was a buffer reserve between the houses and the CP Havelock Corridor which was designated as part of the Morningside Heights Secondary Plan as a possible corridor for the extension of Morningside Avenue to Steeles Avenue and potentially beyond to connect with the Donald Cousens Parkway to Morningside Avenue Link Corridor.

Since EAR 2005, the residential area in Morningside Heights has been undergoing development. The construction of the Morningside Heights Community has proceeded assuming that the alignment utilizing the buffer along the south-east side of the CP Rail would not be implemented. Houses have been constructed backing onto the CP railway (i.e., the buffer which would have allowed for a possible corridor for the extension of Morningside Avenue to Steeles Avenue is no longer available).



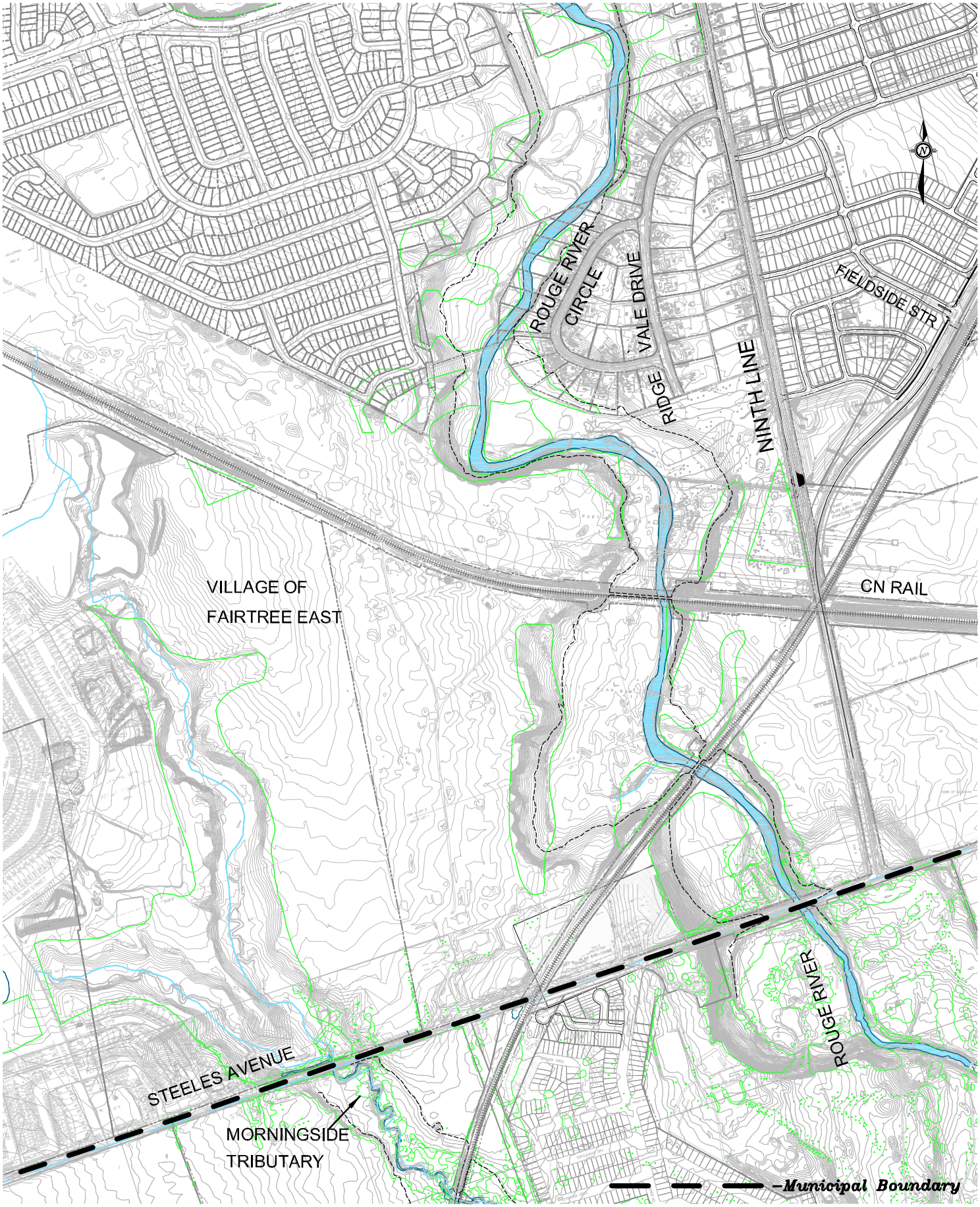
TRANSPORTATION IMPROVEMENTS DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK (formerly Transportation Improvements in the Markham Bypass Corridor South of Highway 407) ENVIRONMENTAL ASSESSMENT	BOX GROVE DEVELOPMENT (ORIGINAL EAR 2005)	EXHIBIT 4-2a



TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
(formerly Transportation Improvements
in the Markham Bypass Corridor South of Highway 407)
ENVIRONMENTAL ASSESSMENT

BOX GROVE DEVELOPMENT AREA
(2009 Aerial)

EXHIBIT
4-2b

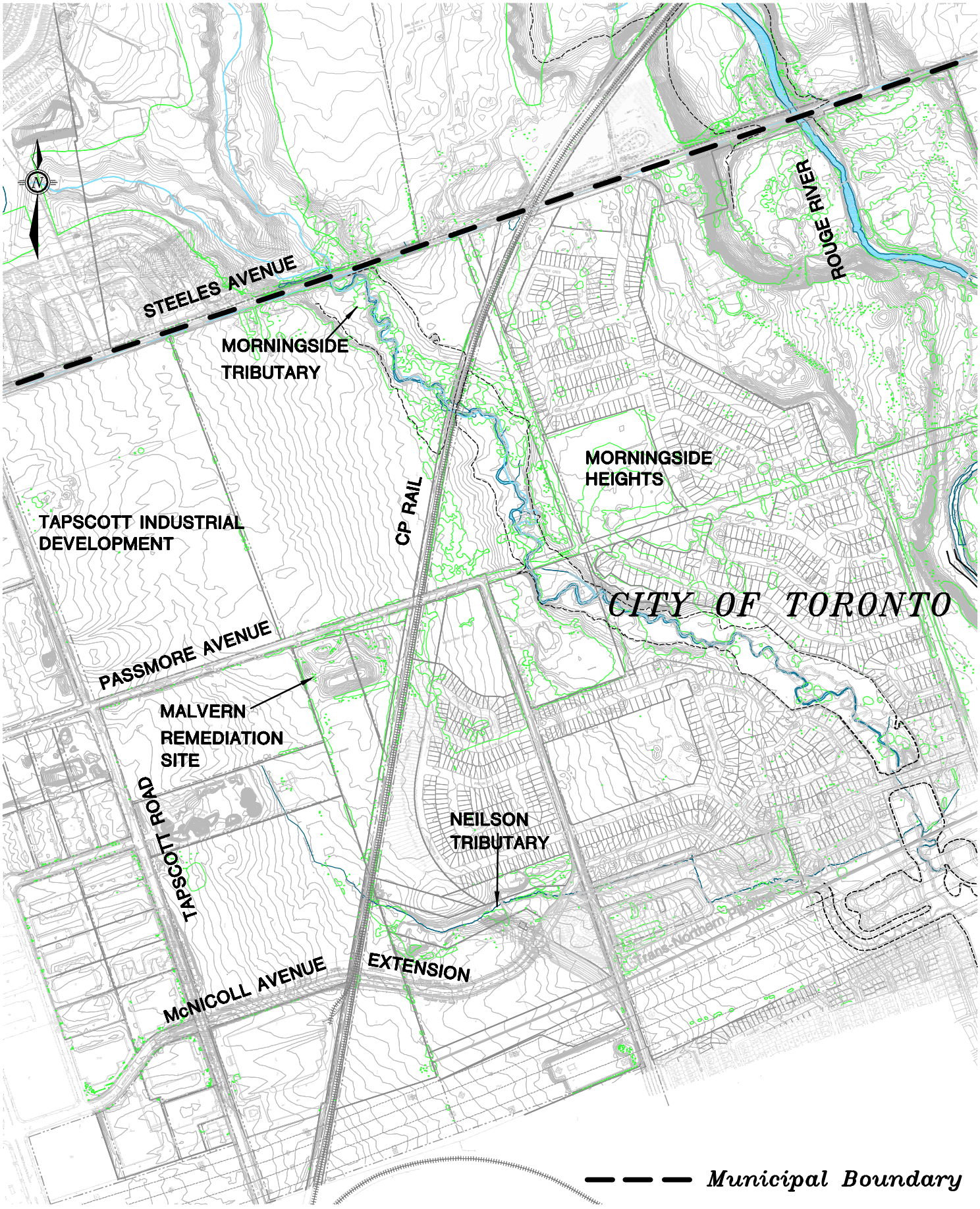


TRANSPORTATION IMPROVEMENTS DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK (formerly Transportation Improvements in the Markham Bypass Corridor South of Highway 407) ENVIRONMENTAL ASSESSMENT	VILLAGE OF FAIRTREE EAST (ORIGINAL EAR 2005)	EXHIBIT 4-3a

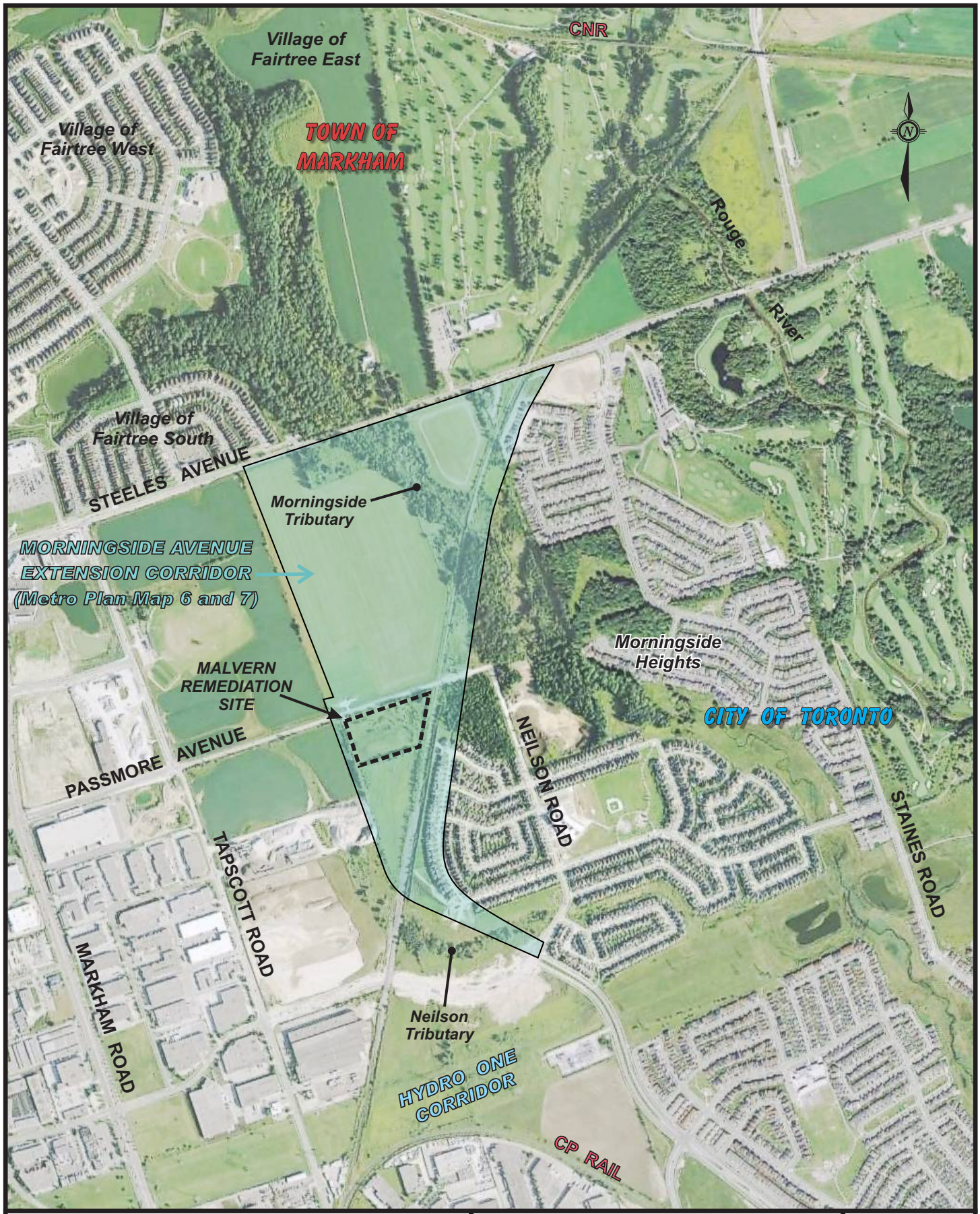
TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
(formerly Transportation Improvements
in the Markham Bypass Corridor South of Highway 407)
ENVIRONMENTAL ASSESSMENT

VILLAGE OF FAIRTREE
(2009 Aerial)

EXHIBIT
4-3b



TRANSPORTATION IMPROVEMENTS DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK (formerly Transportation Improvements in the Markham Bypass Corridor South of Highway 407) ENVIRONMENTAL ASSESSMENT	MORNINGSIDE HEIGHTS (ORIGINAL EAR 2005)	EXHIBIT 4-4a



TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
(formerly Transportation Improvements
in the Markham Bypass Corridor South of Highway 407)
ENVIRONMENTAL ASSESSMENT

MORNINGSIDE HEIGHTS
DEVELOPMENT PLAN
(2009 Aerial)

EXHIBIT
4-4b

4.1.1.3 Parkview Golf Course

The Parkview Golf Course is located immediately north of Steeles Avenue and west of the CP Rail corridor. The Golf Course has 36 holes, which are divided into two 18 hole Golf Courses. Sixteen of the holes are located south of the CN Rail Corridor and 20 are located north of the CN Rail Corridor. The lands to the north of the CN Rail Corridor are leased by the Golf Course from the Ontario Realty Corporation (Hydro One Corridor).

A portion of the lands in the Parkview Golf Course are designated as residential in the Markham Official Plan.

4.1.1.4 Employment Area

The vacant lands immediately east of Tapscott Road within the Tapscott Employment District are designated for employment uses in the City of Toronto Official Plan. This area is also part of the Morningside Avenue Extension corridor that was designated by the 1998 OMB Hearing as a potential alignment corridor for the extension of Morningside Avenue to Steeles Avenue and potentially beyond to connect with the extension of the Donald Cousens Parkway.

Since EAR 2005, there are now several active development applications in this area. At 1251 Tapscott Road just north of McNicoll Avenue, a 47,000 m^2 warehouse complex has recently been approved. Land has been protected at the northeast corner of the site for the Morningside Avenue Extension, but was not acquired under the Site Plan. At 1395 Tapscott Road, fronting on Steeles Avenue, a re-zoning application has been submitted to permit 25,000 m^2 of large format commercial uses on the northern part of the site. A golf driving range has also been proposed at this address but may not be proceeding. The land owner has agreed to convey an 18 m road allowance along the east property line, to accommodate half of the Morningside Avenue Extension right-of-way. The abutting landowner to the east is also agreeable to a similar dedication, but there is no active development application on those lands at this time.

4.1.1.5 Bob Hunter Memorial Park

Since the submission of EAR 2005, the boundary of Rouge Park has been expanded to include the 500 acre Bob Hunter Memorial Park. The park is located east of the CPR line and extends to the north towards Highway 407 and south towards the CN rail line. To the east the park is bounded by the existing Rouge Park that extends to Lake Ontario in the South and north to beyond 16th Avenue.

Bob Hunter Memorial Park was dedicated in August of 2006 as a memorial to the late Bob Hunter, one of the founders of Greenpeace. A management plan has been written for the park and work has commenced and will continue over the next few years with efforts from the Rouge Park, TRCA and others to restore forest cover, create trails and picnic areas and promote stewardship programs.

4.2 Cultural Environment

There has been no change in the cultural environment from EAR 2005.

4.2.1 Archaeological Assessment

Archaeological Services Inc. (ASI) was retained to carry out a Stage 1 archaeological assessment of the Study Area.

Three sources of information were consulted in order to prepare an inventory of archaeological resources in the general vicinity of the Study Area. The three sources were: Ministry of Culture (Ontario, now Ministry of Tourism and Culture), published and unpublished documentary sources, and the files of ASI.

There were no known archaeological sites identified within the Study Area. Nine archaeological sites have been registered in close proximity to the Study Area: the Fairty Ossuary (AlGt-3), the Robb site (AlGt-4), the Faraday site (AlGt-18), the New site (AlGt-36), the Drudge site (AlGt-37), the Sim Reesor site (AlGt-38), the Reading site (AlGt-39), the Garnett site (AlGt-176), and the Morningside Tributary site (AlGt-260).

In addition to the 9 sites noted above, 8 other sites are located within approximately 250 metres of the Study Area limits.

The entire Study Area is considered to have a high potential for the recovery of pre-contact archaeological remains, depending on the degree of previous land disturbance.

The Stage 1 Archaeological Assessment Report is included as Appendix G.

4.2.2 Built Heritage Features

A field survey was carried out within the Study Area to identify the Built Heritage Features and Cultural Landscapes. Table 4-1 lists the Built Heritage Features (BHF) and Table 4-2 lists the Cultural Landscapes Unit (CLU) identified.

Table 4-1: Cultural Landscape Units

No.	Feature Type	Feature Category	Location/Description
1.	CLU	Roads cape	Reesor Road, between Highway 407 and Steeles Avenue east. Documented between Hwy. 7 and 14th Ave. as a cultural landscape for Highway 407 East Partial extension (2001) as requested by MCL.
2.	CLU	Farm Complex	No. 8119 Reesor Road, east side. Listed on *Markham Inventory of Heritage Buildings*, evaluated as Group 2 (of significance and worthy of preservation).
3.	CLU	Farm Complex	No. 8042 Reesor Road. Listed on *Markham Inventory of Heritage Buildings*, evaluated as Group 2 (of significance and worthy of preservation).
4.	CLU	Farm Complex	No. 7960 Reesor Road. Listed on *Markham Inventory of Heritage Buildings*.
5.	CLU	Farm Complex	No. 7939 Reesor Road. Listed on *Markham Inventory of Heritage Buildings*.
6.	CLU	Railscape	CN, this line crosses Reesor Road, 14th Avenue and Ninth Line above Steeles Avenue east, and Steeles Avenue east.
7.	CLU	Farm Complex	No. 7833 Reesor Road. Listed on *Markham Inventory of Heritage Buildings* and within the proposed Cedar Grove HCD boundaries.
8.	CLU	Farm Complex	No. 7784 Reesor Road. Listed on *Markham Inventory of Heritage Buildings* and within the proposed Cedar Grove HCD boundaries.

No.	Feature Type	Feature Category	Location/Description
9.	CLU	Historical Settlement/ Proposed Heritage Conservation District	Historical settlement of Cedar Grove, proposed HCD boundaries from just north of 14th Ave. south to Steeles Avenue east. It includes farm complexes and individual residences, Lapp's Cider mill (designated Part IV, *OHA*), the Rouge River water crossing, Rouge Valley Mennonite Church and cemetery, Cedarena, Cedar Grove Park at Steeles Avenue east. Numerous properties are listed on *Markham Inventory of Heritage Buildings*.
10.	CLU	Waterscape(s)	Rouge River at Reesor Road (within the proposed Cedar Grove HCD boundaries) and tributaries that cross 14th Ave. within Study Area.
11.	CLU	Farm Complex	No. 7551 Reesor Road, main complex out of Study Area but agricultural lands within and within the proposed Cedar Grove HCD boundaries.
12.	CLU	Roadscape	14th Avenue from just east of intersection with Reesor Road west to eastern limits of Box Grove.
13.	CLU	Historical Settlement/ Proposed Heritage Conservation District	Box Grove, crossroads of Ninth Line and 14th Avenue including residences, water crossing, church and cemeteries.
14.	CLU	Farm Complex	7447 and 7449 Ninth Line, 1Ninth century, two farmhouses, 1 stone, 1 frame, large gambrel barn. Listed on *Markham Inventory of Heritage Buildings*
15.	CLU	Farm Complex	No. 6741 Steeles Avenue east, south side, City of Toronto (Scarborough). 1Ninth century farmhouse and barn with outbuilding. Designated under Part IV *OHA*. Included in *Rouge Valley Park Project Inventory* (September 1991).
16.	CLU	Farm Complex	No. 6742 Steeles Avenue east, north side, large farmhouse with 1Ninth century and 20th century sections, large barn complex. Listed on *Markham Inventory of Heritage Buildings*.
17.	CLU	Waterscape	Little Rouge River at crossing of Steeles Avenue east, west of Ninth Line and within Study Area.
18.	CLU	Farm Complex	No. 6545 Steeles Avenue east, south side, City of Toronto (Scarborough), Hamill House 1Ninth century, farmhouse, barn, silo and outbuilding. Included in *Rouge Valley Park Project Inventory* (September 1991). Listed on City of Toronto's Inventory of Heritage Properties.
19.	CLU	Farm Complex	Nos. 6470 and 6472 Steeles Avenue east, north side. Both addresses listed on *Markham Inventory of Heritage Buildings*. Two farmhouse, large barn complex and outbuildings.
20.	CLU	Farm Complex	No. 6461 Steeles Avenue east, City of Toronto (Scarborough), Menno-Reesor House early 20th C. farmhouse, barn. Included in *Rouge Valley Park Project Inventory* (September 1991). Listed on City of Toronto's Inventory of Heritage Properties.
21.	CLU	Farm Complex	No. 6350 Steeles Avenue east, farmhouse, barn and outbuilding. Listed on *Markham Inventory of Heritage Buildings*.
22.	CLU	Roadscape	Passmore Avenue, east from Tapscott to south turn in road. Rural gravel road with grassy shoulders and ditches, hedgerows and treeline. Passmore Avenue has been recently upgraded to better serve the Morningside Heights Community. The road right-of-way is open but no longer travelled, continues east of Neilson Road to the Pickering Townline and a section will become a walkway within Morningside Heights. It is named for Frederick F. Passmore, an early surveyor. Passmore Avenue will eventually be closed at the CP Rail crossing.
23.	CLU	Agricultural land	Agricultural land and remnant agricultural land within the Study Area.

Table 4-2: Built Heritage features

No.	Feature Type	Feature Category	Location/Description
1.	BHF	Residence	No. 7885 Reesor Road, east side, listed on *Markham Inventory of Heritage Buildings* and within the proposed Cedar Grove HCD boundaries.
2	BHF	Residence	No. 7765 Reesor Road, northeast corner of 14th Avenue and Reesor Road. Listed on *Markham Inventory of Heritage* Buildings and within the proposed Cedar Grove HCD boundaries.
3.	BHF	Residence	No. 7273 14th Avenue. Set at a distance from the road, partially visible. Listed on Markham Inventory of Heritage Buildings and within the proposed Cedar Grove HCD boundaries.
4.	BHF	Residence	No. 7277 14th Avenue. Set at a distance from the road, partially visible. Listed on Markham Inventory of Heritage Buildings and within the proposed Cedar Grove HCD boundaries.
5.	BHF	Residence	No. 7166 14th Avenue, 1Ninth century residence with an associated poured concrete silo behind. Listed on Markham Inventory of Heritage Buildings.
6.	BHF	Residence	No. 7124 14th Avenue, dichromatic brick house, 1Ninth century. Listed on Markham Inventory of Heritage Buildings.
7.	BHF	Residence	No. 7181 Reesor Road, east side. Listed on Markham Inventory of Heritage Buildings and within the proposed Cedar Grove HCD boundaries.
8.	BHF	Residence	No. 7218 Reesor Road, west side, Ontario government owned property set at a distance from road, visible from Steeles Avenue east in late Fall. Winter. Double set of stone gateposts on Reesor Road. And Within the proposed Cedar Grove HCD boundaries.
9.	BHF	Residence	No. 7107 Reesor Road, east side, within the proposed Cedar Grove HCD boundaries.
10.	BHF	Railway Viaduct	CN Viaduct over Rouge River, west of Ninth Line, north of Steeles Avenue, Town of Markham.
11.	BHF	Railroad Bridge	CN, construction date on bridge 1963. Included in Rouge Valley Park Project Inventory (September 1991).
12.	BHF	Residence	No. 6351 Steeles Avenue east, south side, Demond – Ingleton House 1844 to 1890 residence. City of Toronto (Scarborough). Listed on the City of Toronto's Inventory of Heritage Properties.
13.	BHF	Silo Ruin	Tapscott Road, east side. City of Toronto (Scarborough).
14.	BHF	Residence	No. 1051 and 1021 Tapscott Road, Scarborough Historical Society plaque, stone house built 1861 by James Weir. Designated Part IV, OHA. Listed on the City of Toronto's Inventory of Heritage Properties.

The Rouge River watershed is the known location of the east branch of the Toronto carrying route (also known as the Carrying Place Trail) to Lake Simcoe. This has been acknowledged by the National Historic Sites and Monuments Board as a national historic event.

4.3 Natural Environment

The predominant natural environmental features within the Study Area are associated with aquatic systems, which include the Rouge River, Little Rouge Creek, Tributary B of the Little Rouge Creek, Morningside Tributary, and to a lesser extent, the Neilson Tributary, Tributary A of the Little Rouge Creek and the Ninth Line Tributary.

In broader terms, the Study Area is located at the northern limits of the Carolinian Life Zone, near the transition into the Great Lakes – St. Lawrence Lowlands Life Zone. The Carolinian Life Zone is predominantly deciduous forest, while the Great Lakes – St. Lawrence Lowlands Life Zone is a very broad transitional area that includes elements of the deciduous forest to the south and conifer-dominant boreal forest to the north. The southern limit of the Oak Ridges Moraine is approximately 5 to 6 km to the north.

Natural heritage features are discussed in greater detail in Appendix C (the memo prepared for the EA Amendment focusing on updates resulting from the 2009-2011 scoped field work and analyses). There has been little change in the natural environment features in the Study Area since the EAR 2005. As a result, the purpose of the scoped field work completed in 2009-2011 was to gather more detailed data at specific locations to ensure that water crossing alternatives could be developed to a sufficient level of design detail (including detailed effects and specific mitigation strategies) for detailed consultation with TRCA, MNR and Rouge Park.

4.3.1 Background Information

There is a significant amount of background information and relevant natural environment studies applicable to the Study Area. All reviewed documents are listed in the References section of Appendix C including a brief description of the key studies. The key studies described include:

- Environmental Policy Review and Consolidation Study (Town of Markham 2007)
- An update of the Rouge Park North Management Plan was completed in 2007 which included Amendment No.140 to the Town of Markham Official Plan, for the addition of Bob Hunter Memorial Park (TRCA 2009);
- Terrestrial Natural Heritage System Strategy (TRCA 2007)
- Region of York Official Plan (adopted Dec 2009).
- Town of Markham Official Plan (Official Consolidation 2005).
- Rouge Park Management Plan (MNR 1994)
- Rouge North Management Plan (Rouge Park Alliance 2001)
- Rouge Park North Implementation Manual (Rouge Park Alliance *2003*)
- Rouge River Fisheries Management Plan Part I: Management Strategy (TRCA/MNR 1991)
- Rouge River Fisheries Management Plan Part II: Assessment and Rehabilitation (TRCA/MNR 1992)

- Town of Markham Natural Features Study – Phase 1 Background Report (Town of Markham 1992)
- Town of Markham Natural Features Study – Phase 1 Background Report Appendices (Town of Markham 1992)
- Morningside Tributary Subwatershed Study – Phase II Report Subwatershed Analysis (R.E. Winter & Associates Ltd. January 1997)
- Environmental Management Plan for Box Grove Secondary Plan Town of Markham (Cosburn Patterson Mather Limited et al. February 2000).

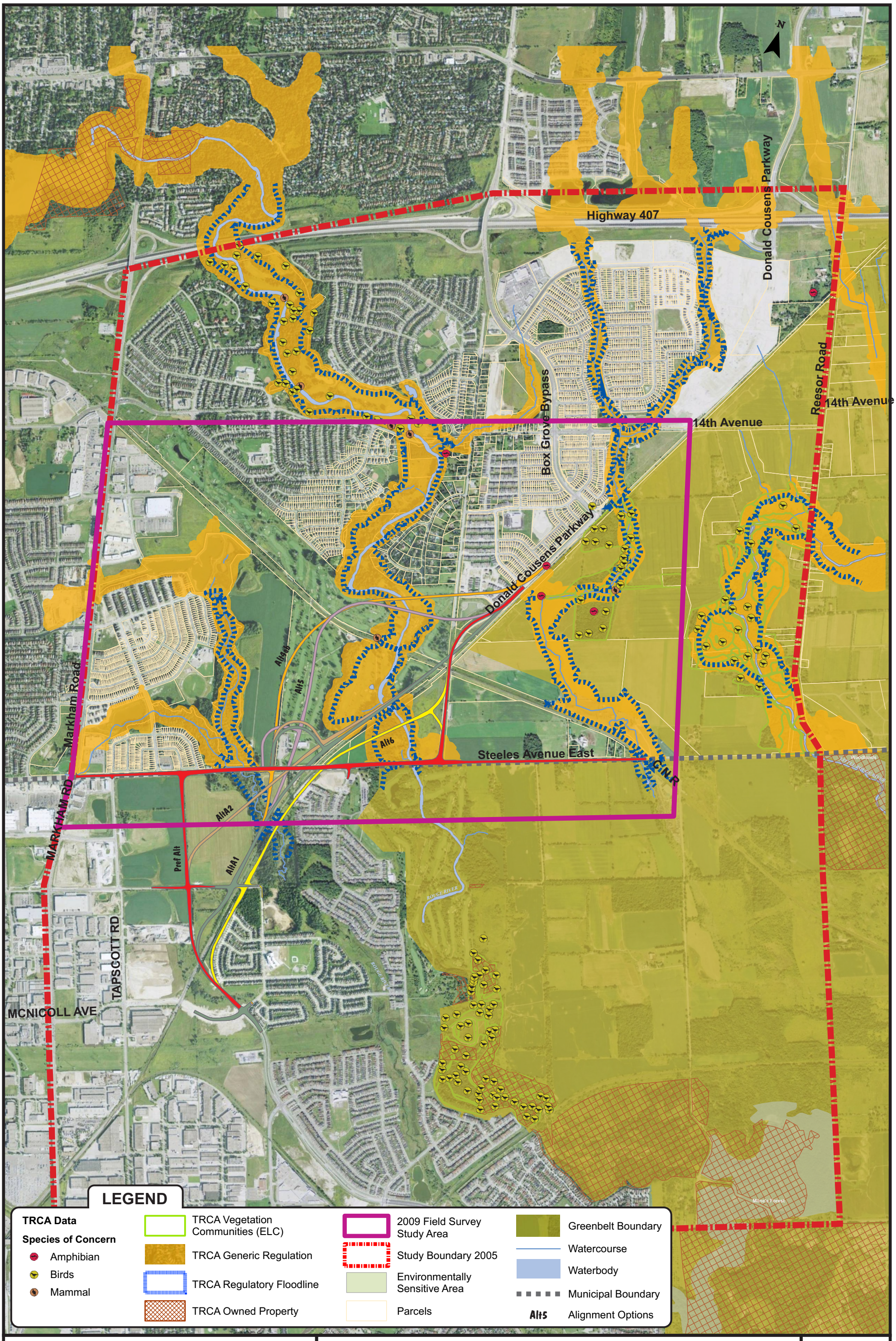
4.3.2 Field Studies

The field program for this project was very comprehensive, and included multi-season, multi-year surveys of flora and fauna, including aquatic habitat and fisheries characterization, vegetation and habitat classification, breeding bird surveys, amphibian calling surveys and general wildlife surveys. The field program was carried out from 2000 to 2004 (including previous studies). Field surveys completed as part of previous studies in the area were used to identify knowledge gaps and information to be updated.

In 2009, 2010, and 2011 additional field surveys were conducted to verify and update findings from the 2000 to 2004 surveys and to provide additional information for detailed development of alternative methods. The 2009-2011 surveys were scoped primarily to the forested areas, riparian habitat, aquatic habitat and valleylands in the vicinity of the Steeles Avenue crossings at Rouge River and Morningside Tributary, with some work at the proposed Neilson Tributary crossing. The 2009-2011 field work in the scoped areas consisted of: verification of vegetation and habitat classification; refining of vegetation mapping in areas of potential impact, breeding bird surveys; calling amphibian surveys; updates to floral and faunal inventories; and an updated assessment and mapping of aquatic habitat of the Rouge River and Morningside Tributary crossings in the vicinity of Steeles Avenue. (See Exhibit 4-5a).

Additional surveys were completed in December 2010 and February 2011 to review potential channel realignments at the Rouge River, Morningside Tributary and the Neilson Tributary and to assess potential impacts to natural heritage features in the vicinity of proposed works.

Field surveys were conducted on ten (10) separate dates between May 22 and August 5, 2009 and on December 2, 2010 and February 28, 2011. Field surveys consisted of three principle types: aquatic resources, vegetation and wildlife.



TRANSPORTATION IMPROVEMENTS
IN THE DONALD COUSENS PARKWAY / MORNINGSIDE AVENUE
LINK CORRIDOR (formerly Markham Bypass Corridor)
SOUTH OF HIGHWAY 407
ENVIRONMENTAL ASSESSMENT

2009 FIELD SURVEYS

EXHIBIT
4-5a

4.3.3 Geology and Physiography

Information on the geological and physiographic character of the study was obtained from published maps and reports, including the Soil Survey of York County (Hoffman and Richards, 1955), The Physiography of Southern Ontario (Chapman and Putman, 1984) and the Surficial Geology of Southern Ontario (Data set 128) obtained from the Ontario Geological Survey, Ministry of Northern Development and Mines (2003). There has been no change to the Geology and Physiography of the Study Area since EAR 2005.

4.3.3.1 Bedrock

The bedrock of York County is Upper Ordovician in origin. It includes the rock formations of Trenton, Billings, Dundas and Meaford, which are composed of limestone and/or shale (Chapman and Putnam 1984, Hoffman and Richards 1955). Average depth to bedrock is generally greater than 40 m below ground surface (bgs).

4.3.3.2 Surficial Geology

Surficial geology within the Donald Cousens Parkway primary Study Area is characterized predominantly by glacial calcareous till on the tablelands (including along Tributaries A and B) with sand/gravel deposits in the Rouge River and Little Rouge Creek Valleys. Additional clay/silt and sand deposits are found adjacent to Little Rouge Creek and the Rouge River. Surficial materials along Morningside Tributary are predominantly till with some clay/silt and organic deposits present (Ontario Geological Survey, Ministry of Northern Development and Mines 2003). Surficial geology is mapped on Exhibit 4-5.

4.3.3.3 Physiography

Within the Study Area, the predominant glacial feature is till plain, with associated level to gently undulating terrain. There is moderate to steep relief associated with the major valleys (Rouge River, Little Rouge Creek and Morningside Tributary). The only other notable physiographic feature on the landscape within the Study Area is a minor drumlin located in the extreme east side of the Study Area to the west of Little Rouge Creek (Hoffman and Richards 1955).

4.3.3.4 Environmental Issues to Consider

The predominant issues to consider with respect to physiography and geology are depth to bedrock and effect on major physiographic features (including groundwater discharge/recharge, slope stability etc.). Bedrock is at depth throughout the Study Area and does not pose a constraint to the proposed undertaking. Within the Study Area, topography is variable and includes relatively level areas, gently rolling lands and moderate to steep valley slopes. Areas with steep slopes that may be at a higher risk of erosion include the valleys of the Rouge River and Little Rouge Creek.

TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
(formerly Transportation Improvements
in the Markham Bypass Corridor South of Highway 407)
ENVIRONMENTAL ASSESSMENT

SURFICIAL GEOLOGY

EXHIBIT
4-5

4.3.4 Soils

The soils within the Study Area are predominantly Milliken loam and Woburn loam, with some Bookton sandy loam, a small amount of Lyons loam, and Bottom Land (i.e., alluvials), the latter along Morningside Tributary, Rouge River, Tributaries A and B, and Little Rouge Creek. Soil types are shown in Exhibit 4-6.

The Woburn, Milliken and Bookton series soil types are classified as Grey-Brown Podzolic soils. Both the Milliken and Woburn soils have developed on medium textured shale and limestone till. Milliken loam is imperfectly drained with little surface stoniness and occurs on gently to moderately sloping topography. It covers much of the Study Area and has little potential for erosion except where moderate slopes cause rapid runoff. The Woburn loam soil type is well drained with little surface stoniness, occurs on smooth to steeply sloping topography and can be susceptible to sheet erosion. It is primarily associated with the Rouge River, Tributary B and Little Rouge Creek. A small amount of poorly drained Lyons loam is associated with the Little Rouge Creek. Lyons loam is classified as a dark grey Gleisolic soil, has little surface stoniness, occurs on very gently sloping topography and is not susceptible to erosion. Bookton sandy loam, primarily associated with the Rouge River in the central part of the Study Area, has developed on sandy outwash materials underlain by clay till. It is well drained, stone free and occurs on gently sloping topography. Bottom Land / alluvials are the immature soils (with limited horizon development) found along stream corridors, and are subject to flooding. Bottom Land soil types vary in their topography and drainage (although it is usually poor), but are stone free and occur on recently deposited alluvium materials.

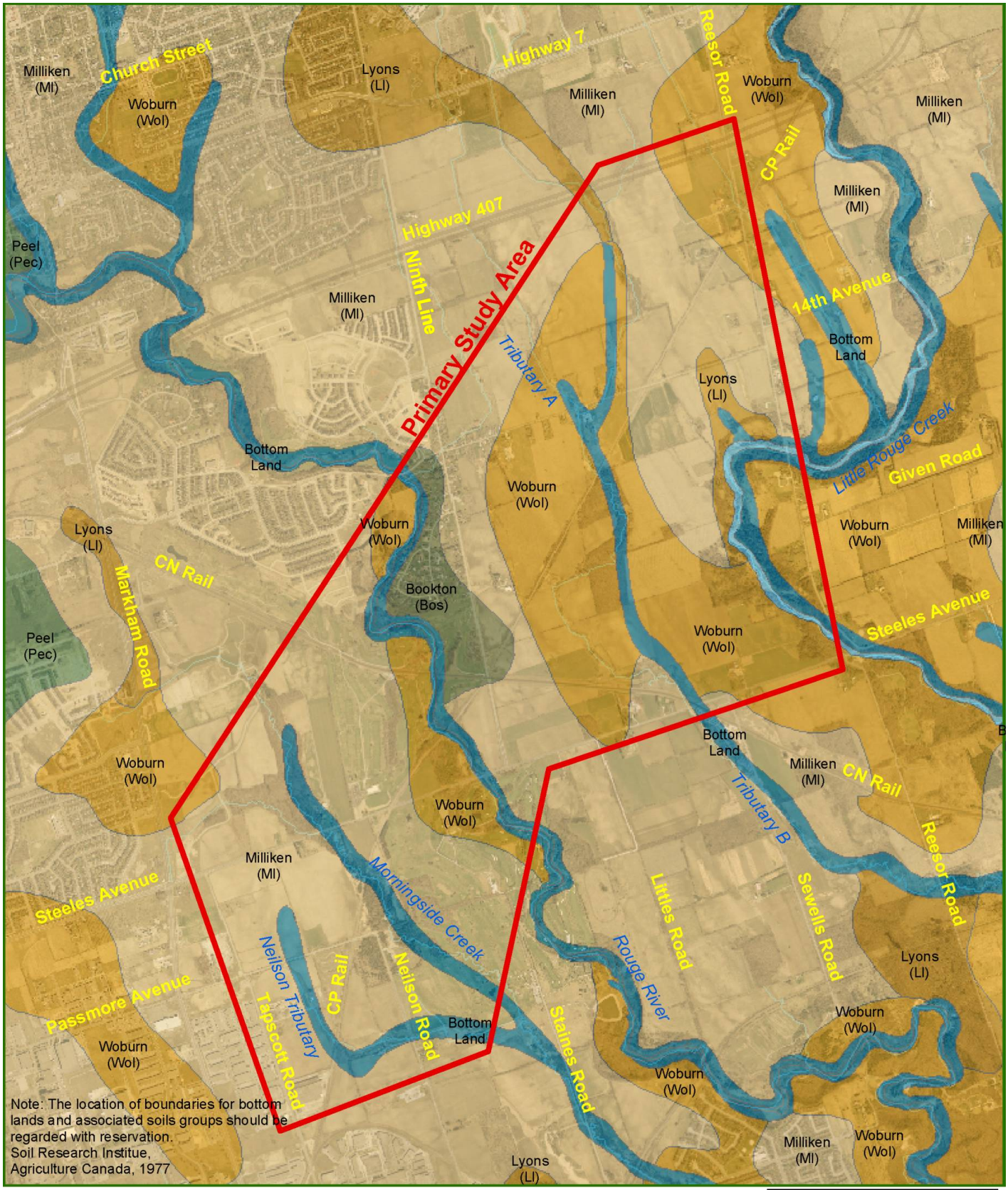
4.3.4.1 Environmental Issues to Consider

The primary issue to consider with respect to soils is the potential for erosion, and associated sedimentation of watercourses or other natural features. The majority of the Study Area has relatively gentle topographic relief and soil erosion is not a significant concern. Where topography is moderate to steep, such as along the Rouge River and Little Rouge Creek valleylands slopes, the predominant soil types (i.e., Milliken and Woburn loams) can be susceptible to erosion.

4.3.5 Natural Environmental Designations

The following sources were reviewed for information on the natural environmental designations in the Study Area:

- Town of Markham Natural Features Study (Town of Markham 1992);
- Natural Heritage Information Centre – website (2005), updated search of the Biodiversity Explorer website in 2009-2010;
- Rouge Park and Rouge North – reports / website (MNR 1994, Rouge North Alliance 2001, Rouge Park Alliance 2003)
- An update of the Rouge Park North Management Plan was completed in 2007 which included *Amendment No.140 to the Town of Markham Official Plan,* for the addition of Bob Hunter Memorial Park (TRCA 2009);
- Greenbelt Plan – website (MMAH 2005);



TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
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ENVIRONMENTAL ASSESSMENT

SOIL TYPES

EXHIBIT
4-6

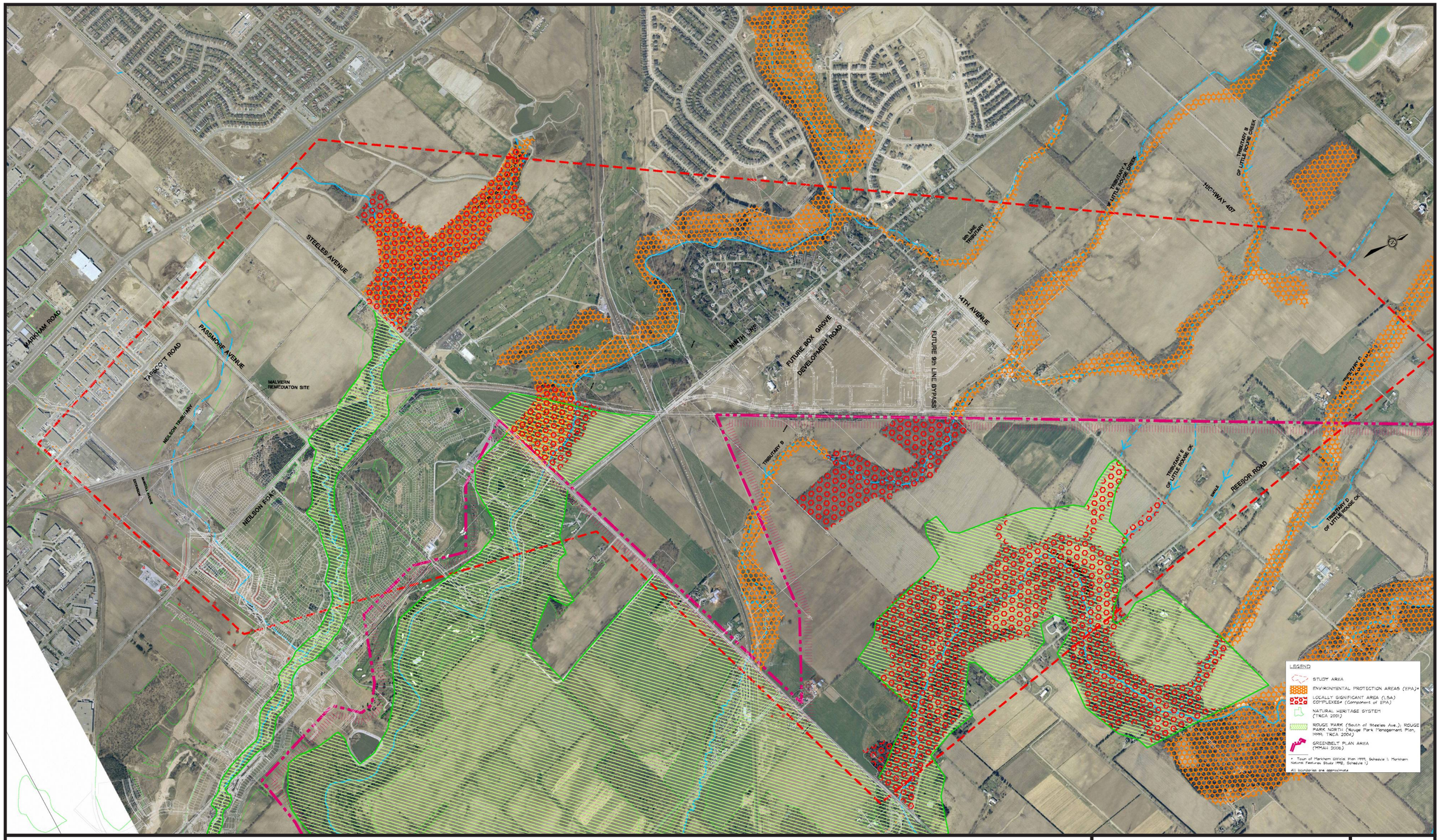
- Terrestrial Natural Heritage System Strategy (TRCA 2007)
- Environmental Policy Review and Consolidation Study (Town of Markham 2007)
- York Region Official Plan (adopted December 2009)
- Town of Markham Official Plan (Official Consolidation 2005); and
- City of Toronto Natural Heritage Strategy – Final Report (part of the Toronto Official Plan [City of Toronto and Toronto and Region Conservation Authority 2001])

As part of the Study, designated environmental features were considered and are shown on Exhibit 4-7. The following key points provide an overview of environmental designations within the Study Area:

- No *Provincially Significant Wetlands* (PSWs) are present;
- No provincially or regionally significant *Areas of Natural and Scientific Interest* (ANSIs) are present in the Study Area. The Rouge River valley downstream of the Study Area is designated as a Provincially Significant Life Science ANSI**.**
- A number of natural environmental features within the Study Area, predominantly aquatic system components and associated woodlands, are classified as *Hazard Lands* (HL), *Natural Heritage System* ([NHS] TRCA 2001), and *Environmental*
- *Protection Areas* (EPAs) including *Locally Significant Areas* ([EPA-LSAs] Town of Markham 1999):

  - Little Rouge Creek (HL, EPA-LSA);
  - Tributaries A, B, C and D that discharge into the Little Rouge Creek (HL, EPA & partly EPA-LSA);
  - Morningside Tributary (HL, EPA-LSA);
  - Box Grove Forest (EPA-LSA, Regionally Significant Forest);
  - Further downstream beyond the Study Area, the Rouge River Valley has been identified as one of 36 critical unprotected areas in Carolinian Canada.

Since completion of the EAR 2005, there has been one change to local, regional or provincial natural environmental designations within the scoped Study Area (i.e., additions / deletions, changes to boundaries). In 2007, the Bob Hunter Memorial Park was added to Rouge Park. Two documents which include natural environmental features have been updated since the 2005 submission: *the Terrestrial Natural Heritage System Strategy (TRCA 2007) and Environmental Policy Review and Consolidation Study (Markham 2009).*



TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
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ENVIRONMENTAL ASSESSMENT

NATURAL ENVIRONMENTAL DESIGNATIONS

EXHIBIT
4-7

4.3.5.1 Special Spaces

In addition to the abovementioned designated features, 'special spaces' within the Study Area have also been considered as part of the Study. Special Spaces are considered to be areas that have special or unique value by resource agencies, municipalities, government and/or the public. The Rouge Park (generally areas south of Steeles Avenue and along the Little Rouge Creek corridor north of Steeles Avenue) and Rouge Park North (generally north of Steeles Avenue) are considered to be Special Spaces. Portions of the Morningside Tributary valley, the Rouge River valley and the Little Rouge Creek valley are included within the Rouge Park. The Rouge Park (North) boundary extends north along the Little Rouge Creek to approximately Major Mackenzie Drive. While boundaries for Rouge Park have been established, boundaries for Rouge Park North are still conceptual in some locations and subject to implementation following the Rouge North Implementation Manual (Rouge Park Alliance, 2003). A major objective for the Little Rouge Creek has been identified as establishing a terrestrial corridor with interior forest conditions.

4.3.5.2 The Greenbelt Plan

The Greenbelt Plan was established under Section 2 of the Greenbelt Act (2005) to take effect on December 16, 2004. The intent is to protect a broad band of countryside in the Golden Horseshoe Area, including agricultural and environmentally sensitive land. The Greenbelt Area consists of lands subject to the Oak Ridges Moraine Conservation Plan, the Parkway Belt West Plan and the Niagara Escarpment Plan and other lands designated as Protected Countryside by the Greenbelt Plan.

The requirements of the Greenbelt Plan vary geographically, depending upon which other Plans they are subject to. Lands within the Protected Countryside are designated as Settlement Areas, Natural System, or Agricultural System. Different land use policies are associated with each designation. Infrastructure is permitted within the Protected Countryside as long as it meets one of two objectives outlined in Section 4.2.1 of the Greenbelt Plan (2005), and is subject to the polices in that Section. These policies are fully described in the Greenbelt Plan (Ministry of Municipal Affairs and Housing, 2005).

The portion of the Study Area located within the Greenbelt Plan area, is shown on the Greenbelt Plan Area map 62, included in Appendix C. This area is generally located east of the Town of Markham, east of the CPR line and north of the CN line (north of Steeles Ave.), and follows the west limits of the Rouge River valley south of Steeles Ave. in the City of Toronto. The Greenbelt Area that falls within the study boundaries is designated as Protected Countryside within the "Natural Heritage System" category. In addition, Morningside Tributary valley south of Steeles Avenue and the Rouge River valley north of Steeles Avenue are identified as "River Valley Connections" but are not within the Greenbelt Area. It is noted that the detailed mapping of the Greenbelt Plan Area provided by the Ministry of Municipal Affairs and Housing (2005) on their website and used for mapping the Greenbelt Plan area included in Appendix C, is for illustrative purposes only and as such should viewed as only an approximation of the Greenbelt Plan boundaries.

The following paragraphs regarding the Rouge River watershed, are excerpted from Section 3.2.6 of the Greenbelt Plan:

"The Rouge River Watershed is of particular significance within the Protected Countryside because of the extensive public investment in establishing the Rouge Park and the efforts of all levels of government in preparing the Rouge North Management Plan. The Rouge Watershed and the Little Rouge River serve as a vital ecological corridor linking the environmental systems of Lake Ontario to the Oak Ridges Moraine in this area of the Greater Toronto Area.

This plan identifies a 600 m wide corridor for the Little Rouge River as the main ecological corridor, between Lake Ontario and the southerly boundary of Oak Ridges Moraine Area, as well as several other Rouge River tributaries, in recognition of the longstanding commitment to establishing the Rouge Park.

Land use planning and resource management within those portions of the Rouge River watershed within the Protected Countryside shall comply with the provisions of both this Plan and the Rouge North Management Plan. In the case of a conflict between this Plan and the Rouge North Management Plan, the more restrictive policies apply. For those lands within the watershed north of Steeles Avenue, outside of the Protected Countryside, the Rouge North Management Plan and the Rouge North Implementation Manual, together with any municipal or conservation authority plans or initiatives which build on and/or support the Rouge North Management Plan, should be considered as the guiding land planning and resource management documents. For those lands within the Rouge Park south of Steeles Avenue, outside of the Protected Countryside, the Rouge Park Plan together with any municipal or conservation authority plans or initiatives which build on and/or support the Rouge Park Plan should be considered as the guiding land use planning and resource management documents."

There have been no changes to the Greenbelt Plan that would affect the Study Area since EAR 2005.

4.3.5.3 Environmental Issues to Consider

Natural environment designations were considered at a landscape-level scale. As noted above, and further discussed in the following sections, most designated features are associated with the valleys, with additional Rouge Park and Greenbelt Plan designations generally on lands south of Steeles Avenue and/or east of the Rouge River.

4.3.6 Groundwater and Hydrogeology

The review of groundwater and hydrogeology in the Study Area was completed using background information (including information from recently installed monitoring wells along the Morningside Tributary), supplemented by field observations of groundwater discharge. Background sources reviewed include: Ministry of the Environment (MOE) water well records; geology maps; and relevant secondary plans / environmental assessment studies and management plans. A complete list of References is provided in Appendix C. Since completion of the EAR 2005, there have not been any changes to the groundwater and hydrogeology in the Study Area.

4.3.6.1 Overview of Well Record Summary

The most important groundwater resource zones in the Study Area are generally associated with the three largest watercourses: Morningside Tributary, Rouge River and

Little Rouge Creek. These are areas of groundwater discharge, either identified (i.e., based on seepage observations) or inferred, based on depth to groundwater in well records. Approximate locations of groundwater seepage observed in the field or identified in background reports are shown on Exhibit 4-8.

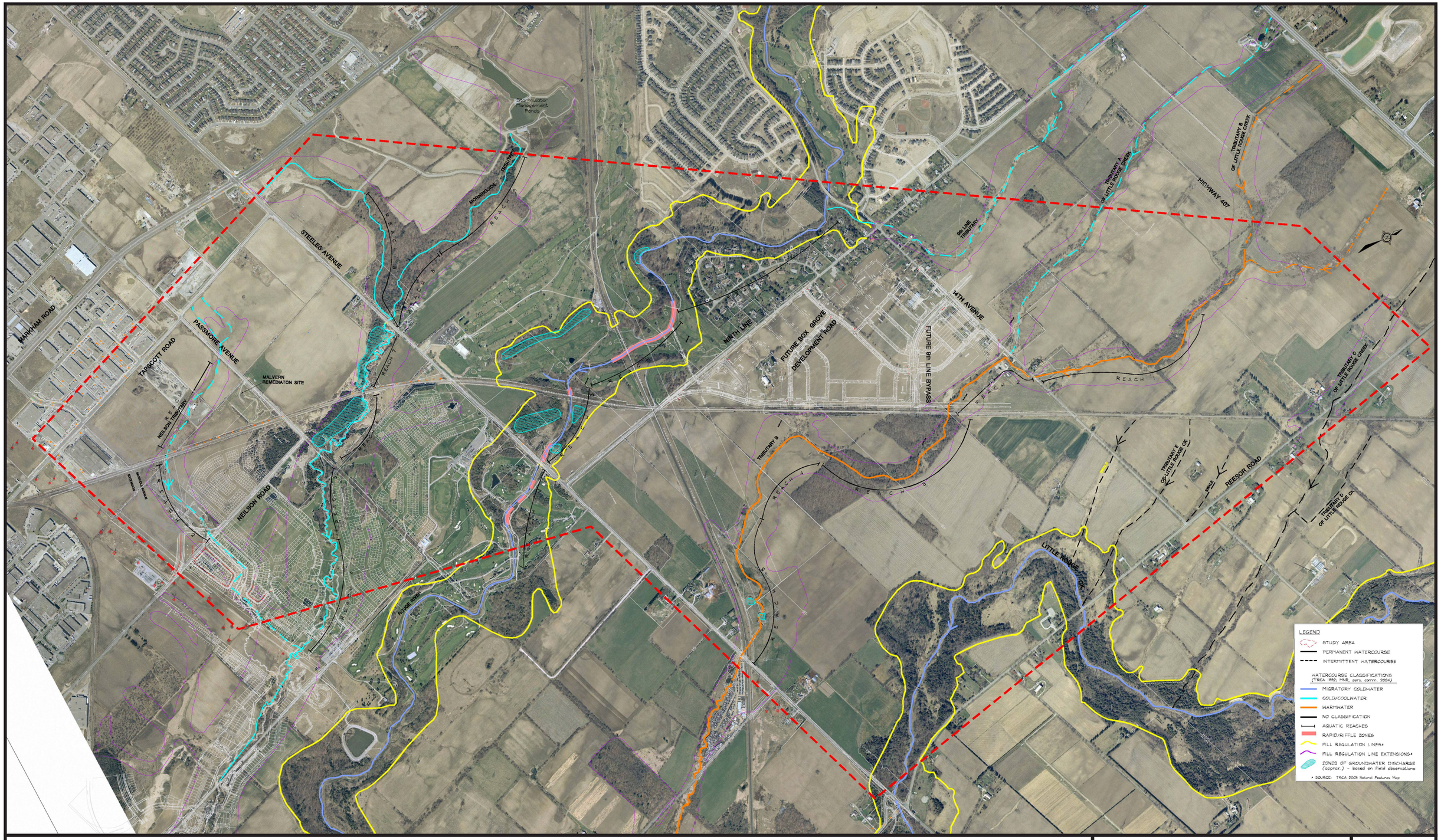
Locations of water wells and a tabular summary of the well records reviewed are included in Appendix C, with key points summarized below:

- The majority of the wells are located in the Box Grove Community, near 14th Avenue and Ninth Line, with others scattered on farmsteads throughout the Study Area;
- All wells are installed at ground elevations ranging from 150 m above mean sea level (amsl) near the south portion of the Study Area to 179 m amsl near the north portion of the Study Area;
- All wells are installed between 11 m below ground surface (bgs) and 80 m bgs;
- Groundwater elevations range from 89 m amsl in the south portion of the Study Area to 163 m amsl in the north portion of the Study Area (i.e., sloping southeast towards Lake Ontario);
- Bedrock (Whitby shale) is encountered in 15 wells at depths between 44 m bgs and 64 m bgs;
- Seventy-five (75) wells are terminated in the overburden material;
- The most common subsurface materials encountered during well installation are interbedded or alternating layers of sand, silt, and clay intermixed with pockets or lenses of gravel;
- There appears to be an upper and lower aquifer composed of sand and clayey silt separated by layers of silt and clay (occasionally mixed with till);
- Approximately 40 wells appear to be terminated in the lower aquifer;
- Approximately 50 wells appear to be terminated in the upper aquifer;
- The average depth to groundwater in the lower aquifer is 49 m bgs, and the average depth to groundwater in the upper aquifer is 22 m bgs; and
- The average static water level across the site (at the time of well installation) is 6 m bgs.

4.3.6.2 Stratigraphic Layers

Based on the geological materials noted during the water well records review, there are four stratigraphic layers across the Study Area: 1) the geological layer immediately overlying the bedrock surface corresponds to the Scarborough Formation, and consists of deposits of sand, silt, and clay; 2) these materials are capped by clays and silty clays of lacustrine origin (i.e., Sunnybrook Formation); 3) which are in turn overlain by deltaic sands and lacustrine silt and clay interbedded with till units of the Thorncliffe Formation; 4) the geological layer closest to the ground surface is Northern Till. This deposit appears to be over-consolidated sandy silt till with varying clay content. Glacial Lake Iroquois deposits seem to occur as sporadic/isolated shallow lenses above the Northern Till across the Study Area. The bedrock is identified as Whitby shale[2], and has a deceasing slope towards Lake Ontario.

[2] According to MOE's "Hydrogeology of Southern Ontario" (1997), Whitby shale has an average conductivity of 0.005 to 1.70 m/day and is considered to have poor water yielding capabilities, when compared to other hydrogeological formations in Southern Ontario (e.g. Amabel Hydrogeological Unit).



TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
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ENVIRONMENTAL ASSESSMENT

AQUATIC FEATURES

EXHIBIT
4-8

4.3.6.3 Aquifers

Based on the relative position of the geological layers identified in the MOE well records, and supporting background information, there are two main aquifers that underlie the Study Area:

- The upper aquifer (Upper Unionville) is located within the Thorncliffe Formation (sand and silt), and is confined by Northern Till (silty till) on the top and Sunnybrook Till (clay till and laminated silt clay) on the bottom. The Morningside Tributary valley penetrates this aquifer between the CPR Line and Steeles Avenue and discharge to the creek is evident. To the south of the CPR line, a small portion of this aquifer underflows the Morningside Tributary.
- The lower aquifer (Lower Unionville) is located within the Scarborough Formation (deltaic sands, silts and clays) which overlies the bedrock surface. This unit is confined on the top by the Sunnybrook Formation. The southern portion of this aquifer underflows the Morningside Tributary and discharges into the Rouge River.

4.3.7 Groundwater Flow, Discharge and Recharge

4.3.7.1 Groundwater Flow

Groundwater flow in both aquifer systems noted in the previous section is predominantly south to southeast towards Lake Ontario, with some local groundwater flow deflections occurring in the vicinity of creeks and rivers. The downward vertical hydraulic gradient of the upper aquifer generally increases southward towards Lake Ontario as a result of groundwater discharge to creeks and rivers that have eroded through the Northern Till (i.e., Rouge River and Little Rouge Creek). There have not been any changes since EAR 2005.

4.3.7.2 Groundwater Discharge

Groundwater discharge zones have been delineated based on groundwater elevations (i.e., depth to upper aquifer system), the number of wells intercepting the upper aquifer system, and supplemental geological and hydrogeological information, including field observations of discharge (as Shown on Exhibit 4-8). As noted above, groundwater discharge areas are generally associated with the major watercourses. It should be noted that groundwater discharge areas have been determined solely on information pertaining to the upper aquifer system. Given the depth of the lower aquifer system, it is highly unlikely that any groundwater from that aquifer is discharged to surface watercourses within the general area.

Watercourses within the Study Area, most notably the Morningside Tributary and the Rouge River, receive some base flow from groundwater discharge on a local scale (as noted by field observations of discharge along west valley slopes). However, at a regional scale, watercourses are likely sustained to a greater extent by precipitation and surface runoff. Moreover, groundwater discharge to smaller tributaries within the Study Area (e.g. Neilson Tributary, Tributaries A and B / un-named tributary of Little Rouge Creek) is likely not significant at the watershed scale, although some evidence of groundwater discharge was noted along these tributaries during field surveys or previous studies.

4.3.7.3 Groundwater Recharge

Groundwater recharge to the upper aquifer system is typically greatest where the overburden material is thin, or is composed of permeable deposits (e.g. sand and gravel). In the Study Area, however, the overburden (i.e., Northern Till) is predominantly silty clay to clayey silt material, which is relatively impermeable to precipitation and water infiltration. The lower aquifer system is located above the bedrock surface and is confined by the Sunnybrook Till. This confining layer effectively reduces the amount of local groundwater recharge that reaches the lower aquifer system.

Given the low permeability of the surficial material and confined nature of the lower aquifer it is unlikely that groundwater recharge within the boundaries of the Study Area is significant when compared to the overall recharge capacity of the watershed, particularly features such as the Oak Ridges Moraine (ORM). There have not been any changes since EAR 2005.

4.3.7.4 Environmental Issues to Consider

The primary issues with respect to groundwater and hydrogeology in the Study Area are generally associated with the upper aquifer, and include:

- Maintenance of groundwater flow direction and discharge to wells and aquatic features, particularly Morningside Tributary, Rouge River and Little Rouge Creek (although the other smaller tributaries may receive a limited quantity of base flow on a local scale). The upper aquifer has the potential to be intercepted by underground services and other construction activities.
- Contamination of aquifers and wells. Private and municipal water wells are installed in the upper aquifer system for a source of potable water and the upper aquifer is relatively more susceptible to potential interception and contamination.
- Infiltration / recharge of precipitation. As stated earlier, the recharge potential of the Study Area is limited due to the composition (i.e., relative impermeability) of the overburden material and confinement of both the upper and lower aquifer system. The Study Area would likely not be classified as an important area of groundwater recharge, though local heterogeneities may exist as isolated pockets of permeable material limited in horizontal and vertical extent, which may influence the direction and magnitude of groundwater movement.
- Interference with, or loss of private wells. Although the majority of wells are located in the vicinity of the Box Grove Community, there are a number of scattered wells. It should be noted, however, that the Box Grove community is on municipal services, with a resulting lower potential for contamination of private wells in that area.

There have not been any changes since EAR 2005.

4.3.8 Surface Water, Aquatic Habitat and Fisheries

Background information on fisheries for watercourses within the Study Area was obtained from MNR, NHIC and TRCA database / resource mapping, and the following studies:

- Morningside Tributary Subwatershed Study, Phase II (1997);

- Aquatic Habitat Survey of Morningside Tributary, Morningside Development Area, Ecoplans Limited, Master Environmental Servicing Plan (1998);
- Aquatic habitat and Landscape Survey (Existing Conditions) of Neilson and Pitchfork Tributary Morningside Development Area, Ecoplans Limited (1998);
- Markham Natural Features Study (1992);
- Rouge River Fisheries Management Plan (1992);
- Environmental Management Plan Box Grove Secondary Plan, Town of Markham (2000);
- Letter of Intent to Implement Compensation, Mitigation and Monitoring Measures for the Harmful Alteration, Disruption or Destruction of Fish Habitat for a Channel reconfiguration of the Neilson Tributary (Raponi-Kaposi Property) in the City of Toronto (Scarborough) (2002);
- Markham Employment Lands Study (ELE) Rodick Road/Highway 407 (Ecoplans Limited, 2003);
- Species at Risk Information from Ministry of Natural Resources (MNR) Aurora office. (Obtained from Emma Followes District Ecologist, June 2003);
- Toronto and Region Conservation (TRCA) Natural Features Mapping for the Markham By-Pass Study Area (July 2003);
- MNR fish collection reports for tributaries in the Markham By-Pass Study Area (Obtained from MNR Aurora in June 2003);
- Tapscott Employment Lands Environmental Conditions Background Report (2004);
- MNR personal communication with John Pisapio (January/February 2004).

Reach by reach assessments of aquatic habitat and fisheries were undertaken as part of previous studies in the general area. To update and augment background information, general habitat assessments were conducted as part of the Study. Due to the abundant amount of current fisheries information available within the Study Area, fish sampling was not carried out as part of the Study.

During 2009 and 2010, additional aquatic habitat assessment and mapping surveys were conducted on the scoped section of the Rouge River and Morningside Tributary at the Steeles Avenue crossings. Fisheries information regarding the presence and status of Redside Dace in both watercourses was also updated (based on correspondence with MNR and TRCA in 2009-2011). Surveys were completed on a reach by reach basis approximately 250 m upstream and downstream of Steeles Avenue. An additional reconnaissance level field survey was completed at the Neilson Tributary in February 2011. The purpose of these surveys was to update and/or verify aquatic habitat information presented in EAR 2005 at crossings and review the proposed works with respect to confirmed Redside Dace habitat in the vicinity of the Morningside Creek crossing. Detailed information of this work is provided in the (Appendix C, May 2011 Natural Environment Report).

Ecoplans completed an updated assessment of aquatic habitat in the vicinity of the Morningside Tributary and Rouge River crossings of Steeles Avenue on July 3, 2009 and

December 2, 2010. The watercourse crossing sites were investigated from approximately 250 m upstream to 250 m downstream of Steeles Avenue. An additional reconnaissance level field survey was completed at the Neilson Tributary on February 28, 2011.

Previous aquatic habitat assessments of watercourses in the broader Study Area were completed by Ecoplans on September 9 and 29, 1998; August 21 and September 29, 2000 and November 13, 2003. The current analysis and discussion notes any changes to aquatic habitat and/or fisheries.

Watercourse crossings and reach locations are shown in Figure 4-8a (Appendix C, May 2011 Natural Environment Report, Attachment 1). Aquatic habitat mapping is included in Appendix C and photographs of the crossing locations are on file at Ecoplans Limited.

4.3.8.1 Aquatic Features Overview

Surface water features form an integral part of the natural landscape in this area and include the following watercourses: Neilson Tributary, Morningside Tributary, Rouge River, Tributaries A, B, C, D and E of the Little Rouge Creek, Ninth Line Tributary and Little Rouge Creek (Exhibit 4-8). All are located within the Rouge River watershed. These watercourses vary in their degree of anthropogenic disturbance, stream classification (i.e., warmwater, coldwater etc.), amount of riparian woody vegetation cover, permanence of flow (i.e., permanent, intermittent or ephemeral) and overall ecological integrity. They range from relatively undisturbed, with contiguous valley forest (e.g., Little Rouge Creek, the Rouge River and Morningside Tributary) to open, channelized reaches with very little associated natural vegetation and associated anthropogenic land uses (e.g., Neilson Tributary, Tributaries A, B, C and E of the Little Rouge Creek and Ninth Line Tributary).

Other surface water features are present, but not are abundant within the Study Area. These include some small seasonally ponded areas in wetlands and several dug ponds on golf courses. These features are discussed in Section 4.3.9 of this report.

The watercourses within the Study Area are shown on Exhibit 4-8. A brief overview of each watercourse is provided below from south/west to north/east. Appendix C provides detailed aquatic habitat notes from the field work carried out in 1998, 2000 and 2003.

Definitions used throughout Section 4.3.8 include the following:

Riffles are areas where the water surface is broken and in many cases rubble or boulders break the surface. **Pools** are deeper and wider than the average dimensions for the stream. The current is appreciably slower and hiding places for fish are frequently more extensive. **Reaches** are described as the area of stream often found immediately downstream from pools and upstream from riffle areas. They are sometimes referred to as **flats** or **runs** due to the smooth surface and relatively uniform depth (Source: *MNR Manual of Instructions Aquatic Habitat Inventory Surveys, 1981*.)

Channel **morphology** includes characteristics such as presence of riffles, runs, pools and flats. **Riparian** refers to streamside vegetation that plays a role in soil stabilization, stream shading/cover, and provision of aquatic food material. **Salmonid** refers to the fish group that includes salmon, trout, char, ciscoe and grayling.

Neilson Tributary

Nielson Tributary is a culturally influenced, intermittent tributary of Morningside Tributary, originating upstream (north) of Passmore Avenue. This tributary conveys stormwater and surface runoff from agricultural fields and commercial areas to the northwest to Morningside Tributary. The tributary is classified as coolwater, based on groundwater discharge noted downstream of the former Neilson Road; however, this groundwater input is likely not sufficient to maintain permanent flow conditions (Ecoplans Limited, 2004). Three reaches were investigated as part of the EAR 2005 study or previous studies, or were described using background information.

Within the Study Area, Nielsen Tributary is generally a ditched channel or poorly defined agricultural swale. Some natural reaches with variable morphology occur downstream of Neilson Road. The upstream reach (Reach 1, located between railway and Passmore Avenue) is a highly modified swale that is ploughed through annually and planted with crops. Reach 2 (located between Neilson Avenue and the rail line), where the crossing is proposed, has variable channel morphology, including swale, poorly defined channel and defined channel sections within a shallow valley system. Reach 3 (downstream of Nielson Road) has had sections reconfigured as part of the development of the Morningside Heights Community in 2002. The restored channel is a natural channel configuration with meanders, enhanced morphology and riparian vegetation (Ecoplans, 2002). The vegetation found along the former channel in this section consisted mainly of disturbed old field and golf course turf with patchy tree cover.

At the time of the February 28, 2010 survey, the channel area through the proposed crossing area in Reach 2 was flooded (due to rain event and mild temperatures during previous days). The wetted width of the channel through the crossing area during this visit was approximately 4 m, in partially frozen conditions (i.e., flow overtopped ice in some areas).

Riparian habitat in the vicinity of the crossing is primarily Reed Canary Grass, Narrow-leaved Cattail, with some Common Reed, and shrubs and tree species (Red-osier Dogwood, Highbush Cranberry, shrub willow, Common Buckthorn, Crack Willow, Manitoba Maple and Balsam Poplar). Typical early successional old field vegetation dominates the higher ground and margins. Fish use / potential was identified in the EAR 2005 as very limited in Reaches 1 and 2, due to intermittent flow and lack of channel definition and habitat features; however it is possible that seasonal use of these reaches does exist. Reach 3 has the greatest potential for seasonal fish use due to proximity to the Morningside Tributary.

Based on available information, the Nielson Tributary is considered an intermittent coolwater system. It originates upstream (north) of Passmore Avenue and conveys stormwater and surface runoff from agricultural fields and commercial areas to the northwest to Morningside Tributary, via a diversion structure downstream of the Study Area.

Groundwater discharge has been noted downstream of the former Neilson Road, but it is likely not sufficient to maintain permanent flow conditions. No evidence of groundwater discharge has been recorded within the scoped Study Area.

At the time of the original EAR 2005 submission, there were no existing historic records of Redside Dace in the Nielson Tributary. The MNR has since verified that the Neilson

Tributary is not an occupied reach for Redside Dace (email from MNR February 25, 2011).

Morningside Tributary

- Permanent tributary of the Rouge River that discharges to the Rouge River south of the Study Area, near the Toronto Zoo.
- Considered a moderately degraded system however classified as a coldwater productive zone (see Section 4.3.8.3) in downstream reaches (TRCA, 1992).
- Predominantly a natural meandering channel within the Study Area, with some short ditched reaches (e.g. adjacent to the north side of Steeles Avenue) and reaches influenced by beaver damming (downstream of Steeles Avenue).
- Five reaches within the Study Area were investigated as part of the Study or previous studies, or are described using background information (Appendix C).
- Reach 4 and reaches downstream of the Study Area have been reconfigured within the Morningside Heights Community. The restored channel is a natural channel configuration with meanders and enhanced morphology and riparian vegetation (Ecoplans, 2002).
- Substrates are variable and include gravel, sand, rubble and boulders in Reaches 5 and 8, with predominantly fine substrates (silt, muck, sand) in Reaches 6 and 7.
- Woody riparian cover is generally good and includes Cedar swamp, lowland forest and shrub thicket. Cover is generally limited downstream in the residential area (former golf course).
- Stream morphology ranges from good riffle-pool-flat habitat within reaches 5 and 8 and a lack of stream morphology (mainly flats) within the beaver flooded areas of reaches 6 and 7.
- Groundwater seepage areas are prominent along the west valley slope south of Steeles Avenue.
- Supports warmwater and coldwater fish species, with potential for management as a coldwater fishery based on baseflow water temperatures (R.E Winter, 1997).
- The Rouge River Fisheries Management Plan identifies Rainbow Trout as the target species for management (see Section 4.3.8.3) (TRCA, 1992).
- There are currently major fish barriers in this system preventing salmonids from migrating to upstream reaches (i.e., Beaver damming). Limited baseflow in upper reaches also limits coldwater habitat upstream of Morningview Trail (R.E Winter, 1997)
- Redside Dace, a coolwater species and designated as an Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSESWIC) and Endangered by the MNR, has been recorded downstream of Old Finch Avenue (1997 NHIC record).

During the 2009, 2010, and 2011 study updates, MNR and TRCA noted through personal communication that Redside Dace are present in several locations of Morningside Tributary and as such the entire creek is considered Redside Dace habitat (Appendix C, May 2011 Natural Environment Report). Since EAR 2005, the status of Redside Dace

has been upgraded to Endangered nationally by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and to Endangered provincially by the Committee on the Status of Species at Risk in Ontario (COSSARO). The species is also listed as Endangered under the provincial Endangered Species Act (ESA); however Redside Dace remains listed as Special Concern under the federal Species at Risk Act (SARA).

The aquatic habitat at the proposed crossing of Morningside Tributary at Steeles Avenue was re-assessed during scoped field studies in 2009.

On the north (upstream) side of Steeles Avenue, Morningside Tributary divides into an East branch (identified as Reaches 8 and 9 in the original EAR 2005) and West branch (identified as Reach 8 in the original EAR 2005). For the purpose of this assessment and in order to provide greater detail at the crossing site, the section of the West Branch of Morningside Tributary that runs parallel to the north side of Steeles Avenue (previously identified as a portion of Reach 8 in the original EAR 2005) was subdivided and renamed Reach 8a (see Appendix C, May 2011 Natural Environment Report, Attachment 1 Figure 4-8a, and Attachment 4). It should be noted that Reach 8a is referenced as part of Reach M3-1 in the Meander Belt Assessment.

West Branch (Upstream of Steeles Avenue)

The West branch is a tributary of the East (or main) branch that originates at a storm water management (SWM) pond approximately 650 m upstream of Steeles Avenue. From the SWM pond, the watercourse flows southerly along a relatively large, well-defined, forested valley system Steeles Avenue. This deciduous forest along the valley is identified as Vegetation Unit 7 / Wildlife Unit 8 in the original EAR 2005. Within the forest, the channel has minimal herbaceous vegetation along the banks; erosion (scouring) occurs around most bends. The channel has a natural meandering character dominated by 'flat' morphology, with some riffles and pools. Sand substrates dominate, with some gravel, rubble and boulders.

At Steeles Avenue, at the upstream end of Reach 8a, the channel bends 90° east and flows easterly for approximately 95 m, flowing along the roadside ditch parallel to Steeles Avenue and abutting the forest edge. Reach 8a outfalls to the East Branch of Morningside Tributary immediately upstream of the 3.8 m wide Structural Plate Corrugated Steel Pipe Arch (SPCSPA) that conveys the watercourse under Steeles Avenue. At the downstream end of the culvert, a storm drain (1 m concrete pipe with rip rap and silt fencing) has recently been installed on the west bank. It is our understanding that this conveys flows from development lands to the west.

Reach 8a has been modified (straightened) in the past and is now conveyed along the roadside ditch, approximately 4 to 5 m from the edge of pavement (8 to 9 m at upstream end of reach near bend) at the base of the steep 2 to 3 m high road embankment. The wetted width of this reach ranged from 1 to 2 m at the time of the July 3, 2009 survey and bankfull widths range from 4.0 to 5.0 m, with bankfull depths ranging from 0.6 to 0.7 m. Depth of flow ranged from 5 to 30 cm in the pools at the time of survey. Bank heights range from 0.5 to 0.7 m; for the most part, the road embankment forms the south bank.

This reach has a 'flat' dominant morphology with a 20 m riffle zone. Substrates are mainly sand with some gravel near the upstream end of the reach within the riffle zone. Severe bank erosion (scouring) was observed in the 2009 survey at the 90° bend (at

Steeles Avenue) and some slumping was evident along the road embankment. Fairly dense overhanging vegetation (Reed Canary Grass, old field herbs, forest edge species – dogwood and deciduous trees) is present along the channel.

East Branch (Upstream of Steeles Avenue)

The East Branch of Morningside Tributary north is relatively larger than the West Branch. It originates in the vicinity of a SWM pond approximately 1 km upstream of Steeles Avenue and, for most of its length, flows through forested valley described above. Watercourse characteristics within the forest are similar to the West branch; that is, a natural meandering channel dominated by 'flat' morphology, with some riffles and pools. Bankfull width is 5.0 to 6.5 m and bankfull depth is 0.4 to 0.8 m (Geomorphic Solutions, 2011). Sand substrates dominate, with some gravel and rubble. As with the West branch, there is minimal herbaceous vegetation along the banks and erosion (scouring) occurs around most bends.

In the vicinity of Steeles Avenue, the channel flows along the east edge of the forest under a partial canopy of younger deciduous trees. In this area, the channel is slow moving with a 'flat' dominant morphology (and a few small pools) with sand substrate. Riparian vegetation includes Reed Canary Grass, overhanging shrubs and trees. Instream cover is mainly woody debris.

Main Morningside Tributary (Downstream of Steeles Avenue)

South (downstream) of Steeles Avenue, Morningside Tributary flows south, bends 90° to the east to flow generally parallel to the road, and then bends 90° to the south. To provide greater detail in the vicinity of proposed works, this section of Morningside Tributary (total length of approximately 104 m), which was originally identified as a portion of Reach 7 in the original EAR 2005, has been partitioned and renamed Reach 7a-1 (upstream end: ~ 24 m length), Reach 7a-2 (middle portion: ~ 40 m length) and Reach 7a-3 (downstream end: ~ 40 m length); this is shown in Appendix C, May 2011 Natural Environment Report, Attachment 1 Figure 4-8a. It should be noted that Reaches 7a-1, 7a-2 and 7a-3 are referenced as Reach M2 in the Meander Belt Assessment. As noted above, a storm drain (1 m concrete pipe with rip rap and silt fencing) has recently been installed on the west bank at the culvert outlet (Reach 7a-1) approximately 7 m from the edge of the culvert. This outfall extends the overall wetted width beyond the culvert by approximately 7 m.

Reach 7a-1 (upstream end) flows southerly (perpendicular to Steeles Avenue) for ~ 24 m, then bends 90 degrees and flows east and parallel to Steeles Avenue for ~ 40 m (Reach 7a-2). Reach 7a-2 is approximately 18 m to 21 m from the existing edge of pavement. Reach 7a-3 (downstream end) bends north toward Steeles Avenue, flowing to within 5 m of the existing edge of pavement (at toe of road embankment), and then bends south at its downstream end.

Reach 7a (-1, 2 and 3) provides very good aquatic habitat conditions with a varied morphology (riffles, pools, flats and runs), gravel substrates (in the riffle sections) along with sand and some silt (in the slower moving areas), and dense overhanging riparian vegetation including graminoids, herbs, willow/dogwood shrubs and deciduous and coniferous trees. The wetted width of this reach ranged from 2.5 to 5 m at the time of the survey and bankfull widths range from 5 to 6 m with an average bankfull depth of 0.45 m depth. Depth of flow ranged from 5 cm to 0.75 m (pools) at the time of survey. Bank

height is typically 0.5 to 0.75 m along the portions of the reach that parallel the road (Reach 7a-3); the road embankment forms the bank.

Instream cover and vegetation includes undercut banks, some woody debris, some floating aquatic plants (*pondweeds*) and emergents (*Reed Canary Grass*). Some erosion (bank slumping) was observed at the bend of Reach 7a-3, where it runs along the toe of the road embankment.

Downstream of Reach 7a, Morningside Tributary flows as a natural meandering channel through a White Cedar swamp. This reach is dynamic and influenced by beaver damming; it has an impounded slow moving 'flat' morphology and deeper channel sand dominant substrates. Riparian vegetation is similar to Reach 7a, with varying levels of canopy cover.

Summary: Aquatic habitat in Morningside Tributary, as assessed in 2009-2010, was generally similar to that reported in the original EAR 2005. Reach 7a, however, supported relatively better habitat conditions (more varied morphology and substrate) than in 2005 due to the reduced influence of beaver activity in this portion of the creek. This is a dynamic reach given the potential for channel modification as a result of beaver activity.

Morningside Tributary is classified as a coldwater stream. It is a permanent system that supports warm and coldwater species. This classification is unchanged from 2005.

At the time of the original EAR 2005 submission, Redside Dace had been recorded in Morningside Tributary downstream of Old Finch Avenue (1997 records). Since the submission of the original EAR 2005, the status of Redside Dace at both the provincial and federal level has changed. It is now designated as Endangered by COSSARO and subject to the ESA. Redside Dace is also now designated as Endangered under COSEWIC in Canada; it remains a Species of Special Concern under SARA.

No records of Redside Dace in the vicinity of Steeles Avenue were included in the updated 2009 fisheries data provided by TRCA. However, MNR confirmed that there are several locations where Redside Dace have been captured in Morningside Tributary and as such the entire creek is considered habitat for the species (E. Followes, MNR; pers. comm. on June 22, 2009; letter from MNR dated September 29, 2010; see reference in Appendix C, May 2011 Natural Environment Report, Attachment 2).

Rouge River

- The Rouge River system is a permanent watercourse that meanders through the Parkview Golf Course north of Steeles Avenue and the Cedarbrae Golf Course south of Steeles Avenue
- Classified as a warmwater productive zone (see Section 4.3.8.3) supporting migratory coldwater species (salmonids) within the Study Area (TRCA, 1992).
- A high diversity of fish species occurs within the Rouge River, including warmwater species, salmonids and baitfish.
- Four reaches within the Study Area were investigated as part of the Study or previous studies, or are described using background information (Appendix C).

- The channel ranges from 10 to 25 m wide within the Study Area, with moderate to high velocities in most sections.
- Substrates are mainly comprised of gravel, rubble, boulders and sand. Morphology is comprised of rapid/riffle/run sections separated by flats in all reaches along with additional pools within Reach 1.
- Bank erosion occurs in a few areas within Reaches 1 and 3, especially prominent along a 30 to 40m high bluff located at the downstream end of Reach 1.
- Groundwater seepage is prominent along the west valley slope throughout the Study Area
- Woody riparian habitat is variable. There are wooded sections interspersed with long reaches of limited or no natural vegetation on the golf courses (i.e., turfgrass to the top of bank).
- A fishway is located at a small dam within Reach 3 on the Parkview Golf Course. No other barriers were noted during field surveys. There is also an active fish hatchery on the golf course.
- The dam and other barriers along the river potentially inhibit fish movement for some species.
- The Rouge River Fisheries Management Plan identifies Smallmouth Bass and migratory Salmonids as the target species for management (see Section 4.3.8.3).
- One species of concern, the Redside Dace, has been recorded in the past near Steeles Avenue (Town of Markham, 1992).
- Good potential spawning habitat for salmonids exists, in particular within Reach 2 (Ecoplans field work 2003). However, it is likely that the salmonids move further upstream to spawn within the smaller coldwater tributaries located north of the Study Area (Town of Markham, 1992).

At the time of EAR 2005, there were existing historic records of Redside Dace in the Rouge River near Steeles Avenue. However, no records of Redside Dace in the vicinity of Steeles Avenue were included in the updated 2009 data provided by TRCA. TRCA staff have since indicated (letter dated August 9, 2010) that the Rouge River in the vicinity of Steeles is not classified as Redside Dace habitat. This was confirmed by MNR in a letter dated September 29, 2010.

Aquatic habitat in the Rouge River at Steeles Avenue was also re-assessed during the additional field studies in 2009.

In the original EAR 2005, the reaches of the river upstream and downstream of Steeles Avenue were identified as Reach 3 and Reach 4, respectively (as shown in Figure 4-8a, Appendix C, May 2011 Natural Environment Report, Attachment 1); it should be noted that this is the same reference to Reach R2 and R1, respectively in the Meander Belt Assessment Report in Appendix B. As part of the 2009-2010 assessment, further refinement of the aquatic habitat (e.g. aquatic habitat mapping and more detailed description) in the more immediate vicinity of the bridge crossing (approximately 50 m up and downstream) was also completed. All reaches are described below.

The aquatic habitat through these reaches is generally similar to that reported in the original EAR (2005). In addition, a small un-named drainage swale not discussed in the original EAR has been included in this overview of 2009 survey results.

Generally, the Rouge River upstream and downstream of Steeles Avenue provides good quality aquatic habitat (e.g. varied morphology, coarse substrates).

Upstream of Steeles Avenue (Reach 3)

Reach 3, upstream of Steeles Avenue, flows through the Parkview Golf course and is crossed by a railway line approximately 340 m upstream of Steeles Avenue. There is a fishway upstream of the railway crossing that provides passage for fish around a boulder dam.

Generally, this reach supports good quality habitat with a morphology comprised of riffles, a long flat zone and some pools. Substrates consist of rubble, gravel, boulders and sand. Instream cover and vegetation consists of Reed Canary Grass, rubble and boulders and some woody debris. There is some bank erosion (slumping) at the bends along this reach.

Riparian vegetation generally includes a mix of old field vegetation and Reed Canary Grass along the banks of the river and woody species (e.g. White Cedar, willow, ash, Manitoba Maple, Staghorn Sumac) further back.

Crossing / Vicinity of Steeles Avenue

The Rouge River is conveyed under Steeles Avenue via a single span bridge structure approximately 30 m wide. The abutments are located approximately 10 m from the banks of the river. This reach (length approximately 50 m upstream, within and 50 downstream of structure) provides good aquatic habitat.

The wetted width upstream of and through the structure ranged from 7 to 8 m at the time of the survey and bankfull widths range from 13 to 15 m with an average bankfull depth of 0.7 m. Downstream of the structure, the wetted width increases to 12 m and the bankfull width is approximately 15 m. Depth of flow ranged from 0.2 m to 1 m (pool) at the time of survey. Bank heights range from 1.5 to 3 m.

Channel morphology along this reach is a 'run' that extends from approximately 20 upstream of the bridge, through the structure, to approximately 10 m downstream. Further downstream, there is a flat and riffle section for approximately 55 m. Further upstream of the run section (~ 30 m) there is a riffle, pool, riffle sequence. Substrates are rubble dominant (with boulders, gravel and sand) upstream and through the structure and gravel and rubble dominant (with boulders, gravel, hardpan clay, silt and sand) further downstream through the flat and riffle zones. Instream vegetation and cover includes a little Reed Canary Grass and the coarse substrate along with some woody debris.

Riparian vegetation includes Reed Canary Grass along the banks and patches of woody vegetation (willow, Basswood, Manitoba Maple, ash), some of which is overhanging. There is little erosion around existing bridge structure due to extensive boulder and rock armouring.

Downstream of Steeles Avenue (Reach 4)

Reach 4, downstream of Steeles Avenue, flows through the Cedarbrae Golf course.

Generally, this reach supports good quality habitat with a morphology comprised of a series of riffles, flats and runs. Substrates consist of rubble, gravel, boulders, sand and some hardpan clay. Instream cover and vegetation includes some Reed Canary Grass, rubble and boulders and some woody debris. The banks are relatively stable with only minor erosion in the bend locations.

Riparian vegetation includes a mix of old field vegetation, Reed Canary Grass and shrub willow along the banks of the river with treed patches (*Manitoba Maple, Sugar Maple, Basswood, ash, Balsam Poplar, White Cedar*). In some areas, the maintained turfgrass approaches the river's edge.

Un-named Drainage Swale

There is a small modified drainage swale (un-named) southwest of the existing crossing that was not discussed in the original EAR 2005. The swale was likely dug to convey drainage from the adjacent golf course. It may also convey some groundwater, based on evidence of groundwater seepage along local portions of the valley. The swale flows easterly and parallel to the south side of Steeles Avenue for approximately 110 m before it outlets to the Rouge River on the west bank. For approximately 50 m upstream of the outlet the swale flows along the base of the road embankment. Further upstream, the swale bends gently south away from the roadway and then west again for the remaining 60 m along Steeles Avenue. Through this 60 m section the swale is approximately 12 m back from the base of the road embankment. At this point the swale feature bends south away from the roadway and toward the golf course. The swale flows over a 1 m high bank at its outfall to the Rouge River that would act as a barrier to fish movement.

The swale has a 'flat' morphology (no refuge pools) and muck bottom. Swale width ranges from 1 to 2.5 m. Approximately 50 m upstream of the outlet area (where the swale bends gently south and then west) there is a low man-made berm that runs along the south side of the swale. Further upstream (along Steeles Avenue and where the swale bends south toward the golf course) the berm increases in size to approximately 1.5 m in height and to between 5 to 7 m in width. Riparian vegetation is dense Ostrich Fern and Jewelweed on the banks with overstory of ash, willow, Manitoba Maple and Sumac.

At the time of the 2009 survey, the swale had a small amount of flow (1 to 4 cm depth) – after a recent rain event. Water temperature at the time of survey was 20.5°C (air temperature 24°C at 1700 hr). No fish have been observed and we are aware of no fish records for the swale. It does not appear to directly support fish, given the barrier at the outlet to the Rouge River (height difference), shallow profile and lack of refuge habitat. It does provide a small amount of flow and allocthonous material input to the Rouge River.

Summary: Aquatic habitat in the Rouge River, as assessed in 2009, was essentially unchanged from that reported in the original EAR 2005.

The Rouge River is a permanent system, classified as 'warmwater and supporting migratory coldwater species (*salmonids*) within the Study Area'. This classification is unchanged from 2005.

At the time of the original EAR 2005 submission, there were existing historic records of Redside Dace in the Rouge River near Steeles Avenue. However, no records of Redside Dace in the vicinity of Steeles Avenue were included in the updated 2009 TRCA data, TRCA staff have since indicated (TRCA 2010) that the Rouge River in the vicinity of

Steeles is not classified as Redside Dace habitat. This has also been confirmed by MNR in a letter dated September 29, 2010 (see reference in Appendix C, May 2011 Natural Environment Report, Attachment 2).

Tributary A of Little Rouge Creek

- Intermittent tributary of Little Rouge Creek (MNR, pers comm. 2004)
- Flows through a predominantly agricultural landscape and is ditched in several reaches within the Study Area.
- Classified as coldwater (MNR, pers.comm 2004). Although this watercourse does not appear to support coldwater species, it is potentially a "coldwater contributor" to the Little Rouge Creek.
- The upper half of the channel is ill-defined. Downstream, the tributary consists of a well-defined shallow valley of variable width.
- Riparian cover is composed of a mosaic or dead elm woodland, old field and marsh communities. Woody riparian cover is patchy (CPW et al., 2000).
- Fish habitat is limited to remnant pools, with some observations of Creek Chub and cyprinid fry during 2000 surveys immediately upstream of 14th Avenue (Ecoplans, 2000; CPW et al., 2000).
- MNR fish collection records for the Study Area show no records of fish in Tributary A collections.

Tributary B of Little Rouge Creek

- Tributary B is a permanent watercourse from approximately 100-200m upstream of 14th Avenue (CPW et al., 2000).
- Classified as a permanent warmwater watercourse (MNR, pers.comm, 2004).
- Supports a diverse baitfish community compared to Tributary A.
- Five reaches within the Study Area were investigated as part of the Study or are described using background information (Appendix C).
- The tributary flows through predominantly agricultural lands, in addition to the Box Grove Forest.
- The channel is modified (straightened) in Reaches 1, 2, 4 and 5, with a naturally meandering wider channel through Box Grove Forest (Reach 3).
- Substrates are comprised of gravel, rubble, sand and boulders. Sand and clay sections also present, and most dominant in Reaches 4 and 5.
- Morphology is comprised of riffles, runs, pools and flats. Riffle and pool morphology is dominant within the upstream portion of Reach 3, through the Box Grove Forest.
- Riparian habitat consists of Reed Canary Grass mixed with old field and some woody species (hawthorn, dogwood, willow), as well as forested cover within Reach 3.

- Natural cascades are present south of 14th Avenue within Reach 2. These cascades present potential seasonal barriers to fish movement. The culvert which conveys this watercourse under Steeles Avenue appears perched, presenting a potential seasonal fish barrier.
- Watercress, a potential groundwater discharge indicator, was noted upstream of 14th Avenue during the 2000 and 2003 field visit by Ecoplans Limited. Two seepage areas were also noted between approximately 200 and 300m upstream of Steeles Avenue.

Ninth Line Tributary

- Largely intermittent watercourse upstream of 14th Avenue, discharging into the Rouge River (CPW et al., 2000)
- Classified as coldwater and permanent by the MNR (MNR, pers.comm 2004). Although this watercourse does not appear to support coldwater species, it is potentially a "coldwater contributor" to the Rouge River.
- The tributary flows through agricultural lands to the north (upstream) and residential lands to the west. The upper half of the channel is ill-defined, becoming defined south of Highway 407. Channel is unstable in sections downstream of 14th Avenue (built up natural debris / garden waste).
- Narrow riparian zone (as determined by yearly plowing limits), dominated by disturbance tolerant, cultural vegetation types (e.g. old field, Reed-canary Grass with dominant meadow marsh); ploughing to within a few metres of the watercourse in upstream reach. Shrubs, trees and anthropogenic garden plantings dominate the riparian zone further downstream.
- Disturbances/barriers include livestock access in upper reaches, an online pond upstream of 14th Avenue and a small in-channel drop structure located downstream of 14th Avenue.
- MNR fish collection records for the Study Area show no records of fish in this tributary. The Box Grove Secondary Plan notes that this tributary supports a permanent community of cyprinids in close proximity of the Rouge River (CPW et al, 2000).

Tributary C of Little Rouge Creek

- Tributary C is an unclassified intermittent tributary of Little Rouge Creek (MNR pers. comm., 2004).
- The tributary flows through agricultural lands, with periodic plowing to within a few metres of the channel.
- An ill-defined channel exists within the Study Area.
- Livestock access upstream of Reesor Road, has resulted in a disturbed channel, devoid of riparian vegetation (CPW et al., 2000).
- Narrow riparian zone (as determined by yearly plowing limits), dominated by disturbance tolerant, cultural vegetation types (e.g. old field, Reed-canary Grass dominant meadow marsh);
- Baitfish species were observed in the vicinity of Reesor Road during Ecoplans 2000 field survey.

Tributary D of Little Rouge Creek

- Tributary D is an intermittent tributary of Little Rouge Creek (Ecoplans, 2000).
- Flows into Tributary C between Reesor Road and 14th Avenue.
- Is a defined channel, however, the channel is ploughed through in sections.
- No fisheries information was available from the agencies or background resources.

Tributary E of Little Rouge Creek

- Tributary E is an ephemeral swale, which drains an agricultural field (Ecoplans, 2000)
- Upstream of the CPR line, this tributary is ploughed through.
- No fish habitat exists in this swale (Ecoplans, 2000).
- No fisheries information was available from the agencies or background resources.

Little Rouge Creek

- Little Rouge Creek is classified as a warmwater productive zone (see Section 4.3.8.3) downstream of Steeles Avenue and supports migratory coldwater species (salmonids) (TRCA, 1992).
- Little Rouge Creek Valley consists of a mix of riparian woodland, shrub thicket and cedar forest within interspersed riparian field and meadow marsh zones. An extensive riparian zone exists within and beyond the Study Area.
- This watercourse historically supported a resident coldwater fishery. Resident coldwater fisheries are presently confined to reaches upstream of Highway 48.
- The Rouge River Fisheries Management Plan identifies Smallmouth Bass and migratory Salmonids as the target species for management in the near term within the Study Area.
- A high diversity of fish species occurs within the Little Rouge Creek, including warmwater and coldwater species. Rainbow Trout and Brown Trout utilize this zone as a migratory corridor.
- The Markham Natural Features study indicates several Redside Dace records for Little Rouge Creek north of the Study Area (Town of Markham, 1992).

4.3.8.2 Aquatic Species of Conservation Concern

The Central Stoneroller, formerly considered Vulnerable by COSEWIC, has been recorded in several watercourses within the Study Area. This species was down-listed in 2000 to "Not at Risk".

One provincially / nationally significant fish species has been identified within the Study Area: Redside Dace. As noted above, the status of Redside Dace has changed as follows:

- National: upgraded from Special Concern to Endangered (COSEWIC)
- Provincial: upgraded from Threatened to Endangered (COSSARO).
- Endangered Species Act (ESA 2007): Endangered and regulated under the ESA

- Species at Risk Act (SARA): No change - Special Concern, but not listed under Schedule 1 (i.e., not subject to SARA)

Through recent (2009-2011) correspondence and liaison with the MNR and TRCA, the locations of Redside Dace as originally reported in EAR 2005 have been refined. In EAR 2005, Redside Dace was reported in the Morningside Tributary downstream of the Study Area, in the Little Rouge Creek, and likely present in the Rouge River.

In 2009, MNR and TRCA reported that Redside Dace has been documented in Morningside Tributary and as such the entire creek is considered habitat for this species. At the time of EAR 2005, there were existing historic records of Redside Dace in the Rouge River near Steeles Avenue. However, no records of Redside Dace in the vicinity of Steeles Avenue were included in the updated 2009 data provided by TRCA. TRCA staff have since indicated (letter dated August 9, 2010) that the Rouge River in the vicinity of Steeles is not classified as Redside Dace habitat.

As described above, MNR has confirmed that the Morningside Tributary is considered an occupied reach (i.e. Redside Dace 'habitat' per the ESA). MNR also confirmed that the Rouge River and Neilson Tributary are not considered occupied reaches.

4.3.8.3 Watershed Managements Objectives

Management objectives for the Rouge River watershed have been considered as part of the Environmental Assessment Study. This includes objectives from: *The Rouge River Fisheries Management Plan* (1992), the *Phase II Morningside Tributary Subwatershed Study* (1997), *The Rouge Park Management Plan* (1994) and *The Rouge Park North Management Plan* (1999).

Rouge River Fisheries Management Plan

- The objective of this plan is to "protect, rehabilitate and enhance the Rouge River watershed so that it will support healthy self-sustaining fish populations consisting of resident and migratory cold and warmwater fish communities where appropriate".
- Sub-zones within the Rouge River watershed are outlined reflecting the variation in stream characteristics and fish community present. Based on characteristics of each sub-zone, indicator species have been selected, with the idea that the watercourses are managed based on the needs of the designated indicator species.
- As outlined above, Rainbow Trout is the indicator species for Morningside Tributary, and the Rouge River and Little Rouge Creek are managed for smallmouth bass and migratory coldwater species. This plan has a 15 year planning horizon. Revisions to this plan are expected in 2005.
- Production zones (warmwater versus coldwater) are also outlined. These areas represent critical production areas and are to be managed for their identified functions.

Rouge North Management Plan

- This plan states that where new roadways are proposed, corridor linkages for fish "should be restored/maintained/protected and enhanced" as identified through more detailed studies.
- Management objectives for watercourses refer to the Rouge River Fisheries Management Plan.

The following is excerpted from Section 6.4.2.3 of the ***Rouge North Management Plan***:

> *"The relationship between the existing and future transportation network and the Rouge Park presents some significant challenges, most notably related to fragmentation of corridors and linkages, and potential impacts due to noise, roadway runoff etc.*
>
> *It must be recognized that the planning and design of municipal and provincial transportation facilities are subject to the requirements of the Ontario Environmental Assessment Act (EA Act) or a municipal planning process (Planning Act). The EA Act requires that effects on all components of the environment be considered through consultation with stakeholders in assessing trade-offs and determining a preferred alternative. It also requires that current legislation, policies and guidelines be addressed. Accordingly, through consultation with the Rouge Park Alliance as well as the municipalities, the objectives associated with the Management Plan would be taken into consideration through the EA process. In addition, transportation facilities are subject to the Canadian Environmental Assessment Act, where applicable.*
>
> *Consequently, given that transportation improvements / new facilities are subject to environmental legislation such as the requirements of the EA Act / or the Planning Act, the policies in the Rouge North Management Plan are to act as guidelines to be considered during these other review and approval processes. The Management Plan does not prohibit transportation facilities from being improved or implemented within the area covered by the park and does not limit such improvements to those that are currently planned or under consideration.*
>
> *The following guidelines and objectives relate to the planning and design of transportation facilities relative to the Rouge Park.*
>
> - *Over and above the existing and proposed roadway crossings, as shown in the municipal official plans, secondary plans and associated studies, additional roadway crossings of the park are subject to the municipal planning process under the Planning Act or Class Environmental Assessment and should be minimized where possible without compromising transportation functions.*
> - *Where new roadways are proposed or existing crossings are reconstructed, corridor linkages for fish, wildlife and / or pedestrians should be restored / maintained / protected and enhanced as identified through more detailed studies. Regeneration on a reach-by-reach basis should be considered as a component of the design process.*

- *Where applicable, roadways on tablelands adjacent to the Rouge Park should be designed to:*
    - *Enable an interface with the Rouge Park where identified;*
    - *Provide for buffering where identified;*
    - *Avoid / minimize any potential adverse impacts on natural features;*
    - *Take into consideration the aesthetics of the park, for example through compatible landscaping; and*
    - *Provide for pedestrians and cyclists where identified.*

During the construction phase, special care should be taken to minimize potential impacts on the ecological resources of the park which could result from the movement of materials and equipment, grading, excavation, sedimentation and erosion controls and other procedures.

Rouge Park Management Plan

- The objective of this plan is to achieve a fully functioning, clean and healthy stream system and associated riparian habitat within the park. The long term objective is the realization of naturally reproducing, self-sustaining native salmonids in cold waters and native Pike, Bass and Walleye in warmer waters.
- General strategies include native species introductions and reintroductions, exotic species control, removal of fish barriers and changes in riparian corridors.

Morningside Tributary Subwatershed Study

- This study's main management strategy is to manage the Morningside Tributary as a coldwater fishery. Strategy techniques for management are outlined under the following headings: restoration of stream banks, stream rehabilitation, fishery rehabilitation and removal of obstacles for fish. The Study Area falls within the Markham and Tapscott Subwatershed management plans.

4.3.8.4 Environmental Issues to Consider

The watercourses and valley systems in the Study Area vary in their morphology, amount of natural riparian vegetation, stream classification status, level of anthropogenic disturbance and overall ecological quality. There are notable differences between reaches or valley sections within a given watercourse (e.g. channelized vs. 'natural' reaches, open disturbed riparian zones vs. wooded, relatively less disturbed areas or narrow vs. wide valley / floodplain areas). Regardless of the classification of a particular watercourse, all watercourses in the Rouge River watershed are to be managed as coldwater systems (MNR, pers.comm, 2004).

Potential impacts of stormwater quality and quantity on watercourses in the Study Area include increased peak flows and deterioration of storm water runoff. As demonstrated in Appendix D, these can be mitigated through the use of appropriate stormwater management practices including extended detention storm water management wet ponds.

These issues are discussed further in Section 7.2.5., Appendix C (Natural Environment) and Appendix D (Stormwater Management Strategy).

Potential impacts of road crossings on stream morphology (e.g. erosion, channel disruption) were also considered in the Study, with the intent of reducing these impacts by providing larger spanning structures with lower risk of interaction with streams.

4.3.9 Wetlands and Terrestrial Vegetation

The mapping and evaluation of wetlands and terrestrial vegetation was completed using a combination of a background information review and comprehensive multi-season field surveys. Information pertaining to vegetation features in the Study Area was reviewed and integrated into this report from the following background sources:

- Morningside Tributary Subwatershed Study – Phase 2 Report (1997);
- Tapscott Employment Lands – Environmental Conditions Background Report (2002);
- A Restoration and Management Strategy for the Open Space and Woodland Areas of the Morningside Heights Community, City of Toronto (2002);
- Markham Employment Lands Study, Highway 407/Rodick Road (2003);
- TRCA mapping and GIS data sets (2002); and
- Other relevant studies, as listed in the References section of Appendix C.

Field surveys for vegetation in the Study Area were comprehensive, including three seasons of inventorying over 4 years (2000 – 2004), representing more than 90 person hours on the following dates: July 27, August 2-3 and September 20, 2000; May 29 and June 7, 2001; June 2 and September 16, 2003; and August 18, 2004. This includes work conducted as part of other projects in the Study Area. Additional vegetation observations were recorded during wildlife and fisheries surveys.

Field surveys of vegetation / flora were conducted on May 22, June 23 and July 16, 2009, December 2, 2010 and February 28, 2011. Additional notes on vegetation were recorded during other wildlife and aquatic field work. Vegetation field surveys in 2009-2011 were scoped to Units 6a, 6b, 7, 16, 17a, 17b, 17c, 33, 36a, 36b and 39. Refer to Figure 4-9a (Appendix C, May 2011 Natural Environment Report, Attachment 1) for terrestrial survey locations and Sections 5.0, 6.0 and 7.0 for additional discussion. The scope of work included:

- Updating the vascular plant species list and status (Appendix C, May 2011 Natural Environment Report, Attachment 5, Table A.5.1 and Table A.5.2). Plant species status was evaluated using the NHIC status / ranks (NHIC website, updated periodically) for provincial rarity ranks (i.e. S-Ranks); the Species-At-Risk in Ontario (SARO) list (MNR website, updated periodically) for provincial status designations; COSEWIC website (COSEWIC – Committee on the Status of Endangered Wildlife in Canada, updated periodically) for national status designations; and Varga et. al. (2000) for regional rarity status. Nomenclature generally follows Newmaster et al. (1998).

- Updating / refining the vegetation community assessment for vegetation adjacent to the Rouge River, Morningside Tributary and Neilson Tributary crossings where removals or impacts may occur (Figures 4-9b, 4-9c and 4-9d; Appendix C, May 2011 Natural Environment Report, Attachment 1). This included verification of ecosite classification, mapping and evaluation of vegetation communities using a modified version of the Ecological Land Classification (ELC) system (Lee et al. 1998). The area of the Nielson Tributary crossing was re-evaluated primarily using updated aerial photography and information documented in the EAR 2005, with a supplementary reconnaissance level field survey in February 2011. Community significance was evaluated using Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario (Bakowsky 1996, NHIC website, updated periodically) and vegetation communities of concern in TRCA region (TRCA 2007), and;
- Collecting data for characterization of habitat types. Field data sheets are on file at Ecoplans Limited.

Data collected as part of field surveys and background information was reviewed and integrated and reviewed, as follows:

- Classification of all vegetation communities, including wetlands and woodlands less than 0.5 ha, within the subject property and immediate adjacent lands. Vegetation communities were classified using the Ecological Land Classification (ELC) System for Southern Ontario (Lee et.al., 1998), with background information used for soils characterization. Habitat classifications were completed by qualified staff, experienced in application of the ELC system. ELC habitat classification for the Box Grove Forest and Little Rouge Creek valley was provided by the TRCA (2002);
- Evaluation of plant species status using: Varga et.al. (1999) and TRCA (2001 updated list 2003) for local and regional significance; Oldham et.al. (1999), Newmaster et.al. (1998) and the NHIC website (2005) updated Biodiversity Explorer website 2011) for Provincial and National significance;
- Evaluation of habitat status using: Natural Heritage Resources of Ontario: Vegetation Communities of Southern Ontario (Bakowsky, 1996; NHIC, 2005 updated Biodiversity Explorer website 2011); and Vegetation Communities of Concern in TRCA Region (City of Toronto and TRCA 2003);
- Evaluation of habitat significance and sensitivity based on a suite of ecological factors including community type, species composition, wildlife habitat / linkages, age structure, level of disturbance, canopy closure, biological health and sensitivity to development and occupancy.

Habitats and vegetation documented in the EAR 2005 were revaluated within the scoped Study Area in consideration of the most current documents.

A scoped inventory of Butternut trees (focused on potential areas of impact for Alternative 3b or Alternative C). All butternut recorded during field assessment were located using a GPS, flagged and photographed for potential future assessment.

4.3.9.1 General Overview

The Study Area is located in a transitional zone between the Deciduous Forest Region to the south and the Great Lakes - St. Lawrence Forest Region to the north (Rowe, 1977). Typical climax forest associations within the transitional zones are dominated by sugar maple and American beech with a minor component of basswood, black cherry, white ash, red maple, red oak, white oak, and red ash.

As previously described, the broader landscape is characterized by a mosaic of agricultural, urban residential and commercial (golf course) land uses. Natural vegetation is predominantly associated with the major valleys: Morningside Tributary, Rouge River and Little Rouge Creek. Other small natural vegetation blocks, isolated small woodlands, hedgerows and other cultural vegetation features represent a relatively small proportion of the Study Area. The Little Rouge Creek and Morningside Tributary valleys are characterized by diverse vegetation communities including swamp, marsh, meadow marsh and forest, with relatively greater woody riparian cover compared to other valleys in the Study Area. The Rouge River valley is characterized by intermittent woody riparian vegetation cover, with areas having little or no woody riparian vegetation (especially within golf courses). Overall, the remaining smaller tributary valleys (e.g. Neilson, Ninth Line, Tributaries A, B and C of the Little Rouge Creek) are dominated by cultural vegetation communities and have sparse to intermittent woody cover.

In total, 278 plant species were recorded in the Study Area (based on compilations of previous study lists and field surveys over the duration of the project). Species are listed, by unit, in Appendix C. Of these, approximately 24% are non-native. These species are widespread and abundant in the areas with a cultural land use history, and include many typical old field and/or disturbance tolerant species. Invasive species such as Garlic Mustard, Common Buckthorn and Dog-strangling Vine are widespread and frequently abundant in the more disturbed areas (e.g. woodland edges, along the rail lines, in fallowfields and agricultural field margins). Native species diversity and abundance is typically greater in the larger swamp and forest blocks in the Morningside Tributary and Rouge River valleys.

The scoped vegetation field surveys in 2009-2011 updated the vascular plant species list. Two additional species were added to the master plant list and a number of species were added to individual vegetation community lists. Refer to Appendix C, May 2011 Natural Environment Report.

4.3.9.2 Vegetation Communities

Vegetation features have been broadly characterized as woodland, wetland or cultural (human influenced) habitat types as shown on Exhibit 4-9. These broad characterizations have been refined into 39 primary vegetation units (many with inclusions and/or habitat mosaics of several vegetation community types), described in detail in Table C.5.1, included in Appendix C. Habitat types are as follows:

- Two Coniferous Forest types. These are dry or fresh-moist White Cedar forests along the Rouge River and Morningside Tributary upper or lower valley slopes, respectively.
- Sixteen Deciduous Forest types: predominantly dry-fresh Sugar Maple – Beech or Sugar Maple -Ash forest on tablelands or upper valley slopes, with fresh-moist Sugar Maple – Yellow Birch, Poplar, or lowland Elm/Willow/Ash/Manitoba Maple forests on floodplains or lower valley slopes.

- Seven Mixed Forest types, predominantly fresh-moist White Cedar-hardwood, fresh-moist Sugar Maple-Hemlock or fresh-moist Hemlock – hardwood forest – generally on floodplains or mid-lower valley slopes.
- Seven Marsh or Open Water types. These are dominated by disturbance tolerant Reed-canary Grass meadow marsh, with occasional sedge, forb or cattail dominant marsh pockets and several small ponds.
- Six Treed Swamp or Thicket Swamp types. These are predominantly White Cedar swamp, with occasional areas of mixed Cedar-hardwood swamp and Willow or Red-osier Thicket Swamp.
- Ten Cultural habitat types. These are dominated by typical Old Field Meadow, with other areas of Cultural Thicket (e.g. in hydro corridors and along rail lines), hedgerows, disturbed young Cultural Woodlands and some Conifer Plantation blocks.

For vegetation communities re-visited during the 2009-2010 field surveys (i.e. units 6a, 6b, 7, 8, 16, 17a, 17b, 17c, 33, 36a and 36b), previous Ecological Land Classification (ELC) vegetation community classifications and delineations identified in the original EAR 2005 were generally verified, with some minor refinements to a few vegetation community boundaries. There were no identifiable changes in general habitat character (aside from several years of succession, most evident in early successional vegetation community types), ecological health, abundance / distribution of invasive plants or degree of anthropogenic disturbance.

There were no changes to vegetation community significance rankings for the vegetation units re-visited in 2009-2010, nor were there any provincially significant vegetation communities or any additional communities of concern in the TRCA Region noted in the updated work. As noted in the original EAR 2005:

- No provincially significant vegetation community types have been recorded.
- Two (2) vegetation Communities of Concern in TRCA Region (i.e. TRCA Levels 1-3) are present: Unit 17a (SWM4-1) and Unit 7 (FOD6-3). Both are classified as Level 3.

Vegetation Communities in the Proximity of Rouge River crossing on Steeles Avenue

Vegetation communities in the vicinity of the Rouge River crossing are described below. Also see Figure 4-9b in Appendix C, May 2011 Natural Environment Report, Attachment 1.

Rouge River Valley North of Steeles Avenue

- Within the broader valley, the predominant vegetation community is *Fresh-Moist Sugar Maple – Hemlock Mixed Forest* (FOM6-1) on the west valley slope. This is well removed from the crossing location. This is characterized by a submature / mature canopy of Eastern Hemlock and Sugar Maple, with associated deciduous species (e.g. White Ash, Basswood).
- In the vicinity of the crossing, there is a mosaic of habitat types including:
    - *Fresh-Moist White Cedar - Sugar Maple Forest* (FOM7-1) on the narrow disturbed east valley slope and riparian area. This is characterized by White Cedar and Sugar Maple on the steep, dry slope and a mix of upland, forest understory, facultative and obligate wetland ground covers including Canada Goldenrod, Bulblet Fern, Reed-canary Grass, Poa sp., Jewelweed, Dwarf

Raspberry, Spinulose Woodfern, Spotted Joe Pyeweed, Blue Cohosh, Bloodroot, Dog-strangling Vine, Purple-flowering, Raspberry, Stinging Nettle, Bittersweet Nightshade, Marsh Bedstraw, Forget-me-not and Riverbank Grape.

- *Dry-Moist Old Field Meadow* (CUM1-1) in a narrow strip (~15 m wide) of abutting Steeles Avenue – within the hydro corridor / on the road embankment. It is dominated by typical old field disturbance tolerant species. Additional pockets of cultural meadow are interspersed throughout the floodplain in this area.
- *Fresh-Moist Willow Lowland Deciduous Forest* (FOD7-3) of secondary growth along the west riparian zone and a mosaic of *Dry-Moist Old Field Meadow* (CUM1-1) and *Mineral Shallow Marsh* (MAS2) in the floodplain further north / west. Ground covers include a typical suite of disturbance tolerant graminoids, forbs and herbs, with facultative and obligate species in low lying areas. Common species include Canada Goldenrod, White Vervain, White Snakeroot, Canada Anemone, Water Horehound, Mullein, Crown Vetch, Meadow Grass, Spotted Joe-pye Weed, Reed-canary Grass, Purple-stemmed Aster, Poa sp., Bird's-foot Trefoil, Common St. John's Wort, Smooth Brome, Cow Vetch, Common Burdock, Teasel, Wild Red and Black Raspberry, Jewelweed, Bittersweet Nightshade and Riverbank Grape.

Rouge River Valley South of Steeles Avenue

- In the vicinity of the crossing, vegetation is a mosaic of culturally influenced habitats, including:
  - *Dry-Moist Old Field Meadow* (CUM1-1) associated with the road embankment and extending approximately 10 m to the south. This habitat is characterized by typical early successional, disturbance tolerant species.
  - A narrow strip of *Manitoba Maple Deciduous forest* (FOD4) / *Dry-Moist Old Field Meadow* (CUM1-1) abutting the south edge of the embankment, west of the Rouge River. This is an anthropogenically influenced habitat dominated by shrubby, poor quality young Manitoba Maple which has been cleared in the past. There is an un-named drainage ditch that runs through a portion of this habitat.
  - A planted / maintained hedgerow of Siberian Elm approximately 70 metres long along the north limit of the golf course.
  - *White Cedar Organic Coniferous Swamp* (SWC3-1) west / south of the narrow forest / hedgerow. This is a wetland on the lower valley slope / floodplain dominated by Eastern White Cedar and Black Ash, with American Elm and Hemlock. The drainage ditch continues through this community.
  - *Fresh-Moist Sugar Maple – Hemlock Mixed Forest* (FOM6-1) in good health located on the upper portion of the west valley slope. This is similar in character to the portion north of Steeles.
  - *Mosaic of Dry-Moist Old Field Meadow* (CUM1-1) and *Reed-Canary Grass Mineral Meadow Marsh* (MAM2-2) east of the river, south of the embankment.
  - Maintained turfgrass / plantings on the golf course further south of the vegetation communities described above.

Vegetation Communities in the Proximity of Rouge River crossing on Steeles Avenue

Vegetation communities in the vicinity of the Morningside Tributary crossing are described below. Also see Figure 4-9b, Appendix C, May 2011 Natural Environment Report, Attachment 1.

Morningside Tributary Valley North of Steeles Avenue

- Consists primarily of upland *Dry-Fresh Sugar Maple - Beech Deciduous Forest* (FOD5-2) on valley slopes and higher ground, with *Fresh-Moist Sugar Maple – Hardwood Deciduous forest* (FOD6-5) on the floodplain.
    - The FOD5-2 vegetation community is dominated by mid mature to mature trees with associates of Sugar Maple, Basswood, White Pine, Northern White Cedar and American Beech. The shrub layer is relatively sparse with little regeneration and ground cover consists of typical vegetation including White Trillium, Wild Sarsaparilla, Spinulose Wood Fern, Blue Cohosh, Red Baneberry, Lady-fern, Tall Meadowrue, Zigzag Goldenrod, Garlic Mustard, Enchanter's Nightshade, Oak Fern, Yellow Avens, Bulblet Fern, Wood Nettle, Maidenhair Fern, Downy Solomon's-seal, Red Trillium, Two-leaved Toothwort, Riverbank Grape and Herb Robert.
    - The FOD6-5 vegetation community consists of a mix mid mature to mature mixed forest of Sugar Maple, American Basswood, Eastern Hemlock, Yellow Birch, Northern White Cedar, Ironwood, White Birch, Green Ash, American Elm and willow species. Highly diverse ground layer dominated by facultative species including Spinulose Wood Fern, Jewelweed, Jack-in-the-pulpit, Red Baneberry, Lady-fern, Tall Meadowrue, Zigzag Goldenrod, Garlic Mustard, Enchanter's Nightshade, Oak Fern, Yellow Avens, Bulblet Fern, Wood Nettle, Maidenhair Fern, Downy Solomon's-seal and Riverbank Grape. The amount of Eastern Hemlock increases as elevation increases to the north and the forest community transitions to a Dry-Fresh Sugar Maple – Hemlock Mixed Forest (FOM3-2). A Portion of the floodplain deciduous forest is periodically flooded by beaver. Overall, this is a healthy good quality forest with very little blow down or dead trees.
- There is a narrow strip of *Dry-Fresh Sugar Maple Deciduous Forest* (FOD5-1) dominated by regenerating Sugar Maple and American Beech in the hydro corridor located adjacent to Steeles Avenue, north of FOD5-2 forest abutting the edge of the road. Ground covers are similar to the adjacent FOD6-5 and FOD5-2 communities. The hydro corridor is periodically cleared or cut back. Soils are dry and terrain slopes to the north / northeast.
- This forested area is classified as an Environmental Protection Area (EPA) and Locally Significant Area (LSA).

Morningside Tributary Valley South of Steeles Avenue

- Consists primarily of *White Cedar Organic Coniferous Swamp* (SWC3-1) on the floodplain, with upland *Dry-Fresh Sugar Maple - Beech Deciduous Forest* (FOD5-2) on the west valley slope and *Cultural Thicket* (CUT) to the east.
    - The conifer swamp (SWC3-1) is dominated by White Cedar with associates of Yellow Birch, White Birch and Tamarack. Ground cover consists of a highly diverse ground layer dominated by facultative and obligate wetland species, with upland species on hummocks and near the top of slope. Common species include Jewelweed, Bulblet Fern, Ostrich Fern, Calico Aster, Swamp Buttercup, White Snakeroot, Naked Mitrewort, Foamflower, Enchanter's Nightshade, Yellow Avens, Tall Beggarticks, Clearweed, Wood, Nettle, Forget-me-not, Virginia Creeper, Riverbank Grape, Canada Goldenrod, Bittersweet Nightshade, Tall Buttercup and Herb Robert. The overall quality of this community is moderate-good, with blowdowns and a large area of standing dead trees present.

  - The upland deciduous forest (FOD5-2) community is located on the west valley slope abutting agricultural lands to the west. It is characterized by mid mature with a few large mature trees of Sugar Maple, Basswood, White Ash and Balsam Poplar. Ground cover is consistent with that found in communities FOD6-5 and FOD5-2 located to the north of Steeles Avenue. This is a very healthy community with little poor heath or mortality. Evidence of anthropogenic disturbance includes overbank dumping and landscape plantings along the edge of Steeles Avenue.
  - The cultural thicket (CUT) is a highly disturbed area of relatively poor quality, on fairly level topography east of the creek. Evidence of anthropogenic disturbance includes ATV trails and old apple trees. Common species include Manitoba Maple, Willow, White Ash, Red-osier Dogwood, and Tartarian Honeysuckle.

- The area south of Steeles Avenue is part of the Rouge Park

Vegetation in the Proximity of Neilson Tributary

Vegetation communities in the vicinity of the Neilson Tributary crossing are described below. Also see Figure 4-9d, Appendix C, May 2011 Natural Environment Report, Attachment 1.

Neilson Tributary Valley

- Generally described as a sparse ditched channel or poorly defined agricultural swale with sections that have been ploughed down to edge of tributary.
- Vegetation communities present include *Dry-Moist Old Field Meadow* (CUM1-1), *Reed-canary Grass Mineral Meadow Marsh* (MAM2-2), *Fresh-Moist Poplar Deciduous Forest* (FOD8-1) and *Fresh-Moist Willow Lowland Deciduous Forest* (FOD7-3).
- Individual trees and small clusters of Crack Willow, Balsam Poplar, Black Walnut, Manitoba Maple and Trembling Aspen are located along this creek reach.
- The shrub and groundcover layers are dominated by disturbance tolerant species typical of old fields and culturally influenced areas, with facultative and obligate wetland species along the tributary. Common species include Red-osier Dogwood, Willow spp., Canada Goldenrod, Reed-canary Grass, Common Buckthorn, Common Reed, Narrow-leaved Cattail, Curled Dock, Bittersweet Nightshade, Poa sp., Smooth Brome, Heath Aster, Wild Carrot, Purple Loosestrife, Dog-strangling Vine and Field Strawberry.
- A restored section of channel with meanders, enhanced morphology and riparian vegetation is located to the southeast. This section of channel was mainly disturbed old field and golf course turf with patchy tree cover before restoration.

As part of the updated field surveys, Ecoplans undertook a field survey for Butternut in February 2011. No Butternut trees were recorded in the Neilson Tributary valley in the vicinity of the proposed crossing.

Wetlands

In general, wetlands represent a relatively small proportion of the vegetation within the Study Area. There are no Provincially Significant Wetlands (PSWs) in the Study Area and at this time there are no known plans for evaluation. The existing wetlands are typically associated with Locally Significant Areas and/or Greenlands System or Rouge Park components.

The larger, higher quality wetlands are restricted to the Morningside Tributary and Rouge River valleys (i.e., Vegetation Units 5a, 6a, 11, 17a, 23a and 33 – refer to Exhibit 4-9). These wetlands are predominantly organic White Cedar swamps on valley slopes, characterized by greater maturity and botanical diversity, relatively less anthropogenic disturbance and groundwater seepage. The remaining wetlands are generally narrow, highly disturbed, less diverse cultural meadow marsh/thickets along the smaller tributary systems (i.e., all or parts of Vegetation Units 2, 3, 8, 18 and 38 – refer to Exhibit 4-9).

Through searches of current database information and communication with the MNR in 2009-2010, it was verified that there are (still) no PSWs in the Study Area (Biodviersity Explorer, 2011; pers. Comm.E. Followes 2009).

Wetlands in the scoped Study Area were verified during additional field investigations in 2009; no substantive changes have occurred since EAR 2005 (e.g. limits, water levels, health, species composition).

Terrestrial Vegetation

The predominant terrestrial vegetation features in the Study Area are woodland blocks associated with watercourses, including valley slopes, floodplains and adjacent tablelands (i.e., Vegetation Units 4, 7, 12, 13, 14, 16, 17b, 20, 24, 25, 27, 28, 29 and 36). These are predominantly mid-aged to mature Sugar Maple – hardwood deciduous forest (upland and lowland) or mixed forest habitat types. There are also several smaller isolated tableland woodlands. The majority of woodland units within the Study Area exhibit some level of disturbance including periodic selective tree harvesting, historic agricultural land use, invasive species prevalence and recreational use.

The most ecologically significant terrestrial vegetation features are: Box Grove Forest, a large deciduous / mixed tableland and valley forest block associated with Tributary B of the Little Rouge Creek (Vegetation Unit 4); an un-named forest associated with the Morningside Tributary north of Steeles Avenue (Vegetation Unit 7); valley and tableland forest along Morningside Tributary south of the CPR line (Vegetation Units 5a, 23a - 34) and the mosaic of habitats along the Little Rouge Creek valley corridor. These are the largest, most ecologically diverse and least disturbed terrestrial features in the Study Area. The remaining terrestrial vegetation blocks are typically moderate to highly disturbed, small meadow, thicket and woodland features.

Additional scoped field investigations during 2009, 2010 and 2011 verified the ELC classifications, composition / character and significance / status of terrestrial communities. There were some refinements to vegetation community limits based on the updated field work, but no major changes were noted (e.g. limits, health / disturbance, species composition). Refined vegetation communities can be found on Figures 4-9b, 4-9c, 4-9d in Appendix C, May 2011 Natural Environment Report).

4.3.9.3 Significant Habitats and Flora

Habitats [3]

No provincially significant vegetation community types are present in the Study Area. Five vegetation communities of concern in Toronto and Region Conservation (TRCA)

[3] Refer to Appendix C, Table C.5.1 for listing and discussion of habitat names and codes.

Region (i.e., TRCA Levels 1-3) were delineated: SAM1 (small pond inclusions), SWM4-1, FOD6-3, MAM3-9 (inclusion within swamp) and SWC3-1. All are classified as Level 3.

Habitats of Concern	Vegetation Units
SAM1	2, 3, Parkview Golf Course
SWM4-1	5a, 17a
FOD6-3	7
MAM3-9	11, Little Rouge Creek valley
SWC3-1	6a, 23a

Vegetation community significance was evaluated using the updated NHIC and TRCA rankings. There were no changes to previously documented communities or identification of additional provincially significant vegetation community types or communities of concern.

Flora

The floristic inventory prepared as part of the original EAR 2005 was generally verified in scoped field survey areas re-visited in 2009, with some minor modifications / additions: two additional plant species not identified in 2003/4 were recorded in 2009 (Butternut and Large-flowered Bellwort); and a number of species were added to the individual species community lists.

In total, 278 vascular plant species were recorded in the scoped Study Area by Ecoplans during the combined 2003, 2004 and 2009-2010 field surveys. Species are listed, by vegetation unit, in Table A.5.1, Attachment 5. Of these, approximately 24% are non-native; these species are widespread and abundant in the areas with a cultural land use history, and include many typical old field and/or disturbance tolerant species. Invasive species such as Garlic Mustard, Common Buckthorn and Dog-strangling Vine are widespread and frequently abundant in the more disturbed areas (e.g. woodland edges, in fallowfields and agricultural field margins). Native species diversity and abundance is typically greater in forested areas of the Morningside Tributary and Rouge River valleys.

Since the submission of EAR 2005, there has been no change in plant species status ranks (at the local, regional, provincial and national levels) for all species documented within the scoped Study Area.

Both of the additional species recorded in 2009 are locally or regionally significant plant species. In total, thirty-seven (37) locally or regionally significant plant species were recorded within the 2009-2010 scoped Study Area and fifty-six (56) species were recorded in the broader 2005 Study Area. Plant species of conservation concern recorded within the scoped Study Area are listed in Table A.5.2, Appendix C, May 2011 Natural Environment Report, Attachment 5, and summarized as follows:

- Butternut (*Juglans cinerea*), is provincially and nationally Endangered, as designated by COSEWIC and COSSARO (Committee on the Status of Species at Risk in Ontario). Butternut and its habitat are protected under the ESA (2007).
- Apart from Butternut, all other species are ranked S5 (i.e. common and secure in Ontario).
- Fifteen (15) species are of conservation concern in TRCA Region: fourteen (14) Level 3 species and one (1) Level 2 species (TRCA 2007).

- Eleven (11) species are considered rare or uncommon in York Region (Varga et al. 2000).
- Thirty-two (33) species are considered rare or uncommon in the City of Toronto (Varga et al. 2000).
- Six (6) species are considered rare in the Greater Toronto Area (Varga et al. 2000).

A total of fifty-six (56) locally or regionally significant plant species were recorded, as noted in Table E.2, Appendix C:

- In consideration of changes to Butternut status since 2005, specific searches for Butternut were completed during 2009 scoped field surveys. Through these surveys, eight (8) Butternut trees were documented in the Morningside Tributary valley, north of Steeles Avenue (Vegetation Unit 7), ranging from 300 m to 400 m from Steeles Avenue.
- Several Butternut trees are present in the Morningside Tributary valley north of Steeles Avenue. No Butternut trees were recorded in the scoped survey areas in the Rouge River valley or Neilson Tributary valley.
- No Butternut trees were recorded in areas potentially impacted by the proposed alternatives (i.e. within the estimated zone of disturbance). Hence, no Butternut health evaluations were completed as part of the current study. If plan refinements at detailed design or additional field surveys identify Butternut within areas potentially impacted by the proposed works, an evaluation of 'retainability' by a certified Butternut Health Assessor would be required to determine applicability of the ESA, using the approach described in *Butternut Health Assessment in Ontario: Finding Retainable Trees* (FGCA 2008). That analysis might include determination of mitigation and/or compensation measures.
- All are considered locally rare or uncommon or species of concern (i.e., TRCA Level 1-3; City of Toronto) or regionally rare or uncommon (York Region) – many of which have shared designations.
    - Twenty-four (25) species of concern in TRCA Region – 22 Level 3 species and 3 Level 2 species;
    - Twenty-two (22) species considered rare or uncommon in York Region;
    - Forty-five (45) species considered rare or uncommon in the City of Toronto;

Significant vascular plant species are listed, by vegetation unit, in Appendix C and included in Table E.3.

Additional field investigations conducted during 2009-2011 identified two additional locally or regionally significant plant species. This increases the total number of species of conservation concern recorded during field surveys to fifty-eight (58). The Natural Environment update (Appendix C) has been updated to reflect these observations.

Within the scoped Study Area, the following species of conservation concern have been recorded: one provincially and nationally Endangered Species (Butternut); fifteen (15) species of conservation concern in TRCA Region; eleven (11) species considered rare or uncommon in the City of Toronto; and six (6) species considered rare in the Greater Toronto Area.

One species is provincially or nationally rare. Butternut is ranked Endangered by COSEWIC and COSSARO and S3? [4] (vulnerable in Ontario, [note: the question mark indicates that there is some uncertainty about the accuracy of this rank]). All other species are not ranked by COSEWIC or COSSARO and are ranked S5 (secure in Ontario), except one species ranked S4 (apparently secure in Ontario). .

4.3.9.4 Environmental Issues to Consider

As noted above, the primary natural vegetation features in the Study Area are associated with the major valley systems. The remainder of the landscape is characterized by a mosaic of fragmented culturally derived vegetation. The primary issues of concern are direct removals of vegetation, fragmentation of habitat blocks, impacts to rare species or habitats.

Since EAR 2005, the general issues concerning natural vegetation features have not changed.

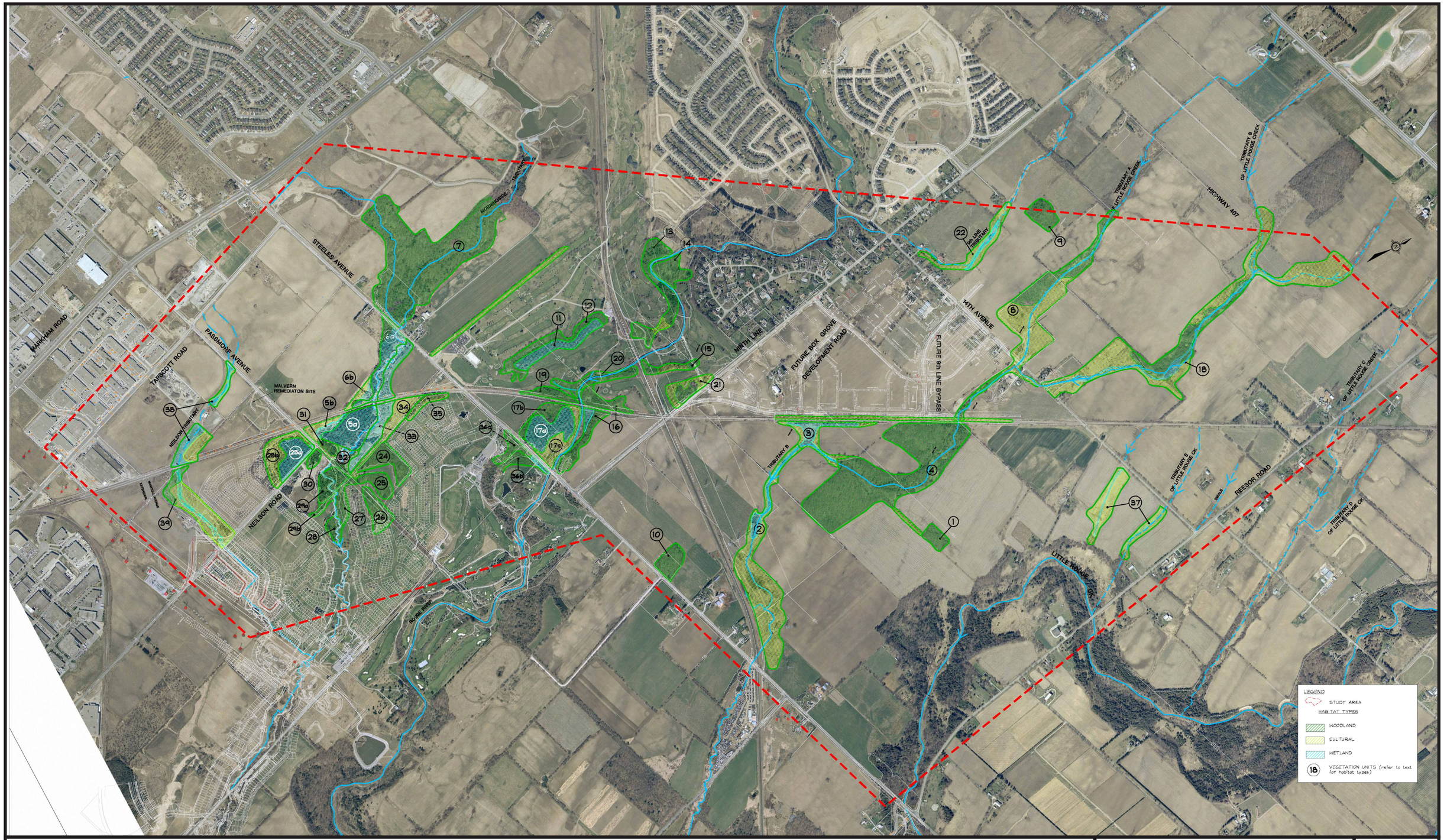
4.3.10 Wildlife

Information pertaining to wildlife in the Study Area from the following background sources was reviewed and integrated into the Study, as relevant:

- Morningside Tributary Subwatershed Study – Phase 2 Report (1997);
- Tapscott Employment Lands – Environmental Conditions Background Report (2002);
- A Restoration and Management Strategy for the Open Space and Woodland Areas of the Morningside Heights Community, City of Toronto (2002);
- Markham Employment Lands Study, Highway 407/Rodick Road (2003);
- TRCA mapping and GIS data sets of wildlife observations (TRCA 2002) updated in 2009; and
- Other relevant studies, as listed in the References section of Appendix C.

A total of 23 wildlife survey units, as shown on Exhibit 4-10, were assessed during a 3 season inventory, with a total field effort of more than 24 hours over 4 days (plus incidental observations during all field surveys – more than 100 person hours in the field).

[4] The Natural Heritage provincial ranking system (provincial - S rank) is used by the MNR Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. The S ranking system uses the following basic categories: **S1. Extremely rare** in Ontario; Usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation; **S2. Very rare** in Ontario; usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation; **S3. Rare to uncommon** in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances. Most species with an S3 rank are assigned to the watch list, unless they have a relatively high global rank; **S4. Common** and apparently secure in Ontario; usually with more than 100 occurrences in the province; **S5. Very common** and demonstrably secure in Ontario; **SE. Exotic**; not believed to be a native component of Ontario's fauna.



TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
(formerly Transportation Improvements
in the Markham Bypass Corridor South of Highway 407)
ENVIRONMENTAL ASSESSMENT

VEGETATION

EXHIBIT
4-9

Five additional wildlife field surveys were completed from April to August 2009. These surveys were focused in a scoped Study Area in the vicinity of the Steeles Avenue crossings of the Rouge River and Morningside Tributary (encompassing nine of the original twenty-three wildlife survey units). In addition, incidental observations were made during all 2009, 2010 and 2011 site visits to the area.

The field program included three primary components:

- **Breeding Bird survey**. Breeding birds were inventoried in Wildlife Units 1 – 15, the highest priority areas, on June 26 and 27, 2003. The survey consisted of approximately 30 person hours in field, and each wildlife survey area received an equal amount of attention, based on its overall size. Each unit was thoroughly investigated for breeding birds, in addition to butterflies and other wildlife.

  Additional, breeding bird surveys were conducted in Wildlife Units 7, 8, 11, 12 and 20 on July 16 and August 5, 2009.

  - The breeding bird survey was conducted by qualified, experienced staff using the Ontario Breeding Bird Atlas (OBBA) protocols and under appropriate conditions (i.e., in-season, appropriate time of day). Wandering transects were completed through the habitat blocks to obtain as complete a coverage as possible and to assist in evaluating breeding habitat quality.
  - An avifaunal inventory and habitat assessment, including a breeding bird survey, was completed in 2009. The purpose of the avifaunal surveys was to update 2003 survey results and gather breeding bird data and evaluate natural areas for avian habitat potential.
  - On July 16 and August 5, 2009, breeding bird surveys were undertaken in wildlife survey units 7, 8, 11, 12 and 20 (see Figure 4-9a, Appendix C, May 2011 Natural Environment Report, Attachment 1 for survey unit locations). Breeding bird surveys followed Ontario Breeding Bird Atlas (OBBA) protocols (Bird Studies Canada 2001). For breeding bird surveys, transects were completed throughout the Study Area by qualified, experienced staff, under appropriate conditions[5]. Level of breeding bird evidence observed was recorded following standard criteria established by the OBBA. This differed slightly from 2003 breeding bird surveys, which were undertaken in Wildlife Survey Units 1 – 15 on two dates: June 26 and 27. Since 2003 surveys included a single survey, level of breeding evidence could not be assigned. With 2009 surveys, two visits were completed and levels of breeding evidence were assigned.
  - A supplemental raptor nest survey was conducted on May 22, 2009, when spring foliage was limited. This survey employed random transects and searches for raptor nests in Wildlife Survey Units 6a, 7, 17a, and 17c.
  - Results of the avifaunal surveys are presented in Table A.7.1, Appendix C, May 2011 Natural Environment Report, Attachment 7.

- **Spring Amphibian Calling Surveys**. Spring amphibian calling surveys were conducted at 12 priority wetland areas, shown on Exhibit 4-10, on May 8, 2002 and April 30, 2003, with a total of approximately 7.5 field hours. In addition, potential

[5] With the exception of Wildlife Survey Unit 12, where avifaunal surveys were conducted from Steeles Avenue to the north, as access was not available.

amphibian habitat was assessed, and observations of any amphibian activity were recorded, during all field visits.

Additional spring calling amphibian surveys were conducted on April 22, May 22 and June 23, 2009. Stations surveyed were consistent with stations surveyed in the EAR 2005.

- The survey was completed following the Bird Studies Canada/Environment Canada Marsh Monitoring Protocol, under appropriate conditions by qualified staff. Survey summary results are included in Appendix C.

- Calling amphibian surveys (i.e. passive 3 minute listening stations) were conducted by Ecoplans at 12 stations on April 22, May 22 and June 23, 2009. Surveys followed the Marsh Monitoring Program (MMP) amphibian calling survey protocol (Bird Studies Canada, 2003) and were undertaken by qualified experienced staff under appropriate conditions (i.e. dusk/evening survey with suitable air temperatures).

- A total of 12 stations were surveyed in 2009 (repeating those previously surveyed in 2003 / 2004, with a few additions). The locations of the calling stations are shown on Figure 4-9a, Attachment 1. Amphibian calling results are included in Table A.6.1, Appendix C, May 2011 Natural Environment Report, Attachment 6.

- Previous amphibian surveys conducted in 2003/2004 and discussed in the original EAR 2005 followed a slightly different protocol with a single survey per year. Surveys in 2009 were intended to address the full suite of potentially breeding amphibian species in the area, with 3 survey periods.

- **General Wildlife Surveys**. Observations of wildlife, wildlife sign (e.g. nests, scat, burrows, tracks, browse etc.) and potential wildlife habitat were recorded during all field visits, and recorded by vegetation unit and wildlife unit.

Evaluation of Wildlife Habitat

Data collected as part of field surveys and background information were integrated and reviewed as follows:

- Updated species status reports include: City of Toronto/TRCA (2008) for local significance; the Natural Heritage Information Centre Biodiversity Explorer website (updated regularly) and the Species At Risk in Ontario List (MNR updated regularly) for Provincial significance; and the Natural Heritage Information Centre Biodiversity Explorer website (2010) and the Species At Risk Act Public Registry website (Government of Canada, updated regularly) for National significance;

- Evaluation of habitat status using MNR's Significant Wildlife Habitat Technical Guide (2000) and Significant Wildlife Habitat Ecoregion Criteria Schedules - Addendum to the Significant Wildlife Habitat Technical Guide (2000) – Working Draft January 2009.

- Evaluation of wildlife habitat significance and sensitivity based on a suite of ecological factors including: community type / rarity; species composition and abundance; movement opportunities / linkages; level of disturbance; extent of habitat; overall health and sensitivity of component species to development and occupancy.

Avifaunal

Supplemental Wildlife Observations and Habitat Assessments

- Supplemental wildlife observations were recorded during vegetation and aquatic field visits; these included species sightings, as well as evidence of use (e.g. browse, tracks / trails, scat, burrows, and vocalizations). Wildlife habitat potential was also evaluated during field surveys. Results are presented in Table A.8.1, Appendix C, May 2011 Natural Environment Report, Attachment 8.

4.3.10.1 Wildlife Species Diversity and Abundance

A habitat assessment overview and wildlife survey results for the 23 wildlife survey units are provided in Table 1 of Appendix C, with key features discussed below.

- The broader landscape mosaic within the Study Area provides habitat for a range of common, generalist wildlife species that are tolerant of urban and semi-urban conditions. Aquatic and riparian areas provide some habitat for waterfowl, herons and other water-using species although few such species were observed.
- A total of 99 wildlife species were recorded. Of these, twenty-eight (28) are considered significant wildlife species or wildlife species of concern (Table F.1, Appendix C): one provincially significant (S2) butterfly species; and 27 wildlife species of concern in TRCA region (L1-L3) or urban areas (L4). An additional twenty-four (24) bird species of Conservation Priority were observed. Species significance is discussed in detail in Section 4.3.10.3.
- No wildlife Species-at-Risk were recorded (although one species of Special Concern, Monarch, was recorded).

The status of Bobolink has changed since submission of EAR 2005; it is now designated Threatened (THR) in Canada by COSEWIC, but is not listed on Schedule 1 of the SARA and has no status under that legislation.

Bobolink is now also designated as Threatened Provincially (COSSARO) and subject to the ESA, 2007. Two individuals were recorded in Unit 13 outside the scoped Study Area during the 2003 surveys. This species was not recorded during the 2009 scoped field surveys.

4.3.10.2 Herpetofauna

Amphibians

Results from 2009 calling amphibian surveys are generally similar to 2003/2004 results, considering potential for year to year variability and climatic influence. In general, the scoped Study Area provides relatively limited amphibian breeding habitat (e.g. permanent ponds without fish or woodland vernal pools) and low abundances of a few common, expected species were recorded. Key results are as follows:

- In total, six (6) amphibian species were recorded during 2003, 2004 and 2009 field surveys: Spring Peeper (*Pseudacris crucifer*), Green Frog (*Rana clamitans*), Gray Treefrog (*Hyla versicolor*), American Toad (*Bufo americanus*), Northern Leopard Frog (*Rana pipiens*), and Wood Frog (*Rana sylvatica*). Refer to Table 1 for a

summary and Table A.6.1, Appendix C, May 2011 Natural Environment Report, Attachment 6 for full listing.

- For survey stations in the vicinity of the existing Morningside Tributary and Rouge River crossings of Steeles Avenue, almost no amphibian calling was recorded during any of the 2003, 2004 or 2009 surveys.
  - Stations 1a, 1b and 2 (Morningside Tributary valley): no calling in 2003, 2004 or 2009
  - Stations 5 and 12 (Rouge River valley): no calling in 2003 or 2004, low numbers of Green Frog calling in 2009
- No federally (COSEWIC) or provincially (MNR / COSSARO) designated species at risk, or provincially rare amphibian species (i.e. S1 to S3 ranked by NHIC) were recorded during any of the 2003, 2004 or 2009 surveys.
- Four (4) species are considered regionally significant by TRCA (e.g. ranked L1-L3);
  - L2: Gray Treefrog, Spring Peeper, and Woodfrog
  - L3: Northern Leopard Frog

Table 4-3: Amphibian Species Observed All Years 2003, 2004, 2009

Species	Grank[2]	Srank[3]	COSEWIC[3]	MNR[4]	TRCA rank (2008)[5]	Year Observed		
						2003	2004	2009
Gray Treefrog (*Hyla versicolor*)	G5	S5			L2			X
Spring Peeper (*Pseudacris crucifer*)	G5	S5			L2	X		X
Wood Frog (*Rana sylvatica*)	G5	S5			L2		X	
Northern Leopard Frog (*Rana pipiens*)	G5	S5	NAR	NAR	L3	X	X	
American Toad (*Bufo americanus*)	G5	S5			L4	X	X	
Green Frog (*Rana clamitans*)	G5	S5			L4			X

*See Legend in Appendix C, May 2011 Natural Environment Report, Attachment 7.

Reptiles

Though no reptiles were recorded during field surveys, targeted surveys were not undertaken and a number of reptile species are potentially present in the general area, including Midland Painted Turtle (*Chrysemys picta marginata*), Snapping Turtle (*Chelydra serpentina*), Eastern Red-backed Salamander (*Plethodon cinereus*) and Eastern Gartersnake (*Thamnophis sirtalis sirtalis*).

TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
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WILDLIFE FEATURES

EXHIBIT
4-10

4.3.10.3 Avifauna

In total, 48 bird species were recorded in the scoped Study Area during 2003 and 2009 surveys; results were generally similar in 2003 and 2009 (Refer to Table A.7.1, Appendix C, May 2011 Natural Environment Report, Attachment 7). All but one species are considered possible, probable or confirmed breeding species in the Study Area and are expected for site conditions. Of the total of 48 bird species observed:

- None are federally (COSEWIC) or provincially (COSSARO/MNR) designated species-at-risk or provincially rare (i.e. S1 to S3 ranked by NHIC).
- Six (6) species are considered "Area Sensitive" (species requiring large areas of suitable habitat in order to sustain population numbers) by MNR (2000)[6].
- Seven (7) species are considered regionally significant (L3 rank) by TRCA.
- Five (5) species are 'Interior'[7] forest species and 12 are 'Interior/Edge' forest species. The majority were recorded in Wildlife Unit 8, a large, contiguous deciduous forest block along the Morningside Tributary valley upstream (north) of Steeles Avenue. This forest does contain a small amount of 'interior' habitat (i.e. 100 m from the edge) (Freemark and Collins 1989; Cadman et al. 2007).
- No other habitat types which support species with specific habitat requirements are present in the scoped Study Area. These include, for example, rare habitat types such as alvar, fen, large open water / marsh areas or large concentrations of coniferous trees or Carolinian woodland.
- Many of the bird species recorded are habitat generalists and/or urban-adapted species such as American Robin, European Starling, Red-winged Blackbird, Common Grackle, Brown-headed Cowbird and Song Sparrow. These are common throughout the Study Area and Toronto Region.
- Some forest-associated species (e.g. Pileated Woodpecker, White-breasted Nuthatch, Wood Thrush, Scarlet Tanager and Eastern Wood-pewee) and wetland-associated species (e.g. Great Blue Heron, Belted Kingfisher) were also recorded.
- **Raptors**. Several raptors were recorded during the 2003 and 2009 surveys: Red-tailed Hawk, Great-horned Owl and Northern Harrier. Although no raptor nests were recorded during the 2009 survey, there is suitable nesting and foraging habitat present in the Study Area (e.g. sub-mature to mature deciduous forest). Additional raptors not recorded during field surveys but possible given site conditions include: Sharp-shinned Hawk, Cooper's Hawk and Eastern Screech Owl.

[6] **Area Sensitive** bird species require "a substantial area of suitable habitat for successful breeding and their populations decline when habitat becomes fragmented". This includes birds of various habitats, such as grassland or forest birds. In the case of forest birds, the minimum forest habitat for area sensitive species is at least 100 metres from any edge habitat" (MNR 2000; pp 43).

[7] **Interior** bird species require habitat which is often found 100 m from the forest edge while **Interior/Edge** species are found within both interior and edge habitat (Freemark and Collins, 1989).

Forest Interior bird species primarily breed *at least* 100 metres from the forest edge, thereby requiring larger woodlands (Cadman et al 2007). It should be noted that the concept of 'forest interior' is being reconsidered in the scientific community due to varying habitat use by wildlife. That is, some species which have been identified as forest-interior or forest-dependent, do not use only forest interior or core areas, but are also found in smaller woodlands and at woodland edges ((Freemark and Collins, 1989; Yahner et al. 1997; Yahner et al. 1997).

- There was no nesting activity noted during 2009 scoped site investigations. One inactive Phoebe nest was recorded on the Rouge River bridge on December 2, 2010.
- No nests were observed at the Morningside Tributary culverts; however, these culverts may provide limited potential for nesting. Given the variety of vegetation communities present (upland forest, cultural thicket, meadow marsh, cultural meadow and lowland forest), there is potential for migratory bird nesting activity in areas proposed for road improvements.

4.3.10.4 Other Wildlife

Refer to Appendix C, May 2011 Natural Environment Report, Attachment 8, Table A.8.1 for a full list of other wildlife species recorded within the scoped Study Area.

Mammals

In general, the Study Area provides habitat for common, urban-adapted and/or generalist mammal species. In total, four species of mammals were recorded during the combined 2003 and 2009 field surveys: White-tailed Deer (*Odocoileus virginianus*), Eastern Chipmunk (*Tamias striatus*), Raccoon (*Procyon lotor*) and Coyote (*Canis latrans*).

None are federally (COSEWIC) or provincially (MNR/COSSARO) designated species at risk, provincially rare species (i.e. S1 to S3 ranked by NHIC) or regionally significant TRCA L-ranked (e.g. L1-L3) species.

This area likely supports a range of common mammals that were not recorded during field surveys but are often found in similar habitats throughout the province. These species include Groundhog (*Marmota monax*), Red Squirrel (*Tamiasciurus hudsonicus*), Grey Squirrel (*Sciurus carolinensis*), Beaver (*Castor canadensis),* Red Fox (*Vulpes fulva*), Porcupine (*Erethizon dorsatum*), Mink (*Mutela vison*), Striped Skunk (*Mephitis mephitis*), and Eastern Cottontail (*Sylvilagus floridanus*), in addition to a number of small mammals that often go undetected (e.g. example shrews, voles, mice, bats).

Insects

Two Odonate species and 13 Lepidoptera species were recorded during the combined 2003 and 2009 field surveys, in conjunction with other field surveys (refer to Attachment 8, Table 5). These are common throughout Ontario and expected for site conditions.

One SAR was recorded: Monarch (*Danaus plexippus*). Monarch is a federally (COSEWIC) and provincially (MNR) designated Species of *Special Concern*, primarily because of on-going threats to its wintering areas located outside of Canada. This species, and its larval host plant of Common Milkweed (*Asclepias syriaca*), are actually common in Ontario. No notable stands of Milkweed or exceptional old field habitat were recorded in the scoped Study Area.

4.3.10.5 Wildlife Movement Opportunities

Wildlife movement opportunities are noted on Exhibit 4-10. As expected, the greatest opportunities for wildlife movement are provided by the larger valley systems (Morningside, Rouge and Little Rouge). These are generally less disturbed systems with much greater natural vegetation cover, habitat diversity and wildlife habitat elements. In addition, they are relatively wider and have fewer barriers at road crossings (i.e., bridges

vs. culverts in smaller systems), affording a greater opportunity for movement by larger mammals such as deer. It should be noted, however, that major road and railway barriers / filters do exist in this setting. Of the three larger valleys, the Little Rouge Creek valley likely provides the best opportunities for wildlife usage and movement, given its breadth, smaller number of barriers and moderate to dense woody vegetation cover.

The smaller tributary valleys are generally highly disturbed, narrow features with limited natural vegetation cover. As such, they may provide some local wildlife movement opportunities, but are not important at a regional scale and do not allow passage of larger animals.

Other features such as the larger wetland and woodland blocks provide habitat nodes for the most mobile wildlife groups (birds and some mammals), and may function as linkage features to varying degrees for less mobile species (such as amphibians/reptiles) that are able to disperse across open fields. However, these larger woodland blocks are all associated with the valleys.

Wildlife movement opportunities are generally associated with the three valley systems, with the Rouge River valley generally most significant is this regard, given its size and an existing crossing structure which permits terrestrial passage. However, terrestrial passage is somewhat constrained given the narrow width (particularly during higher flows), unsuitable substrates (large rip rap) and lack of protective cover in the immediate vicinity of the bridge.

The Morningside Tributary valley is also a major valley system which provides wildlife movement opportunities, but wildlife passage is highly constrained by the steep embankment and relatively small culvert at Steeles Avenue; this culvert has limited potential for terrestrial passage in general, and no terrestrial movement potential during periods of higher flow / beaver influenced water levels when the culvert is nearly full).

The Neilson Tributary valley is a smaller, narrow and anthropogenically influenced system with limited connectivity much further upstream of the proposed crossing (i.e. it originates as a field swale with limited vegetation). As such, it provides some local wildlife movement opportunities, but is not as important at a regional scale and wouldn't allow passage of larger animals through smaller culverts at roads and the rail line. There is currently no crossing at the proposed alignment.

4.3.10.6 Significant Wildlife Species and Species of Concern

In total, twenty-eight (28) significant wildlife species and wildlife species of concern have been recorded within the Study Area. A composite list of significant wildlife species is provided in Table 2 of Appendix C and significant species are listed, by wildlife habitat unit, in Table 1 of Appendix C.

Nationally and Provincially Significant Species

No nationally significant species were recorded. One provincially significant species, Giant Swallowtail (S2) was recorded in Wildlife Unit 2, at the north end of the Box Grove forest. This is likely an 'accidental' or stray from outside York Region.

No wildlife Species-at-Risk were recorded, but one species of Special Concern[8], Monarch, was recorded. The Monarch Special Concern status is based on ongoing threats to wintering habitat outside of Canada. Habitat for this species (i.e., meadows with Milkweed spp.) is present, but no notable concentrations of the host plant or butterflies were observed. Such habitat and Monarch butterflies are common in Ontario and elsewhere in the species' Canadian range.

Please note earlier comments above regarding Bobolink status change.

Species of Concern in TRCA Region

Twenty-seven (27) Species of Concern in TRCA Region (i.e., Level 1-3 and Level 4, if found in urban areas) have been recorded during field surveys for this project and in previous studies. Most are Level 3 and Level 4, with several Level 2 species also recorded. Many of these species share a 'Conservation Priority' designation, discussed below. Most were recorded in habitats in the larger valley systems.

Conservation Priority Species

In addition to the locally and regionally significant species noted in Table 2, 24 bird species considered Conservation Priority[9] (CP) in York Region or Toronto were recorded. By CP Level, these species are as follows:

York Region (24 species):

- **Level 1**: Northern Mockingbird, Brown Thrasher and Savannah Sparrow.
- **Level 2**: Pileated Woodpecker, Bank Swallow, Mourning Warbler, Swamp Sparrow and Bobolink.
- **Level 3**: Ruby-throated Hummingbird, Red-bellied Woodpecker, Alder Flycatcher, Eastern Kingbird, Indigo Bunting, Black-and-White Warbler, American Redstart, Scarlet Tanager, Barn Swallow, Eastern Meadowlark and American Goldfinch.
- **Level 4:** Black-capped Chickadee, Wood Thrush, Gray Catbird, Wood Duck, American Woodcock and Orchard Oriole.

Toronto Region (22 species):

- **Level 1:** Pileated Woodpecker, Savannah Sparrow, Bank Swallow, Mourning Warbler, Northern Mockingbird, Brown Thrasher
- **Level 2:** Ruby-throated Hummingbird, Bobolink, Eastern Meadowlark, Swamp Sparrow, Scarlet Tanager and American Redstart.

[8] Although Monarch is considered Special Concern in Canada, the primary threat is loss of wintering habitat in the highlands of Mexico. Ontario represents a large proportion of the Monarch's Canadian range.

[9] **Conservation Priority** – is a planning tool developed by Bird Studies Canada that assigns bird species a conservation priority status for regions (Municipalities) in southern Ontario. Evaluation is based on three components – Jurisdictional Responsibility (breeding distribution), Area Sensitivity (habitat cover required for breeding), and Preservation Responsibility (biological sensitivities). The aim is to help identify significant natural heritage features, and prioritize conservation efforts through the occurrence of bird species of regional priority, as one component for consideration. It is not intended to identify indicator species, rare and threatened species or those in need of population restoration and has no ***formal municipal*** Official Plan Status.

- **Level 3:** Red-bellied Woodpecker, Eastern Kingbird, Alder Flycatcher, Orchard Oriole, Barn Swallow, Black-and-White Warbler and American Goldfinch.
- **Level 4:** Wood Duck, American Woodcock and Black-capped Chickadee.

Since EAR 2005, there have been updates to the TRCA fauna rankings. Of the six (6) Herpetofauna species observed in the Study Area, four species previously not ranked, are now L-ranked by TRCA: American Toad (L4), Leopard Frog (L3), Spring Peeper (L2) and Snapping turtle (L2).

The number of bird species ranked between L1 and L4 increased from 27 to 33 species. Additional field surveys in 2009 recorded two additional frog species: Green Frog (Rana clamitans) (L4) and Gray Treefrog (Hyla versicolor) (L2).

Additional field surveys in 2009 recorded four additional bird species within the vicinity of the Steeles Avenue closings of Rouge River and Morningside Tributary.: Great Blue Heron (L3), White-breasted Nuthatch (L4), Chipping Sparrow (L5) and House Sparrow (L+).

4.3.10.7 Environmental Issues to Consider

Within the Study Area, the major valley systems and associated areas (Morningside Tributary, Rouge River, Little Rouge Creek and Tributary B, including the Box Grove Forest) provide the most significant wildlife habitat, in terms of habitat size, diversity, level of disturbance, specialized habitat elements, connectivity / movement potential and overall ecological quality. As demonstrated by specific and supplemental field surveys, these valleys support the richest diversity of wildlife and greatest number of significant and sensitive species.

Habitat blocks outside of these valleys and smaller / disturbed valley systems provide ecological support roles to varying degrees, including minor movement functions, functional connectivity (via close proximity to larger features), occasional use by forest-associated species (typically for foraging activities) and habitat for common, generalist and tolerant / urban-adapted species.

The primary issues to consider with respect to wildlife are: direct removals of higher quality wildlife habitat; indirect impacts and fragmentation of important wildlife movement corridors.

4.3.11 Significant Wildlife Habitat

Wildlife habitat significance was evaluated using the Significant Wildlife Habitat Wildlife Habitat Technical Guide (MNR 2000), in which "significant wildlife habitat" is broadly categorized as:

1. Seasonal concentration areas (e.g. conifer forests for deer wintering);
2. Rare vegetation communities or specialized habitats for wildlife;
3. Habitats of species of conservation concern, excluding the habitats of endangered and threatened species; and
4. Animal movement corridors.

Wildlife is described as:

" *all wild mammals, bird, reptiles, amphibians, fishes, invertebrates, plants, fungi, algae, bacteria and other wild organisms*" (Ontario Wildlife Working Group, 1991 as referenced in Significant Wildlife Technical Guide, 2000).

Additional clarification with respect to determination of significant wildlife habitat is provided in the Draft Significant Wildlife Habitat Ecoregion Criteria Schedules (MNR 2009).

The large valleys within the Study Area would be considered significant wildlife habitat based on meeting criteria 3 and 4. The culturally influenced smaller tributary systems and remaining anthropogenic landscape features do not meet the criteria outlined above.

- There are no documented seasonal concentration areas (although some potentially suitable conifer cover is present in the Morningside Tributary valley south of the CPR line).
- No provincially significant vegetation communities are present. Five vegetation communities of conservation concern (Level 3) in TRCA region are present, all of which are associated with major valleys. Although some groundwater seepage zones are present, other specialized habitats for wildlife (e.g. diverse, cavity tree rich forests, old growth forests, woodland amphibian breeding ponds etc.) are absent or generally not abundant.
- There is habitat for one provincially significant species / Species-at-Risk, Redside Dace (S3; Threatened in Ontario, Special Concern in Canada). There are historic and/or recent records of this species in the Rouge River and Morningside Tributary. One additional S2 species, Giant Swallowtail, was recorded, but this is likely a stray from its normal range. There is also habitat for several species considered regionally significant – generally in larger valleys and associated woodlands.
- Identified animal movement corridors are predominantly restricted to the larger valleys, although it should be noted that there are numerous road and rail crossings of all valleys within the Study Area. In addition, local movement opportunities exist along the smaller disturbed tributaries. No major hedgerows or other linear vegetation features are present.

Based on updated 2009-2010 field work and analysis, there are no changes to conclusions regarding potential Significant Wildlife Habitat from EAR 2005 – the Rouge and Morningside valleylands would still likely be considered as such.

4.3.12 Contaminated Material

A site contamination review was carried out for the Donald Cousens Parkway to Morningside Avenue Link Corridor south of Highway 407 in order to identify any areas of potential contaminated soil within the Study Area that may have resulted from previous and / or current land uses (see Appendix C) as part of the 2005 EA. Areas were identified based on a review of the following:

- Visual inspection of the corridor and surrounding properties;

- Review of relevant aerial photographs of the corridor and surrounding area obtained from the Ministry of Natural Resources (MNR) for 1954, 1971, 1978, and 1997;
- Review of Metropolitan Toronto and York Region City Directories from 1958 to 2001;
- Contacted the Technical Standards and Safety Authority (TSSA) Fuels Safety Division regarding existing or abandoned fuel storage tanks within the corridor;
- Requested Historical Environmental Information Reporting System (HEIRS) Report; and
- Review of Ecolog Environmental Risk Services Ltd. Report for the corridor, which included searches of various federal, provincial and private source databases.

Based on the field review, aerial photographs and the above noted documentation the following areas of potential site contamination have been identified.

- Hydrocarbon impacted soils may be encountered at some locations directly under the railway tracks for the CP Rail and CN Rail corridors.
- An asphalt plant is located south of Passmore Avenue and east of Tapscott Road. The plant is approved for the release of industrial air into the environment and is a generator of various wastes. There is the potential to encounter hydrocarbon impacted soils if the site was impacted during construction.
- The Malvern Remediation Site located south of Passmore Avenue has existed since 1995 and contains mildly radium – contaminated soils. The site is monitored regularly to demonstrate that the site has not impacted the environment. The site is owned by the Ontario Realty Corporation and is regulated by the Canadian Nuclear Safety Commission.
- A small scrap yard is located south of Steeles Avenue and adjacent to the west side of the CP Rail corridor. There maybe the potential for hydrocarbon or metal impacted soils in the vicinity of the scrap yard.
- Hydrocarbon impacted soils may be located in the vicinity of the maintenance buildings associated with the golf course north of Steeles Avenue and west of Ninth Line.

There has been no change in findings / conclusions regarding contaminated material from EAR 2005.

4.4 Agriculture

There have been no changes in agriculture land use since EAR 2005.

4.4.1 Soil Capability

Soils were classified for their potential agricultural capability based on the Soil Capability for Agriculture system developed as part of the Canada Land Inventory (Environment Canada, 1972). The Foodland Guidelines (1978) were originally referenced and later updated by the Agricultural Land Use Policies of the MMA Provincial Policy Statements in 1995 and 1996. Published soil surveys (Hoffman and Richards, 1955), aerial mosaics and topographic mapping as well as general field

reconnaissance were additional data sources. Other geological and physiographical data were used as a cross-reference to the agricultural soils maps.

4.4.2 Agricultural Land Use

Agricultural land use was based on the Ministry of Agriculture, Food and Rural Affairs Land Use Systems (1983) mapping, as well as aerial mosaics and general field reconnaissance to identify crop types and agricultural field usage in the Study Area. These field observations were updated regularly throughout the course of the study.

4.4.3 Farm Community

Information on the farm community was collected via: letters to landowners to solicit comments on proposed transportation improvements; and formal and informal contact with farmers, including comments and discussions during Public Consultation Centres from 2003 – 2005, used to develop an understanding of farming activities within the agricultural community.

4.4.4 General Overview

According to the Town of Markham Official Plan, City of Toronto Official Plan and Scarborough Official Plan, agricultural land use within the Study Area includes lands north of Steeles Avenue (more specifically north of 14th Avenue and east of the CPR line south of 14th Avenue), in addition to some lands south of Steeles Avenue. Additional lands south of Steeles Avenue are either designated as natural heritage features or are already developed or planned for development.

Within Markham, active agricultural land use and the location of most active farms (owner-operated and leased operations) generally correspond with those lands identified above (i.e., north of 14th Ave. and south of 14th Ave. east of the CPR). During the study, those lands were planted in a mixture of crops including corn, soybeans and barley. According to the Canada Land Inventory mapping, those lands are identified as either Class 1 Soils (no significant limitations) or Class 3 Soils (moderately severe limitations), for the production of common field crops. Under policy 2.3 of the Provincial Policy Statement (MAH, 2005), specialty crop lands and Class 1 to 3 lands are to be given the highest priority for protection. The factors limiting the agricultural productivity of high capability soils in the Study Area include erosion potential, low fertility, and inundation by streams or lakes, moisture limitations, adverse soil characteristics, topography and excess water. Soil capability, for the rural section of the Study Area, is shown in Appendix C.

Most of the lands currently used for agriculture are also within the Greenbelt Plan area (i.e., lands to the east of the CPR and north of the CN lines). With this designation, continued agricultural land use is viable in the future.

West of the CPR line south of 14th Avenue, the lands are a mix of agricultural (most of which is currently under development or slated for development), hazard lands in the valleys and urban with existing, proposed or approved residential or commercial development. This area is excluded from the Greenbelt Plan area and agricultural land use is not viable or desirable within such a landscape. Any existing agricultural land use in those areas is anticipated to be interim in nature.

4.4.5 Environmental Issues to Consider

The primary issues of concern with respect to agriculture are: loss of prime agricultural land (Class 1 to 4 soil types), impacts to movement of farm machinery (i.e., crossing busy roads) and overall impact to the farm community.

4.5 Transportation

The existing transportation network is shown on Exhibit 4-11. The major Roads within the Study Area are Ninth Line, 14th Avenue, Steeles Avenue, Highway 407, Morningside Avenue and Reesor Road. The rail corridors within the Study Area include both CN and CP Rail. Since EAR 2005, part of the Box Grove Bypass has been constructed as shown in Exhibit 4-11 and a Town of Markham Arterial Road is under construction.

All updates of the existing and future transportation conditions (i.e. roadway network and transit initiatives) have been incorporated into the additional traffic analysis documented in Section 3.3. As noted in Section 3.3, the needs that motivated the undertaking in EAR 2005 is still required even with the recent improvements in the roadway network and transit system. The updated existing and future transportation conditions are also included in the analysis and evaluation of alternatives in Chapter 6.

4.5.1 Road Network

Both Ninth Line and 14th Avenue are designated as arterial roads under the jurisdiction of York Region. Ninth Line has a 2-lane rural cross-section and is a north-south arterial road. The *Secondary Plan for the Box Grove Planning District* (June 2002) includes the realignment of Ninth Line to the CP Havelock Subdivision where it would meet the Town Arterial Road and continue south to where it would reconnect with existing Ninth Line at the Hydro One Corridor. Existing Ninth Line would be redesignated as a minor collector road. The Secondary Plan notes that the Town Arterial Road and realigned Ninth Line alignment from the CP Havelock Subdivision could be used for Donald Cousens Parkway to Morningside Avenue Link Corridor south of Highway 407, and if so, Ninth Line will terminate at the CP Havelock Subdivision.

Since EAR 2005, Ninth Line has been modified as part of the Box Grove development. As per the Secondary Plan for the Box Grove Planning District (June 2002), a new arterial has been built extending from Ninth Line north of the Hydro One Corridor, which parallels the CP Havelock Subdivision for approximately 1 km, turns perpendicular along a north west alignment and reconnects with the original Ninth Line alignment south of Highway 407. The section of Ninth Line bypassed by the new alignment had been redesignated as a minor collector road, and the new arterial road section has been named the Box Grove Bypass. As noted in the Secondary Plan, the realigned arterial along the CP Havelock Subdivision could be used for the Donald Cousens Parkway to Morningside Avenue Link Corridor South of Highway 407. The Box Grove Bypass has been constructed in a 36 m right-of-way with an ultimate 45 metre right-of-way designated in the Regional Official Plan (protects for future rapid transit corridor as identified in the York TMP 2009) with a 4-Lane cross-section and right and left turn lanes provided at all intersections as necessary. The Box Grove Bypass, connecting with Ninth Line through the Town of Markham, is also designated as a part of a Regional Rapid Transit Corridor.

TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
(formerly Transportation Improvements
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ENVIRONMENTAL ASSESSMENT

EXISTING CONDITIONS
TRANSPORTATION

EXHIBIT
4-11

In conjunction with the final build-out of the Box Grove Planning Area, Markham is constructing a Town Arterial Road to address local traffic needs from the Box Grove Bypass to the existing terminus of the Donald Cousens Parkway at Highway 407.

Currently, 14th Avenue is an east-west arterial with a two lane rural cross-section. The *Secondary Plan for the Box Grove Planning District* (June 2002) includes the realignment of 14th Avenue to the south at the CP Havelock Subdivision (at-grade crossing) and a potential future grade separation, which is currently planned by 2021 (York Region Transportation Master Plan, November 2009), but is subject to funding availability and priority setting for rail grade separation. The maximum right-of-way width is 36 m (*York Region Official Plan, November 2002,* and December 2009).

York Region will be completing a Class Environmental Assessment study in the future for 14th Avenue road works. The at grade crossing of 14th Avenue and the CP Rail is being realigned in conjunction with the Town Arterial Road that is being constructed as part of the build out of the Box Grove Development.

Reesor Road is a north-south local road under the jurisdiction of the Town of Markham with a two lane rural cross-section. Schedule 'G' of the *Town of Markham Official Plan* (January, 1999) indicates a future road widening requirement of 26 m and Schedule 'C' shows intersection improvements at 14th Avenue.

Within the Study Area, Steeles Avenue is a two lane east-west arterial road under the jurisdiction of the City of Toronto with a rural cross-section. In 1992, a Class EA was approved for the widening of Steeles Avenue to four lanes from McCowan Road to the Pickering Townline. The widening was carried out from McCowan Road to just west of Tapscott Road, and from Townline west to Beare Road when the Taunton Road Extension was constructed. There have also been several local improvements more recently to support development in the Tapscott Employment District and in Morninside Heights (at Staines Road).

The City of Toronto has indicated that the timing for the widening of Steeles Avenue through the Study Area is unknown. During the Study, the City of Toronto advised that any alternative should protect for the potential grade separation of Steeles Avenue and the CP Rail Corridor. Since EAR 2005, Steeles Avenue has been designated as a future Rapid Transit Corridor, as part of Metrolinx 25-year plan (and the MTO Durham-Toronto-York Area Transportation Study (August 2009), completed in support of the Seaton Development), connecting York Region, the City of Toronto, and Durham Region.

Morningside Avenue is an urban arterial road (36m right-of-way) under the jurisdiction of the City of Toronto, which begins just north of Lake Ontario at Guildwood Parkway to Old Finch Avenue (since EAR 2005, Morningside Avenue has been extended to Oasis Boulevard / McNicoll Avenue north of Finch Avenue). Morningside Avenue has an interchange with Highway 401 and is currently four lanes north of Sheppard Avenue to Old Finch Ave. A Class EA for the Finch/ Morningside / CPR grade separation was filed in March 2002. As part of the Class Study, it was recommended that Morningside Avenue be widened to four lanes north of Halfway Avenue and realigned north of Old Finch Avenue to curve north across the CPR tracks. From the CPR tracks the alignment would then curve to connect to the alignment for the extension of Morningside Avenue as

part of the Morningside Heights development. The Class EA was approved in the Spring of 2002 and detailed design began in early 2005.

The Finch/ Morningside / CPR grade separation was completed since EAR 2005. Morningside Avenue now curves west across the CPR tracks to meet Finch Avenue, and curves back to a north-west alignment through the Morningside Heights development, ending approximately 1.4 km north-west of Finch Avenue.

The Morningside Avenue Extension corridor from Finch Avenue to Steeles Avenue has been identified in Schedule 2 of the Toronto Official Plan (July 2006). The *Morningside Heights Secondary Plan* provides for an alignment in the Buffer Reserve south of the CP Rail line. Neilson Road has been realigned as Morningside Avenue and Oasis Boulevard, and will be closed just south of Passmore Avenue once the McNicoll Avenue Extension is open to traffic. At that time Passmore Avenue will also be closed west of the CPR. McNicoll Avenue Extension will serve the future east – west component of the network at the south end of the Study Area. The intersection of Morningside Avenue and McNicoll Avenue is the proposed terminus of this study. Provision has been included in the Secondary Plan for the potential extension of Morningside Avenue towards Steeles Avenue.

Highway 407 is a toll highway, which extends from the QEW in Burlington to east of Brock Road in the City of Pickering. Within the Study Area, the highway has a 4-lane divided cross-section and is the most northern boundary of the Study Area. Since EAR 2005, the highway now has a 6-lane divided cross-section and is the most northern boundary of the Study Area.

The portion of the Donald Cousens Parkway north of Highway 407 was approved separately in 1997 with construction of the Donald Cousens Parkway north of 16th Avenue having commenced in 2002. Construction has been completed for the section of the Donald Cousens Parkway from Highway 407 to Major Mackenzie Drive, including the new partial interchange with Highway 407. The environmental assessment for the north section Donald Cousens Parkway interchange with Highway 407 did not include the S-E or S-W moves as part of the approvals. Donald Cousens Parkway generally has a 4-lane cross section in a 36 m right-of-way. The overall road network is shown on Exhibit 4-11.

4.5.2 Rail Corridors

The Study Area is crossed by both the CN York Subdivision and the CP Havelock Subdivision. The CN York Subdivision extends from the north-west and crosses over both Ninth Line and Steeles Avenue. The main function of the railway is the movement of freight through the GTA. According to CN, the York Subdivision is currently operating at full capacity, with an average of 55 trains per day. Future plans for the York Subdivision would include the requirement to double track the existing single track sections.

The CP Havelock Subdivision extends from the south-west and crosses at-grade with Steeles Avenue, Ninth Line, 14th Avenue and Reesor Road. The major function of the CP Havelock Subdivision is a branch line for freight movements. According to CP Rail, the frequency of trains on the Havelock Subdivision is 2 trains per day.

The *York Region Transportation Master Plan* (June 2002) has shown GO Rail service on the CP Havelock Subdivision as part of the proposed 2031 transit network within York Region with a possible GO Station in the vicinity of Locust Hill. According to CP Rail, there is a possibility for resumption of VIA service to Peterborough or commencement of GO Service to Peterborough or a destination nearer to Toronto. Timing of the implementation of these services is dependent on federal and provincial government initiatives.

Since EAR 2005, GO Rail transit service has been proposed on the CP Havelock Subdivision as part of the York Region Transportation Master Plan (December 2009) and as part of Metrolinx's The Big Move (November 2008), with a possible GO Station in the vicinity of Locust Hill. The project is listed as part of Metrolinx's 15-year plan. There is also a possibility for resumption of VIA rail service to Peterborough or commencement of GO Service to Peterborough or a destination nearer to Toronto. The federal government made funding commitments in February 2008 to commence such a service, but the project is currently under study and review. Timing of the implementation of these services is dependent on federal and provincial government initiatives.

4.5.3 Transit

Within the Study Area there are existing transit services operated by both York Region Transit (YRT) and the Toronto Transit Commission (TTC). In addition to the existing service, future transit initiatives are being planned by both York Region and the City of Toronto, as well as the Province of Ontario through the provincial agency Metrolinx.

Existing Service

York Region Transit operates Route 2 and 2A. Route 2A - service along 14th Avenue during weekdays only into the Legacy Community located west of Ninth Liner (via Legacy Drive, Rouge Bank Drive and Russell Jarvis Drive) and along Ninth Line to the Markham-Stouffville Hospital. It is proposed that this service will be extended east into the Box Grove community in a phased approach, based on development. This service will provide transportation opportunities for residents and businesses in the Box Grove community. Since EAR 2005, this service has also been extended east into the Box Grove community via Box Grove By-Pass and Riverwalk Drive.

Existing transit initiatives are shown on Exhibit 4-12. Since EAR 2005, York Region Transit Route 2 - Milliken operates along Denison Avenue with a eastern terminus in the Study Area. The route extension operates along Elson Street, Eastvale Drive and Steeles Avenue during weekday peak periods. During weekends and holidays, the route operates north along Markham Road from Denison Avenue, to 14th Avenue, along Chatelaine Drive, Roxbury Street, Boxwood Crescent and Legacy Drive to terminating at Rouge Bank Drive and Russell Jarvis Drive.

TTC operates several transit routes in and around the Study Area. Bus service is provided on Steeles Avenue to Markham Road (Route 53 branches A & B), with reduced service provided to Staines Road (Route 53 A only). Additional peak period only semi-express services, Routes 53 E and F, operate to Markham Road and Staines Road respectively. TTC Route 102 operates on Markham Road, with Route 102 branch D extending north of Steeles Avenue, operated under contract by YRT.

Service is provided to the Morningside Heights community on Morningside Avenue (Route 116) via Nightstar Road and Mantis Road, as well as on Neilson Road (Route 133) which extends into the community via Morningside Avenue, Oasis Boulevard, Seasons Drive and Staines Road. Finally, Progress Avenue (Route 134 B) operates as an extension into the Tapscott industrial area during rush hours only. Typical headways for existing services in the Study Area are listed in Table 4-4.

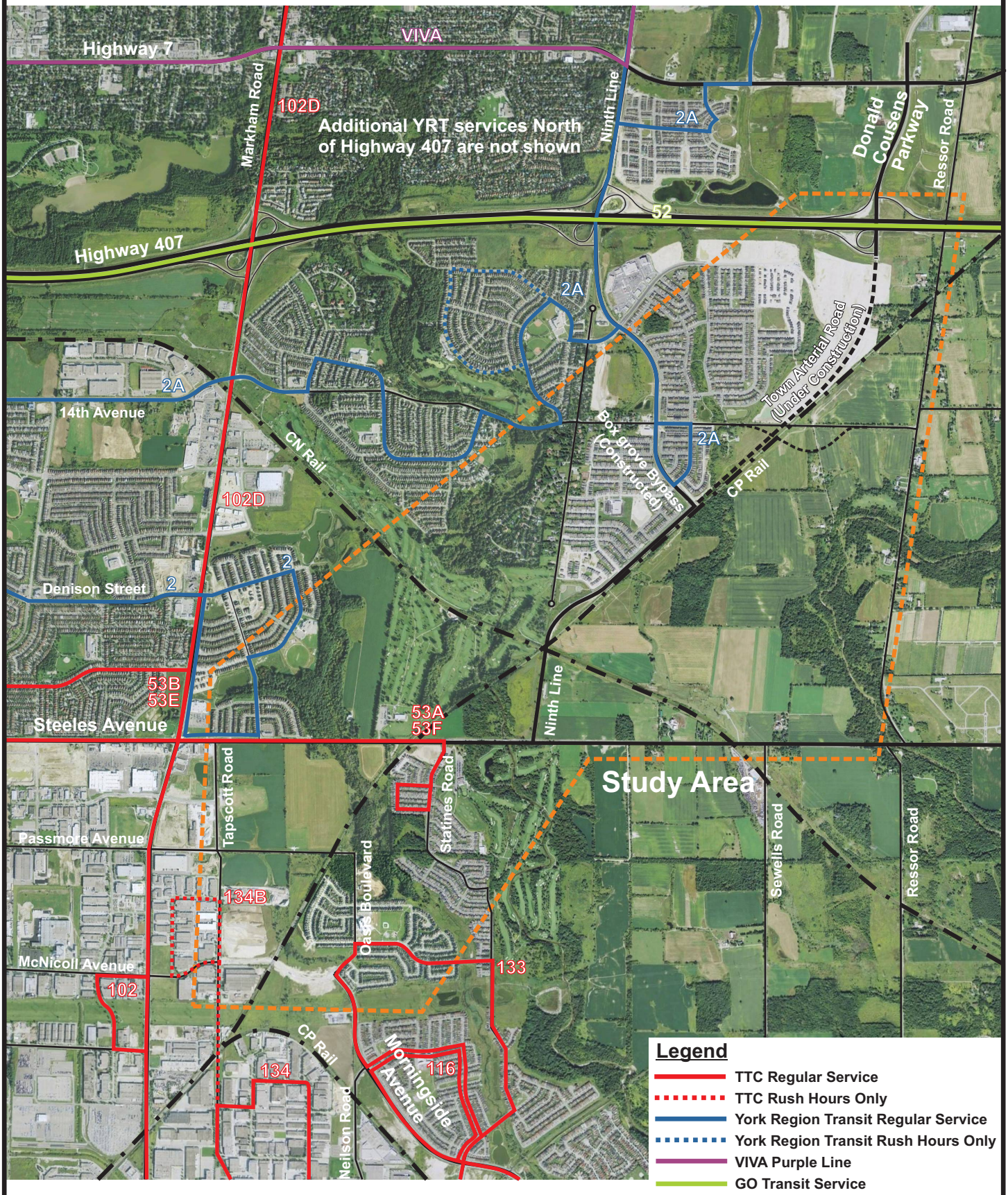
Table 4-4 Existing Transit Service Headways for Routes in the Study Area

Service Provider	Route Number	Route Name/Description	Headways (minutes)		
			Weekday		Weekend
			Peak	Off-Peak	
YRT	2	Milliken	20	30	30
	2A	14th Avenue	30	30	-
TTC	53 A,B,E&F	Steeles Avenue, west of Markham Road	3	6	10
	53 A&F	Steeles Avenue, east of Markham Road	10	12	20
	102 C&D	Markham Road, south of Steeles Avenue	10	15	20
	102 D	Markham Road, north of Steeles Avenue	20	30	60
	116	Morningside Avenue	6	9	10
	133	Neilson Road	9	10	12
	134 B	Progress Avenue, to Tapscott Road	20	-	-

GO Transit also operates several bus routes on Highway 407, Routes 51, 52 and 54, providing connections from Oshawa, Pickering, Scarborough and Markham to York University. Although there are no stops in the immediate vicinity of the Study Area, the bus services operates from Pickering via Scarborough Town Centre and Langstaff GO Station (Route 51), from Oshawa via Unionville GO Station (Route 52), and from several stations on the Stoufville Line (Route 54) to York University. Service levels vary, but typically each line operates at headways of 30 minutes during peak periods, and 1 hour during off-peak periods.

GO Transit currently runs weekday peak hour, peak direction service along the Stouffville GO rail line, supplemented by off-peak bus service in the same corridor. Currently, 5 trains run inbound to Toronto in the morning, and outbound to Markham in the evening, at headways of approximately 15 minutes. The GO bus service runs every 30 minutes in both directions during the early afternoon period and evenings to Union Station, and every 60 minutes at other times, including the off-peak direction during peak periods.

Existing transit services are shown on Exhibit 4-12.



TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
(formerly Transportation Improvements
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ENVIRONMENTAL ASSESSMENT

EXISTING TRANSIT SERVICES

EXHIBIT
4-12

Future Initiatives

Since EAR 2005, there has been an increased emphasis on improving mobility via transit in the Greater Toronto Area. Plans have been formulated to provide regional rapid transit connections across the Greater Toronto Area, including in southeast Markham and northeast Toronto. Metrolinx's The Big Move (November 2008), proposed several rapid transit lines, including Highway 7 north of the Study Area, Markham Road to the west, and Steeles Avenue in the Study Area.

As discussed under section 4.5.2 Rail Corridors, new or improved GO Transit service is also proposed on rail lines in the vicinity, including the existing GO Stouffville Line, along the CP Havelock Subdivision and along the CP mainline to Seaton north of Pickering/Ajax. Table 4-5 lists Metrolinx's rapid transit proposals in the vicinity of the Study Area.

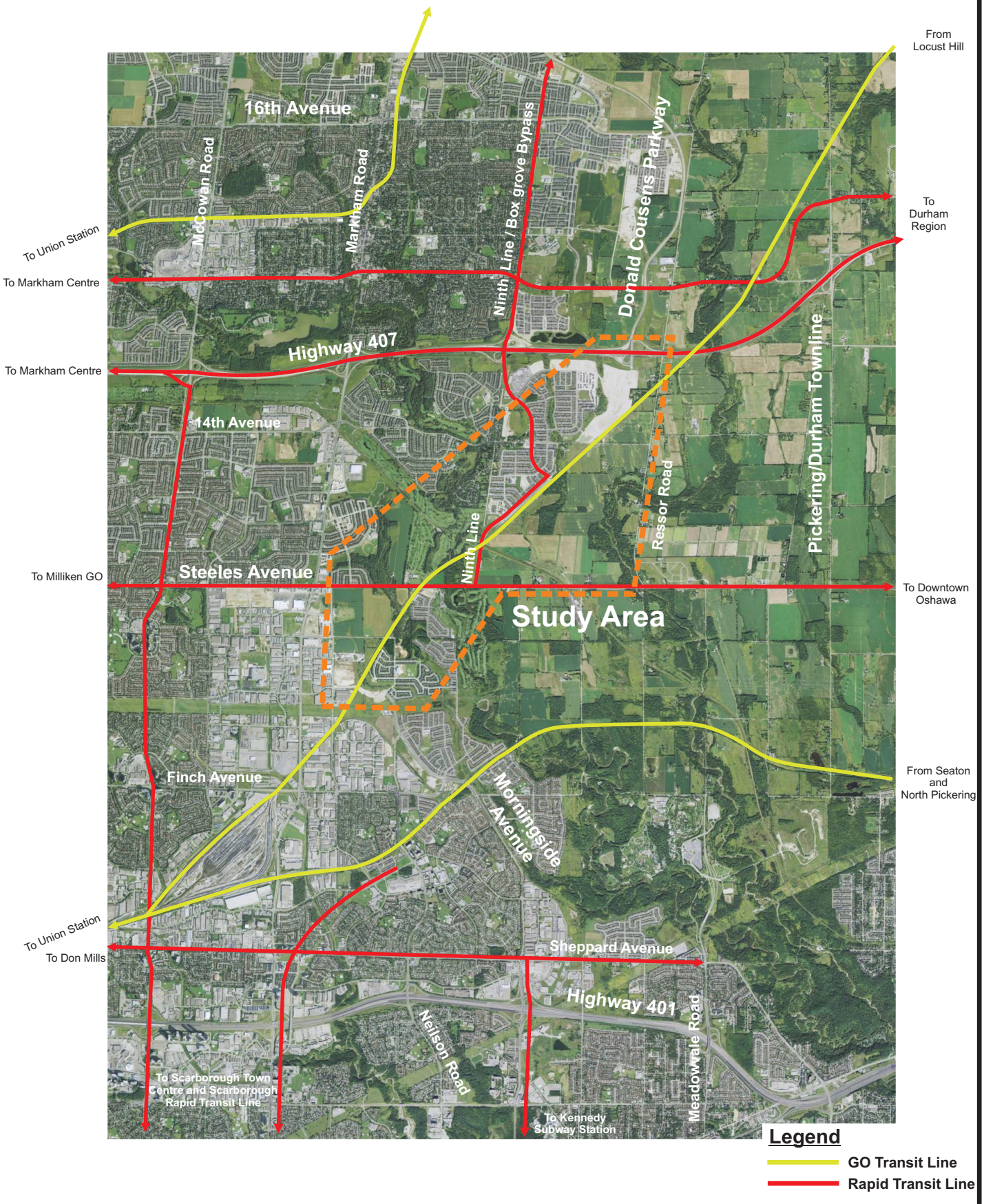
York Region has identified many of the same transit corridors selected by Metrolinx, but makes some additional proposals (York Region Transportation Master Plan, November 2009). Ninth Line is a proposed rapid transit corridor between Major Mackenzie Drive East and Steeles Avenue. The service is proposed to operate from north to south via Donald Cousens Parkway, Ninth Line, Box Grove Bypass, and the Donald Cousens Parkway/Morningside Avenue Link, which is the subject of this study. Transit priority is also proposed for other major routes, such as 14th Avenue, west of Box Grove Bypass.

Table 4-5 – Metrolinx's Rapid Transit and GO Transit Improvements in Northeast Scarborough and Markham

Metrolinx Number	Line Name	Start/End Points	Timeline
11	Stouffville Line	Mt Joy GO to Union	15-year
12	Havelock Line	Locust Hill (Markham) to Union	15-year
13	Seaton Line	Seaton to Union	15-year
27	Hwy 7	Peel-Boundary to Locust Hill (Markham)	15-year
34	Sheppard Avenue East	Don-Mills to Scarborough Centre	15-year
35	Scarborough RT	Kennedy to Malvern	15-year
36	Hwy 2	Scarborough to Downtown Oshawa	15-year
50	Hwy 407 Transitway	Vaughan Centre to Markham Centre	25-Year
51	Steeles Ave	York University to Milliken	25-Year
52	Eglington-Kingston-Morningside	Kennedy to Malvern	25-Year
53	Hwy 407-McCowen Rd-Hwy 401	Markham Centre to Pickering	25-Year
54	Steeles Ave-Taunton Rd	Milliken GO to Downtown Oshawa	25-Year

Durham Region identifies a transit corridor on Taunton Road connecting with Steeles Avenue, and a Transitway in the Highway 407/ Highway 7 corridor, to be tied in with the Highway 407 East extension into Durham Region (Durham Region Official Plan, March 2004 Consolidation). Durham Region's "Growing Durham" study (November 2008) designates Taunton Road and Highway 7 as Higher-Order Growth corridors. The City of Toronto also has several major transit initiatives, including along Markham Road, and the CP Rail corridor (City of Toronto Official Plan, July 2006). Exhibit 4-13 shows future transit initiatives in context of the Study Area.

There are many important transit initiatives throughout the GTA, including in and around the Study Area. However, with the notable exception of the Highway 7 Rapid Transit Corridor, most of these projects are several years in the future. Due to funding and other uncertainties, exact timing of these projects is unknown.



TRANSPORTATION IMPROVEMENTS
DONALD COUSENS PARKWAY TO MORNINGSIDE AVENUE LINK
(formerly Transportation Improvements
in the Markham Bypass Corridor South of Highway 407)
ENVIRONMENTAL ASSESSMENT

PROPOSED TRANSIT IMPROVEMENTS IN MARKHAM AND NORTHEAST SCARBOROUGH

EXHIBIT
4-13

Transit City

Transit City is an initiative to build eight new Light Rail Transit (LRT) lines in the City of Toronto to communities currently not serviced by rapid public transit. The eight LRT routes include Sheppard East LRT, Eglinton Crosstown LRT, Finch West LRT, Scarborough RT, Jane LRT, Don Mills LRT, Malvern LRT and Waterfront LRT. These routes are in support of the transit focus objective in the City of Toronto Official Plan, and is also part of the Metrolinx "The Big Move" Regional Transportation Plan for transit improvements in the Greater Toronto Area and Hamilton. Each LRT line will provide connection to the existing TTC subway system, GO Transit, other Transit City LRT routes and regional public transit systems. Progress of Transit City initiatives will be subject to directions from the current City of Toronto Council.

For additional information, please visit the Transit City website at: http://www3.ttc.ca/About_the_TTC/Projects_and_initiatives/Transit_city/index.jsp

Durham-Toronto-York Area Transportation Study

The Ministry of Transportation carried out the Durham-Toronto-York Area Transportation Study to evaluate long range inter-regional road and transit improvements in the western Durham, northeastern Toronto and southeastern York areas. The Study (2009) was carried out in support of the Central Pickering Development Plan, Provincial land holdings in Seaton and the eastern GTA component of the Growth Plan.

The transportation strategies identified in this Study recommend a "transit first" approach with the provision of transit services for the Central Pickering area. Key initiatives include the provision of transit services on Taunton Road / Steeles Avenue, 407 Transitway and Highway 7. These initiatives should be coordinated with the respective roadway improvements to ensure consideration and implementation of transit services.

The Durham-Toronto-York Area Transportation Study Report is available on the City of Pickering website at: http://www.cityofpickering.com/seaton/studies_DYTTS.html