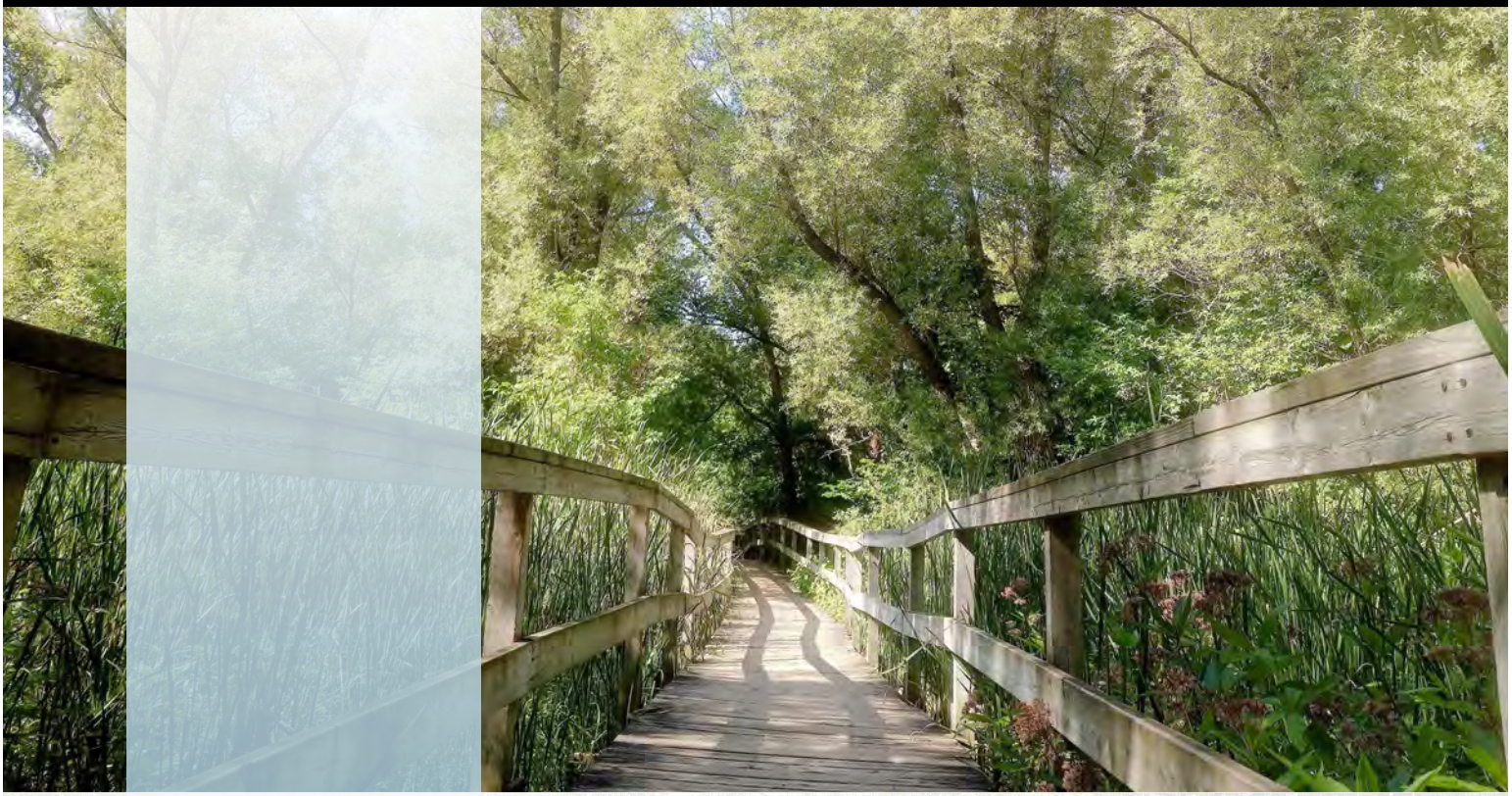
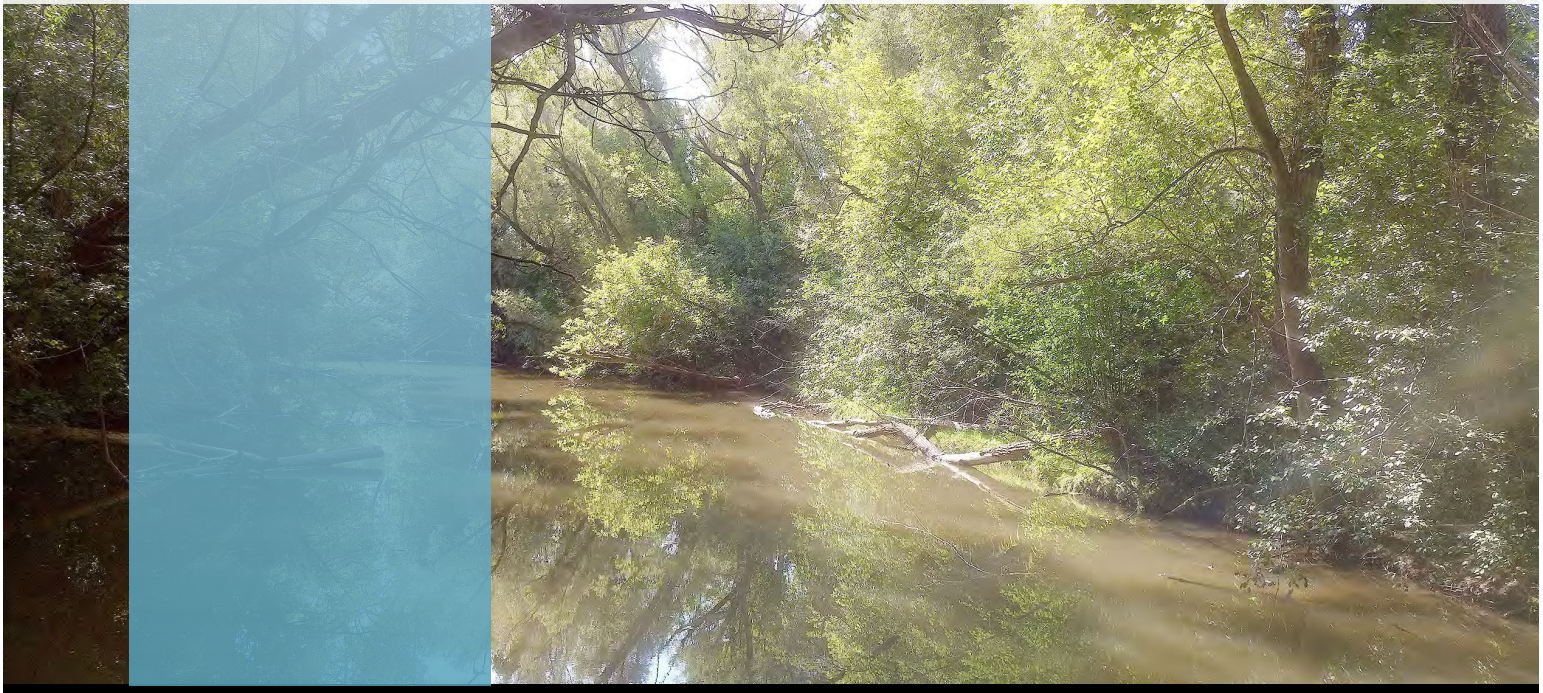


Environmental Impact Study Guidelines

December 2018



City of Markham

Environmental Impact Study Guidelines

Version 2 - December 2018

Version History

#	Date	Note
v1.0	June 2002	n/a

Development Services Commission
Planning and Urban Design
Markham Civic Centre
101 Town Centre Blvd
Markham, ON L3R 9W3

Table of Contents

List of Appendices

1.0 Introduction

The City of Markham contains a Greenway System comprising protected *natural heritage and hydrologic features*, enhancement lands and protected agricultural lands. The management of the Greenway System is identified in Chapter 3 of the Official Plan 2014, as amended, which provides the framework and policies to ensure a healthy and sustainable natural environment. The Greenway System is made up of the City's most ecologically important landscapes and covers approximately one-third of the City's land base. A primary source of negative impacts to the Greenway System results from changes in the use of *adjacent lands* from primarily agricultural landscapes to urban land uses. An Environmental Impact Study (EIS) is a planning tool to assist with decisions regarding development where the form and/or function of *natural heritage and hydrologic features* are potentially impacted. These guidelines will assist in ensuring a clear and consistent approach to both the preparation and review of EIS submitted to the City of Markham.

1.1 Purpose of an Environmental Impact Study

An EIS is one of several technical reports that may be required in support of a proposed development. It provides critical input to the planning process to enable balanced planning decisions to be made based on technically-sound, unbiased assessments of the repercussions of proposed development with respect to environmental impacts. The EIS will inform the development proposal and should be prepared early in the development process where there is the greatest opportunity to avoid or minimize impacts through refinements to site design and layout. The development review process is a collaborative and iterative process which typically results in modifications and changes to the development concept prior to a staff recommendation to Council.

An EIS identifies and evaluates potential impacts to *natural heritage and hydrologic features* resulting from a proposed development. To assist the City in evaluating the merits of development proposals, the EIS shall demonstrate how the proposed development, *redevelopment*, and/or *site alteration* conforms to the Environmental Systems policies in Chapter 3 of the City's Official Plan. Recommendations in the EIS should identify how any impacts to *natural heritage and hydrologic features* within the City's Greenway System are addressed and appropriately avoided, minimized, mitigated and/or compensated. The conclusions of an EIS must clearly identify any net negative impacts to enable sound planning decisions to be made. The completion of an EIS does not necessarily assure that the application will be approved.

1.2 When is an EIS required?

The City will require an EIS where a development application has the potential for negative impacts to *natural heritage and hydrological features* identified for protection in the Official Plan 2014, as amended. The Official Plan identifies the width of *adjacent lands* (120 metres for most natural heritage and hydrologic features) where development proposals are likely to have a negative impact to the Greenway System.

A comprehensive EIS will generally be required for larger developments where negative environmental impacts are anticipated. An EIS may be scoped or streamlined where detailed environmental field work has already been completed (e.g., through a master environmental servicing plan) or for smaller developments where it is anticipated that there will be minimal negative environmental impacts. Outside of the Greenbelt Plan and Oak Ridges Moraine Conservation Plan areas, the City may waive the requirements for an EIS where no negative environmental impacts are anticipated (e.g., there are urbanized lands between the development proposal and the Greenway System). City staff will confirm whether an EIS is required at a pre-consultation meeting. Where an EIS is required, the proponent is expected to prepare EIS Terms of Reference to ensure the study addresses all relevant matters.

1.3 Environmental Impact Study Guidelines Updates

The City of Markham Environmental Impact Study Guidelines shall be comprehensively reviewed every 5 years or upon completion of an Official Plan conformity process to ensure the document is up to date, relevant and reflects approved policy, procedures and regulations. Housekeeping updates may be completed at any time as new policies, procedures or requirements are approved by partner agencies.

2.0 Role of Agencies

An Environmental Impact Study may be required by other agencies. The City will support the submission of a single report to minimize unnecessary costs. The proponent is encouraged to review the EIS Terms of Reference with all agencies and confirm the scope of the necessary field work and study requirements.

2.1 York Region

The York Region Official Plan identifies and protects for a Regional Greenlands System consisting of Natural Core Areas and Natural Linkage Areas within the Oak Ridges Moraine Conservation Plan, the Natural Heritage System within the Protected Countryside of the Greenbelt Plan, *key natural heritage features*, *key hydrologic features* and functions, and their associated *vegetation protection zones*. York Region relies on the technical advice of Toronto and Region Conservation Authority (TRCA) staff for development applications in proximity to the Regional Greenlands System. York Region may require submission of an EIS where the Regional Greenlands System is impacted.

2.2 Toronto and Region Conservation Authority (TRCA)

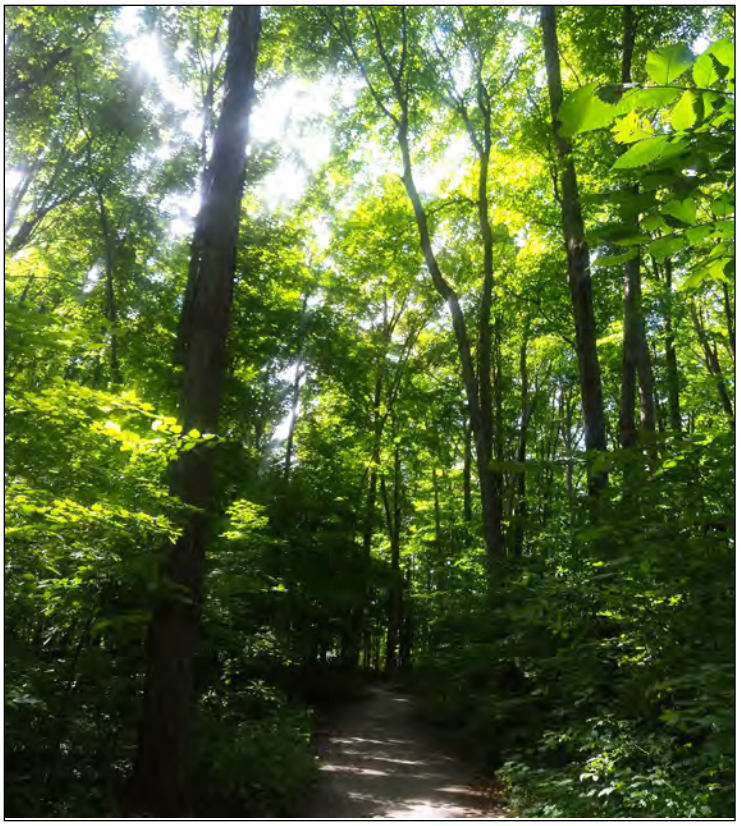
The TRCA reviews development applications under a number of roles and responsibilities which are detailed in Section 3.2.1 of TRCA's Living City Policies. These include requirements under Section 28 of the Conservation Authorities Act 'as a Regulatory agency', providing comments on natural hazards under Section 3.1 of the Provincial Policy Statement, 2014, as a public commenting body under the Planning Act, and as a landowner. The TRCA may require the submission of an EIS to address matters under their jurisdiction. The City also has a Memorandum of Understanding with the TRCA whereby the City relies on the TRCA for guidance on technical matters, such as the protocols for undertaking various studies. The TRCA has its own EIS Guidelines which should be incorporated in the development of a Terms of Reference. One EIS should be prepared to address the requirements of both the TRCA and the City.

2.3 Ministry of Natural Resources and Forestry

The Ministry of Natural Resources and Forestry (MNRF) is responsible for administering the Endangered Species Act, 2007 (ESA). The City recommends that all applicants contact the MNRF to determine pre-screening requirements for potential *habitat for endangered and threatened species*. Applicants are responsible for ensuring that development applications fully comply with the requirements and regulations of the ESA. Although compliance with the ESA is a provincial concern, the City will require that proponents demonstrate that the authority having jurisdiction over the ESA is satisfied with the development application with respect to the protection of *endangered* and *threatened species*.

2.4 Fisheries and Oceans Canada

Fisheries and Oceans Canada (DFO) is responsible for administering the Fisheries Act as well as aquatic species listed under the Species at Risk Act. Where development applications are located in proximity to a waterbody, applicants are responsible for self-assessment and for submitting information to DFO where there is potential for serious harm to fish or impacts to aquatic species at risk. The City will require demonstration that DFO or the authority having jurisdiction over the Species at Risk Act is satisfied with the development application with respect to the protection of *endangered* and *threatened species*.



Wismer Park

3.0 Approach to Evaluation in a Natural Heritage Systems Context

The protection of *natural heritage features* within a natural heritage system context is the way natural heritage protection now occurs in the City and elsewhere in the province. The City has taken this approach to reflect provincial direction and current best practices in conservation biology.

In the past, *natural heritage features* were typically evaluated as being discrete and independent from each other. However, there is interaction among *natural heritage features* and they are often dependent on each other to varying degrees. These dependencies may include, for example:

- wildlife that overwinters in one feature and breeds in another (e.g., several species of tree frog and salamanders);
- home ranges of wildlife that may include several features (e.g., raptors and woodpeckers);
- wildlife that roosts or breeds in one habitat and feeds and/or hydrates in another (e.g., bats);
- wildlife that may forage/hunt in more than one feature (e.g., ruffed grouse);
- features that are hydrologically connected such that impairment of surface water quality and/or quantity in one feature may impact the quality and/or quantity in others; and,
- features providing *groundwater recharge* function which supports discharge areas in other features.

A natural heritage systems approach recognizes the ecological inter-relationships among features as being critically important for protecting features and functions, and especially *biodiversity*, in the long term. This has implications when determining the significance of a feature and/or function, as they may be ecologically important with respect to other features in the system. For example, if a woodland that serves as over-wintering habitat for frogs or salamanders is compromised through a reduction in size that reduces its viability for providing appropriate conditions, or by introducing predatory domestic cats that substantially reduce population sizes, it may affect the *biodiversity*, function and significance of a nearby pond which is used for breeding, even though the development is not directly affecting the pond in any way. Recognition of a systems context also affects the approach to impact analysis as it must account for the role each feature plays in the context of the entire system.

4.0 Submission and Approval of an Environmental Impact Study

The requirements for an EIS will be addressed at the pre-consultation meeting and through completion of the pre-consultation checklist. Submission of the EIS along with all other supporting material will be required prior to an application being deemed 'complete'. Proponents are expected to prepare EIS Terms of Reference in consultation with City staff and agencies to ensure the study addresses all relevant matters especially where other agency interests need to be addressed. This assists both the applicant and the City in that expectations of the content of the EIS are documented at the outset. Proponents may also wish to submit a draft EIS for review to receive staff's preliminary feedback and avoid multiple re-submissions. At the time of the formal submission, four hard copies and an electronic copy of the EIS are required. Mapping of natural heritage features in a GIS format may also be required for large-scale or complex applications.

City staff will review the EIS and provide comments to the applicant through the Development Planning group on any outstanding matters which may lead to modifications to the development proposal or to the proposed mitigation measures. Once any outstanding matters have been addressed and the EIS is accepted as final by City staff, the recommendations of the EIS will be incorporated as conditions of approval and development agreements.

Where there are issues or concerns that extend beyond the technical expertise of City staff, additional resources through a peer review may be required. Where a peer review has been determined to be necessary, the proponent shall bear the costs of the review.

The completion of an EIS does not ensure that the application will be approved.

5.0 Outline of an Environmental Impact Study

This section describes the content and general organization for an EIS that will be acceptable to the City of Markham. The final content of the EIS, including an annotated Table of Contents for the final report, must be agreed on through the Terms of Reference process. There is flexibility on the headings and terminology used to organize an EIS, however the information and analyses agreed to with the City and TRCA, based on the information provided in this section, must be provided for the EIS to be considered complete for the purpose of reviewing the application.

5.1 Introduction and Purpose

- Describe the subject property and the surrounding landscape including existing land uses and structures;
- Describe the current and proposed land use designations and zoning permissions; and,
- Identify the names and qualifications of the EIS authors and contributors.

5.2 Relevant Policy and Regulatory Framework

This section of the EIS should set out the policies and legislation that are relevant for the proposed application. Refer to Appendix 'H' for a list of policy documents and legal instruments (or their updated versions as they become available) which may need to be addressed or consulted. This is not a complete list but is provided to assist in the preparation of EIS reports.

5.3 Characterization of the Natural Heritage Features and Functions

The City will consult with the TRCA to ensure that technical requirements and appropriate field survey protocols are followed in the characterization of the natural environment. Depending on the scale of the EIS, pre-construction baseline data collection and monitoring may need to be undertaken to account for seasonal variation at the site and should be initiated at least two years prior to any site development plans. Identification of appropriate monitoring locations, methods, parameters and the nature of the monitoring should be reviewed by the City in consultation with the TRCA to ensure the EIS will provide adequate characterization of the subject lands. Details are provided in Appendix 'F' and TRCA's EIS Guidelines.

A review of background data sources should be completed including the Province's Natural Heritage Information Centre (NHIC) database, TRCA/City mapping, and historic environmental studies.

This section of the EIS should generally include the following information:

- description of soils, topography, landform and surficial geology;
- description of the property based upon Ecological Land Classification (ELC). ELC data sheets may be requested for more complex applications;
- description of the flora and vegetation of the study area based on fieldwork in the three growing seasons;
- description of wildlife and wildlife habitat including insects, birds, amphibians, reptiles, mammal and fish;
- comprehensive lists of plants and wildlife observed within the site including each species status at a local, regional, provincial and national level;
- identification and evaluation of *wetlands* and *woodlands* based on the City's Official Plan, TRCA's *wetland* mapping and the Ontario Wetland Evaluation System;
- description of hydrologic and hydrogeologic conditions including headwater drainage features, *seepage areas and springs*; and,
- description of interconnection between surface and groundwater systems and the natural heritage system including the results of any feature-based water balance.

Figures and mapping will generally be required to depict the following:

- location of the subject property;
- regional and landscape context of the subject property including nearby *natural heritage features*, watercourses, major landform features, etc.;
- limits of Oak Ridges Moraine Conservation Plan and Greenbelt Plan area, where applicable;
- vegetation communities by ELC, with modifications as appropriate;
- location of any significant flora and fauna, with

consideration for species subject to confidentiality protocols;
- location and area covered by survey stations and sampling points;
- location of watercourses and headwater drainage features (HDFs should be labelled by the recommended management recommendation);
- constaint lines for each *natural heritage and hydrologic feature*, natural hazard and *vegetation protection zones*. The purpose of this figure is to identify areas that are constrained and (un)suitable for development from a natural heritage perspective; and,
- a comprehensive constraint map overlaid with the proposed development. This may be combined with the previous figure depending on its complexity.

Each figure should be overlaid on a current aerial photograph base and should provide property limits (study area), scale bar, names of roads and watercourses.

5.4 Staking of wetlands, woodlands and top of bank

Staking exercises may be required to verify the exact boundaries of *natural heritage and hydrologic features* and to apply the appropriate *vegetation protection zones*.

Applicants are responsible for coordinating the staking of protected features with City, TRCA, and MNRF staff as appropriate and for arranging for a qualified Ontario Land Surveyor to be present with sufficient stakes and flagging materials.

TRCA staff will participate in staking the top of bank and contiguous vegetation to the watercourse, valley system and/or *wetlands*. *Wetlands* may be confirmed through application of the Ontario Wetland Evaluation System (OWES) with TRCA and, where applicable, MNRF. TRCA and/or City staff will assist with staking *woodland* limits.

5.5 Evaluation of Ecological Cores, Corridors and Linkages

Ecological cores, corridors and linkages are essential components of the Natural Heritage Network. The larger cores and ecological corridors are identified in the City's Official Plan 2014, as amended, as 'Natural Heritage Network Enhancement Lands'. Further refinement of cores and corridors may be undertaken through a *subwatershed plan* or a master environmental servicing plan where existing connections between *natural heritage and hydrologic features* exist. The width and location of ecological corridors and linkages should at a minimum include consideration of the targeted wildlife species, the distance between the features, the proposed adjacent land use, life cycle requirements, and any other uses proposed within the linkage (e.g., trails).

Where ecological cores and corridors are identified, the EIS will address how these components will be delineated and implemented. The EIS shall also identify opportunities to improve connectivity between features through existing hedgerows, agricultural fields and valley corridors where appropriate and feasible.

5.6 Evaluation of Significance

Woodlands, *wetlands*, and *valleylands* identified on the subject property or on *adjacent lands* should be assessed for their significance:
- w*oodlands* over 0.5 ha shall be assessed for significance based on the York Region Official Plan and the Markham Official Plan. *Woodlands* located in the Oak Ridges Moraine or Greenbelt Plan areas shall be assessed for significance using relevant Provincial criteria;
- where *wetlands* have not been assessed by the Province, they shall be evaluated using OWES regardless of their status or size if requested by TRCA or MNRF staff. *Wetlands* determined not to be a *provincially significant wetland* will be assessed using protocols provided by TRCA.
- v*alleylands* shall be assessed for significance in accordance with Provincial guidance. All major *valleyland* systems contained within the Oak Ridges Moraine and Greenbelt Plan areas are *significant valleylands*; and,
- s*ignificant wildlife habitat* shall be assessed by the applicant if requested by City and/or TRCA staff. The criteria to confirm *significant wildlife habitat* in the City of Markham are provided in the Significant Wildlife Habitat Criteria Schedules for Ecoregions 6E and 7E identified in Appendix 'E'.

It is appreciated that the evaluation of features outside the subject property may be challenging owing to the ability to access them. In such cases, appropriate approaches should be discussed with the City, but will generally be based on the best effort and professional opinions of the applicant's consultants.

In addition to assessing the significance of features

based on their individual characteristics and status, the characterization must also evaluate them in a systems context. Each feature in the Natural Heritage Network contributes to and plays a role in the function of the entire system. For example, watercourses link features from a hydrologic perspective, thus changes or impacts to a stream in a particular development may affect other features down stream. Likewise, a *woodland* may provide critical aspects of some components of a species life cycle or habitat needs and impacting it could affect the species' survival in other features.

5.7 Description of Proposed Development

Describe the proposal and provide a site plan of the development application which should include:

- the location and size of buildings/structures, parking areas, roads, and other impermeable surfaces;
- location and depth of grading (fill removal or placement) and all disturbances associated with construction;
- location of stormwater management facilities and low impact development features including outlet locations;
- location of servicing infrastructure;
- location and extent of trails and pathways; and,
- timing of construction and development

5.8 Impact Assessment and Mitigation Measures

The objective of the Impact Assessment section is to identify potential impacts to features and their functions that comprise the Greenway System (including the linkage areas), and demonstrate how these impacts are being addressed through a hierarchy of avoidance, minimization, mitigation, and where no other options exist, compensation. The impact analyses must be undertaken in a systems context and assess impacts not only in regard to the immediate feature, but also to the system as a whole.

The impact assessment must include identification of:

1. Direct impacts: These include the physical displacement of features such as vegetation removal or watercourse realignment
2. Indirect impacts: These include the effects of activities or a change in land use adjacent to features such as the impacts from increased trail activity, influx of domestic pets and invasive horticultural plants, or changes in light, noise and moisture regimes, etc.
3. Cumulative impacts: These include the combined or additive impacts from land use changes in the past and foreseeable future and/or on lands adjacent to the proposal, such as the additive effects of stormwater management facilities in existing and proposed development on receiving watercourses.

The analysis must also evaluate the potential for impacts during construction and after construction, including the expected long-term impacts that will result from a proposed change in land use. A list of potential impacts is provided in Appendix 'D'. This is provided to assist in the writing of the impact analysis and is not intended to be exhaustive.

All potential impacts of a development application are to be identified in the EIS. A preliminary design or construction methodology should be provided for more complex, site specific issues where more detail is needed to assess impacts due to construction of infrastructure, unique site issues or constraints, areas where policy flexibility is sought or features being altered or compensated. Wherever possible, the EIS should provide mitigation measures for each impact based on the magnitude and duration of the impacts. Mitigation should be provided in the context of adaptive management, whereby mitigation is monitored and evaluated for its effectiveness, and corrected where not working.

5.9 Monitoring and Adaptive Management

Monitoring before, during and after construction is essential as part of any EIS process where mitigation is identified. The purpose of monitoring is to ensure mitigation measures are correctly implemented and maintained, and to evaluate the performance and effectiveness (i.e., adequacy) of mitigation measures. Examples include:

- inspections of tree and *woodland* protection fencing;
- inspections of erosion and sediment controls;
- inspections to ensure integrity of v*egetation protection zones* and to check for encroachments into *natural heritage features;*
- evaluations to see if *vegetation protection zones* are protecting *natural heritage features* (especially if they contain trails and may be increasing access to *natural heritage features*);
- monitoring of vegetation, breeding birds, amphibians and/or other wildlife to determine if new development has resulted in any changes;
- monitoring of *wetland* hydrology;
- monitoring the success of any invasive species

removal, restoration of other management initiatives;
- monitoring of *natural heritage features* for encroachments, invasive species, and changes to hydroperiod; and,
- monitoring of restoration and replanting plans.

For some smaller developments, the monitoring plan may be included as part of the EIS. However, for larger projects, it may be preferred to provide a monitoring framework in the EIS that outlines what needs to be monitored, the duration and frequency of monitoring, and provides the details of monitoring in a separate monitoring plan that can be developed after draft plan approval. Monitoring should include baseline data collection prior to any construction (this can include, but is not necessarily limited to the inventory data collected for site characterization), monitoring during construction and post-construction monitoring.

In most cases, the monitoring plan should be undertaken in the context of an adaptive management approach. This includes:
- providing goals and/or objectives for mitigation and management initiatives;
- targets or performance measures for each mitigation action;
- monitoring protocols that will facilitate determination of whether goals and objectives are being met;
- a schedule for evaluating monitoring data and reporting results to the City and TRCA; and
- proposed refinements and/or alternatives if mitigation does not achieve goals and/or objectives.

In many cases monitoring may need to continue for several years after development. As an example, natural channel design where a watercourse is being altered may need to be monitored for up to 10 years. Erosion or thermal impacts in sensitive locations within the valley corridor, such as downstream of a proposed stormwater management pond may require long-term monitoring. Feature-based water balance typically requires a minimum of 3 years of post-construction monitoring. The prescribed length of monitoring is typically influenced by the risk associated with the works undertaken. It is noted that the duration of most development projects is not long enough to truly measure the effects of land use change or evaluate the effectiveness of mitigation.

The City does not expect an applicant to continue monitoring on a long-term basis, although some post construction monitoring may be required for some mitigation initiatives. However, the City will require monitoring to undertaken in an adaptive management framework to allow other agencies or parties to undertake data collection in the future, assess impacts and/or evaluate the effectiveness of mitigation on an opportunistic basis. The obligations of an applicant with respect to post-construction monitoring and any corrective actions identified through monitoring will be discussed at the pre-consultation meeting and finalized through the review and approval of the EIS.

5.10 Recommendations

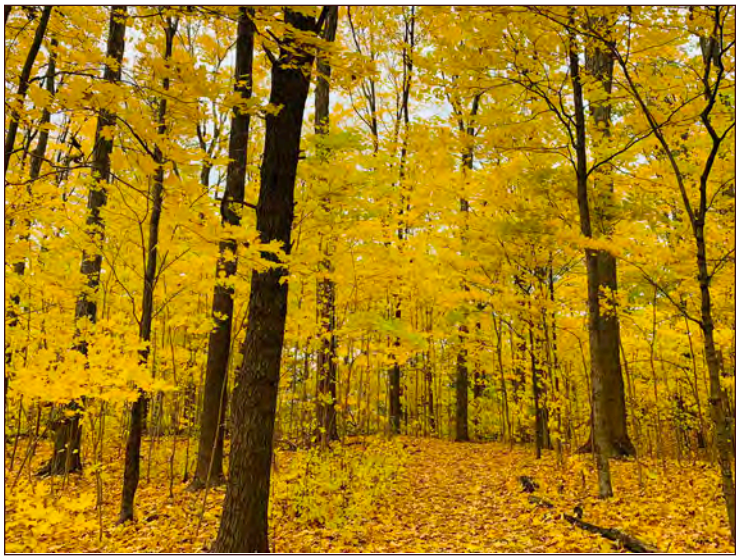
The EIS should provide a summary of all recommendations provided throughout the report in a "Recommendations" section, with guidance as to how they will be implemented. Coordination between the various disciplines involved in the development application will be necessary to ensure that the recommendations of the EIS have been appropriately incorporated into the plans and reports. As a guide, the recommendations should address:
- whether the proposal should proceed as identified?
- whether the proposal should be revised to eliminate or reduce impacts?
- what minimization, mitigation and/or compensation is required?
- what are the conditions of development approval?
- what are the monitoring recommendations?

Raymerville Woodlot

6.0 Natural Heritage and Hydrologic Evaluations in the Oak Ridges Moraine and Greenbelt Plan Areas

Where development, *redevelopment* and *site alteration* are proposed within the *adjacent lands* of *key natural heritage features* or *key hydrologic features* within the Oak Ridges Moraine Conservation Plan or Greenbelt Plan areas, a natural heritage and/or hydrological evaluation shall be prepared. The natural heritage and/or hydrological evaluation shall generally follow the same format as an environmental impact study but shall also include the specific requirements as identified in the Provincial Plans and any technical guidance as may be provided by the Province (i.e. Oak Ridges Moraine Conservation Plan Technical Paper Series 8 – Preparation of Natural Heritage Evaluations for All Key Natural Heritage Features, and Greenbelt Plan Technical Paper 1: Technical Definitions and Criteria for Key Natural Heritage Features in the Natural Heritage System of the Protected Countryside Area).

Natural heritage and hydrological evaluations shall also address how the requirements of the Provincial Plans are being met including but not limited to, connectivity, avoidance of removal of *natural heritage features*, disturbed area, impervious surface of developable area, *natural self sustaining vegetation* targets etc.. Prior to preparation of natural heritage and hydrological evaluations, applicants are encouraged to meet with City staff to scope requirements and ensure all relevant information is appropriately addressed.



Thomas Frisby Woods Park

Little Rouge Creek

Austin Drive Park

APPENDICES

Tributary of Beaver Creek

MARKHAM

LPAT File Number PL140743 - April 9, 2018 Office Consolidation

This map is subject to appeals to the Local Planning Appeal Tribunal. The numbered boxes depict lands owned by appellants of this map. The scope of any issues raised in those appellants' appeals will be identified as part of Local Planning Appeal Tribunal Case No. PL140743

OFFICIAL PLAN

MAP 4 - GREENWAY SYSTEM

as modified and approved by York Region June 12/14

JUNE 2014

SCALE 1:35,000

0 0.5 1 2 3 4 Kilometers

Map 4 - Greenway System is subject to Appeal Nos.

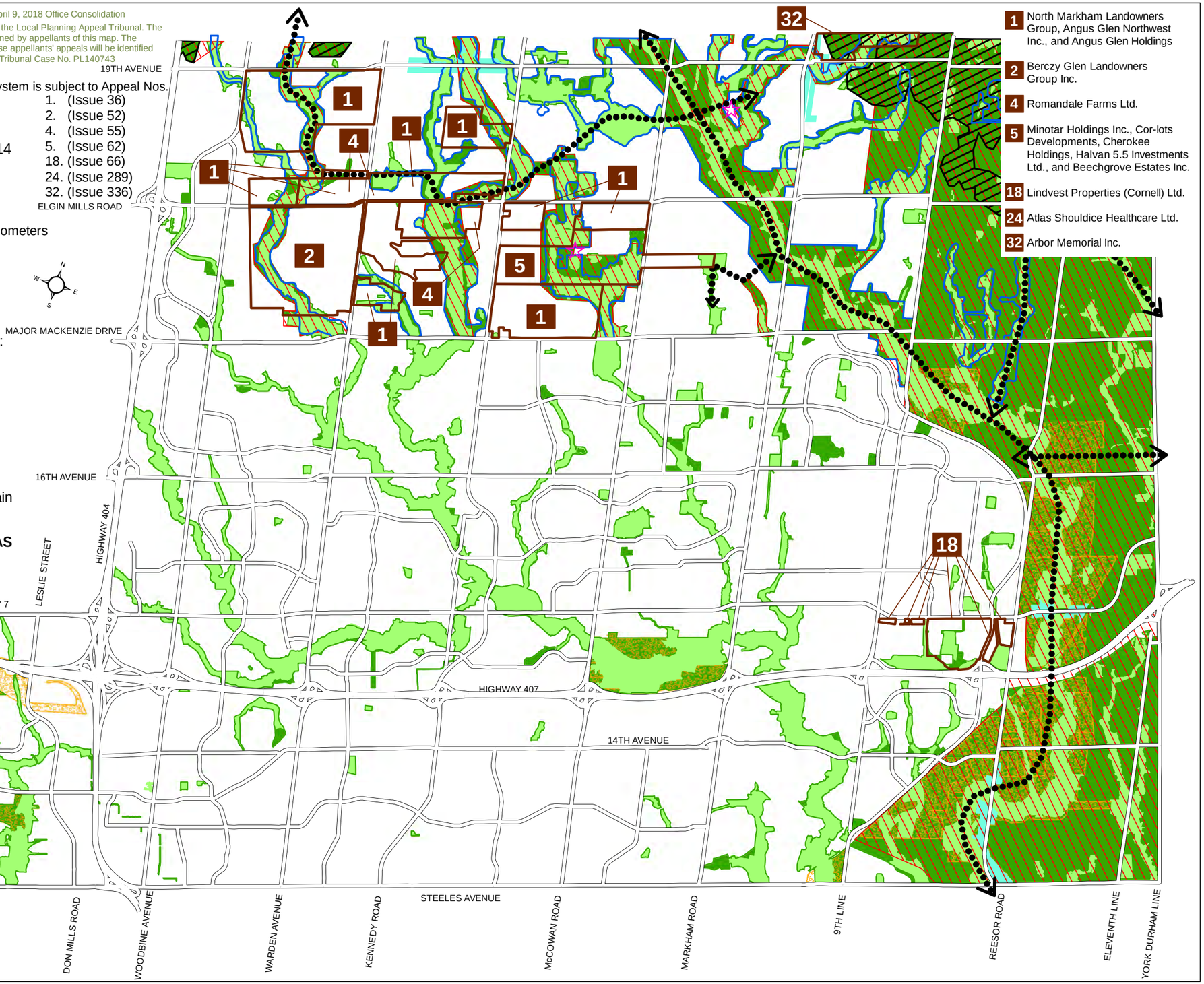
1. (Issue 36)
2. (Issue 52)
4. (Issue 55)
5. (Issue 62)
18. (Issue 66)
24. (Issue 289)
32. (Issue 336)

GREENWAY SYSTEM

- Greenway System Boundary
- Natural Heritage Network
- Natural Heritage Network Enhancement Lands:
  - Core Area Enhancements
  - Core Linkage Enhancements
- Rouge Watershed Protection Area
- Oak Ridges Moraine Conservation Plan Area
- Greenbelt Plan Area
- Other Greenway System Lands including certain naturalized stormwater management facilities

NATURAL HERITAGE RESTORATION AREAS

HAMLETS



1 North Markham Landowners Group, Angus Glen Northwest Inc., and Angus Glen Holdings

2 Berczy Glen Landowners Group Inc.

4 Romandale Farms Ltd.

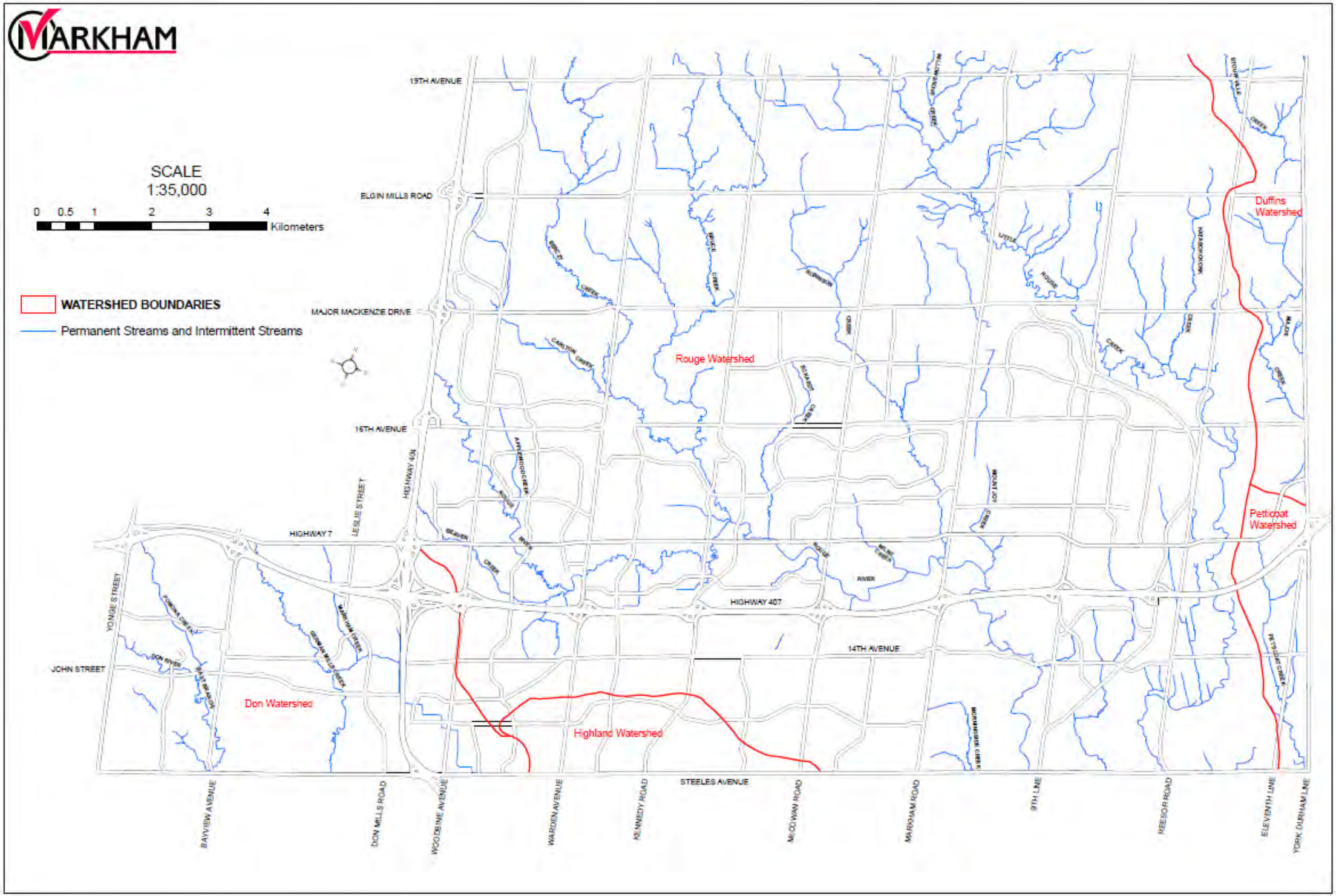
5 Minotar Holdings Inc., Cor-lots Developments, Cherokee Holdings, Halvan 5.5 Investments Ltd., and Beechgrove Estates Inc.

18 Lindvest Properties (Cornell) Ltd.

24 Atlas Shouldice Healthcare Ltd.

32 Arbor Memorial Inc.

Appendix A2: Watershed Boundaries



Appendix A3: Toronto and Region Conservation Authority Regulatory Framework

This is for illustrative purposes only and subject to change. Proponents should consult with the TRCA for more precise delineations of the areas subject to O. Reg. 166/06.

MARKHAM

LPAT File Number PL140743 - April 9, 2018 Office Consolidation
This map is subject to appeals to the Local Planning Appeal Tribunal. The numbered boxes depict lands owned by appellants of this map. The scope of any issues raised in those appellants' appeals will be identified as part of Local Planning Appeal Tribunal Case No. PL140743

OFFICIAL PLAN

Appendix A - Toronto and Region Conservation Authority Regulatory Framework is subject to Appeal No. 2 (Issue 52), 24 (Issue TBD)

APPENDIX A - TORONTO AND REGION CONSERVATION AUTHORITY REGULATORY FRAMEWORK

as modified and approved by York Region June 12/14

For illustrative purposes only. The text of the Toronto and Region's Conservation Authority Regulation prevails.

JUNE 2014

SCALE
1:35,000

0 0.5 1 2 3 4 Kilometers

Ontario Regulation 166/06
(Area subject to review)

Flood Vulnerable Areas

1. Cummer Creek Floodplain Area
2. Beaver Creek at Highway 7 Area
3. Rouge River west of Warden Avenue Area
4. Berczy Creek, Unionville Core Area Special Policy Area
5. Rouge River, Highway 7 and Main Street Unionville Area
6. Rouge River, River Bend Road/Campbell Court Area
7. Robinson Creek south of Bullock Area

Floodplain (Consult with Toronto and Region Conservation Authority to obtain most current floodplain information)

Note: The legal basis for delineating regulated areas is defined in the text of Toronto and Region Conservation Authority's Regulation. This illustrative map serves as a screening tool and may be updated as new information becomes available. Some regulated features may not appear on this screening map. Site investigations and detailed studies requested at the time of an application may further refine or delineate the requested area.

2 Berczy Glen Landowners Group Inc.

24 Atlas Shouldice Healthcare Ltd.

19TH AVENUE
ELGIN MILLS ROAD
MAJOR MACKENZIE DRIVE
16TH AVENUE
HIGHWAY 7
LESLIE STREET
YONGE STREET
JOHN STREET
BAYVIEW AVENUE
DON MILLS ROAD
HIGHWAY 404
WOODBINE AVENUE
WARDEN AVENUE
KENNEDY ROAD
HIGHWAY 407
14TH AVENUE
STEELES AVENUE
McCOWAN ROAD
MARKHAM ROAD
9TH LINE
REESOR ROAD
ELEVENTH LINE
YORK DURHAM LINE

Appendix B: Minimum Vegetation Protection Zones

Please consult Table 3.1.2.22 in the Markham Official Plan 2014 for the most current in-force vegetation protection zone standards.

Feature	Minimum Adjacent Lands*	Minimum Vegetation Protection Zones**	Measurement***
Significant Valleylands	120 metres	10 metres except where the upper limit of other *natural heritage and/or hydrologic features* and/or their *vegetation protection zones* are located between the toe of the slope and top of bank. In these instances, additional lands will be required to protect the features, as determined through an environmental study, consistent with the guidance provided in the Natural Heritage Reference Manual, and with consideration for the effect of the valley slope on the function of the *vegetation protection zone*. In the Urban Areas as identified on Map 12- Urban Area and Future Urban Area, a reduced *vegetation protection zone* may be considered in accordance with Section 3.1.2.25.	Whichever is the greater of long-term stable top of bank, limit of the *floodplain* defined by the TRCA or edge of other *natural heritage and hydrologic features*
Valleylands	120 metres	10 metres In the Urban Areas as identified on Map 12 - Urban Area and Future Urban Area, a reduced *vegetation protection zone* may be considered in accordance with Section 3.1.2.25.	Whichever is the greater of long-term stable top of bank or limit of *floodplain* defined by the TRCA
Significant Woodlands	120 metres	10 metres	Outermost drip line of edge trees as determined by field staking with the City in consultation with the TRCA and relevant agencies
Woodlands	60 metres	10 metres In the Urban Areas as identified on Map 12 - Urban Area and Future Urban Area, a reduced *vegetation protection zone* may be considered in accordance with Section 3.1.2.25.	Outermost drip line of edge trees as determined by field staking with the City in consultation with the TRCA and relevant agencies
Provincially Significant Wetlands	120 metres	30 metres In the Urban Areas as identified on Map 12 - Urban Area and Future Urban Area, a reduced *vegetation protection zone* may be considered in accordance with Section 3.1.2.25.	Wetland boundary as determined through field staking with the TRCA in consultation with the City and relevant agencies
Wetlands	120 metres	15 metres	Wetland boundary as determined through field staking with the TRCA in consultation with the City and relevant agencies
Significant wildlife habitat and habitat of endangered and threatened species	Determined based on wildlife requirement	Determined by an environmental impact study or equivalent study consistent with the standards recommended in the Natural Heritage Reference Manual	
Fish habitat	120 metres	15, 20 or 30 metres as determined by an environmental impact study or equivalent study consistent with the standards recommended in the Natural Heritage Reference Manual	Edge of water feature
Rouge River tributaries within the Rouge Watershed Protection Area	120 metres	Determined in accordance with Section 3.1.4.1	

Feature	Minimum Adjacent Lands*	Minimum Vegetation Protection Zones**	Measurement***
Oak Ridges Moraine Conservation Plan Area and Greenbelt Plan Area On the Oak Ridges Moraine Conservation Plan Area and the Greenbelt Plan Area the standards specified by the Provincial Plans willy apply. Standards provided in this Table are minimums and their adequacy must be evaluated through site-specific studies.			
Wetlands on the Oak Ridges Moraine and the Greenbelt	120 metres	30 metres	Any part of the feature
Seepage areas and Springs on the Oak Ridges Moraine and the Greenbelt	120 metres	30 metres	Any part of the feature
Significant woodlands on the Oak Ridges Moraine and the Greenbelt	120 metres	30 metres	Outermost drip line of edges of trees
Permanent streams and intermittent streams on the Oak Ridges Moraine and the Greenbelt	120 metres	30 metres	Oak Ridges Moraine Conservation Plan: Edge of meanderbelt Greenbelt Plan: Outside boundary of the k*ey natural heritage* or *key hydrologic feature*
Sand barrens, savannahs and tallgrass prairies on the Oak Ridges Moraine or Greenbelt	120 metres	30 metres	Any part of the feature
Provincially rare species on the Oak Ridges Moraine	120 metres	Determined by a Natural Heritage Evaluation or applicable Provincial regulation and guideline	

* The adjacent lands are those lands contiguous to a *natural heritage feature or hydrologic feature* as measured from the feature, exclusive of property boundaries.

** Minor roundings of *vegetation protection zones*, located outside of the Oak Ridges Moraine Conservation Plan Area and the Greenbelt Plan Area, may be considered where there is no net loss in the required area of the minimum *vegetation protection zone*.

*** Measurement may also be determined in accordance with the Ministry of Natural Resources and Forestry Natural Heritage Reference Manual

Appendix C: Determining Vegetation Protection Zones for Significant Valleylands

In some instances the City of Markham Official Plan identifies a requirement for additional lands beyond a minimum 10 metre *vegetation protection zone* for *significant valleylands* where they are associated with *natural heritage and/or hydrologic features*. The requirement is noted in Appendix B and Section 3.1.2.22 of the Official Plan 2014. This Appendix provides direction on the application of this policy.

Valleylands are landforms regulated by the Toronto and Region Conservation Authority (TRCA) and *significant valleylands* are protected under the Provincial Policy Statement. The requirements to address slope stability and erosion rests with the TRCA and they will determine setback requirements in accordance with their requirements and authority under the Conservation Authorities Act and regulations. Where *valleylands* support species regulated under the Endangered Species Act or if subject to the provisions of the Species at Risk Act, the requirements of those Acts will prevail where greater than TRCA or City requirements.

The *vegetation protection zone* requirement for *significant valleylands* identifies that where *natural heritage or hydrologic features* are located between the *toe of slope* and the *stable top of bank*, land in addition to the minimum 10 metre requirement will be required to protect the *significant valleyland* feature. The amount of additional *vegetation protection zone* is to be determined through an EIS.

This appendix identifies how additional *vegetation protection zone* requirements shall be determined based on the following scenarios:

1. No *natural heritage features* within the valleylands;
2. N*atural heritage features* and v*egetation protection zones* are located below the *stable toe of slope;*
3. N*atural heritage features* are located partially or wholly between the *stable toe of slope* and *stable top of bank;*
4. N*atural heritage features* are located coincident or extend beyond the *stable top of bank;* and,
5. Ill-defined or unconfined valley systems.

For the purposes of interpreting this appendix, the following definitions are provided:

Stable Top of Bank is determined through a geotechnical study undertaken to the satisfaction of the TRCA. It may be the *physical top of slope* where the existing slope is stable and not impacted by toe erosion; or an additional setback where the existing slope is unstable and or impacted by erosion.

Stable Toe of Slope is determined through a geotechnical study to be either the physical toe of slope where existing toe is stable and not impacted by erosion or the landward limit of the toe erosion allowance where the existing slope is unstable and/or impacted by erosion.

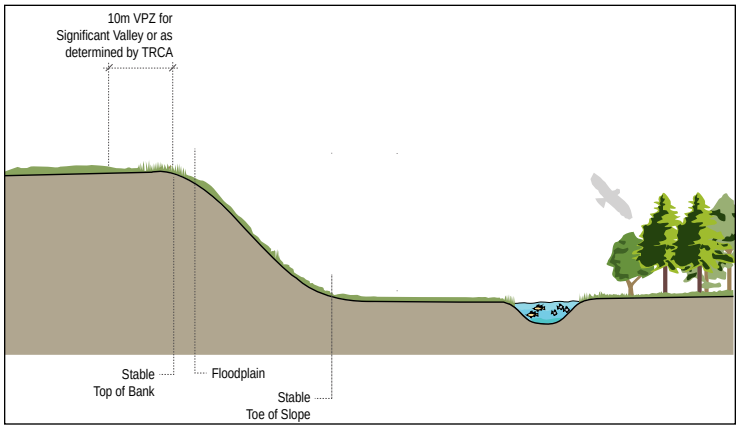
Physical Top of Bank is that point where there is a break in slope of grade which distinguishes the valley landform from the surrounding tableland. Valleys are erosional features (i.e., they have eroded downward as a result of water movement). Valley slopes may be simple (ascending in one relatively unbroken slope to the elevation of the surrounding tableland), or compound, where there is more than one break in slope including situations where the slope may be terraced. The *physical top of bank* is generally represented by the uppermost point at which erosion has formed the valley, thus the guiding principle where the valley slope is compound is to use the uppermost break in slope. This will need to be determined in the field with the TRCA.

For further interpretation of technical definitions of top and toe of bank, refer to the TRCA's *Living City Policies 2014*.

Scenario 1

NO NATURAL HERITAGE FEATURES WITHIN THE VALLEYLANDS

Description: Within the *valleyland*, there are no other *natural heritage features*. In situations where there are no natural heritage features within the immediate reaches of the valley upstream and downstream, the feature may not fall within the definition of *significant valleylands*. If there is any question regarding the *valleyland* classification, the Provincial criteria recommended in the Natural Heritage Reference Manual should be applied.

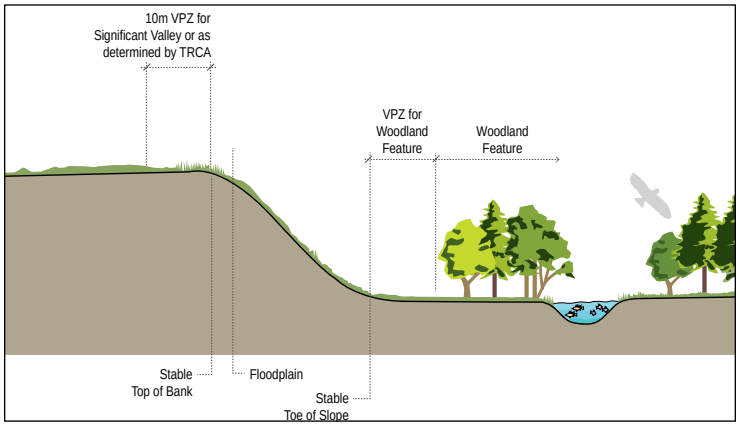


Vegetation Protection Zone: 10 m from the greater of the *stable top of bank* or limit of *floodplain* or greater as determined by TRCA to address erosion, slope stability, and protection of contiguous vegetation. The City does not require additional *vegetation protection zone* in this scenario.

Scenario 2

NATURAL HERITAGE FEATURES AND VPZ ARE LOCATED BELOW THE STABLE TOE OF SLOPE

Description: *Natural heritage features* and their *vegetation protection zones* are wholly located below the *stable toe of slope*, i.e., there are no features located on land between *toe of slope* and *stable top of bank*.

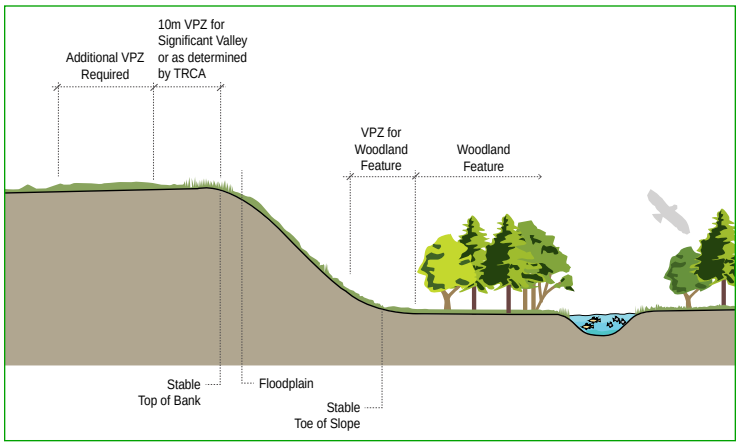


Vegetation Protection Zone: 10 m from the greater of the *stable top of bank* or limit of *floodplain* or greater as determined by TRCA to address erosion, slope stability, and protection of contiguous vegetation. The City does not require additional *vegetation protection zone* in this scenario.

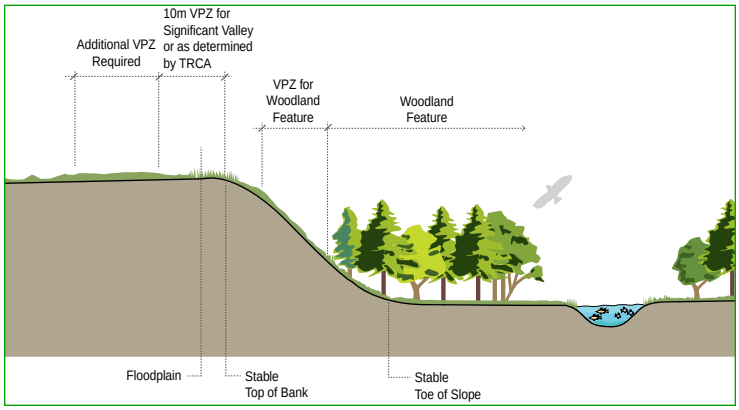
Scenario 3

NATURAL HERITAGE FEATURES ARE LOCATED PARTIALLY OR WHOLLY BETWEEN THE STABLE TOE OF SLOPE AND STABLE TOP OF BANK

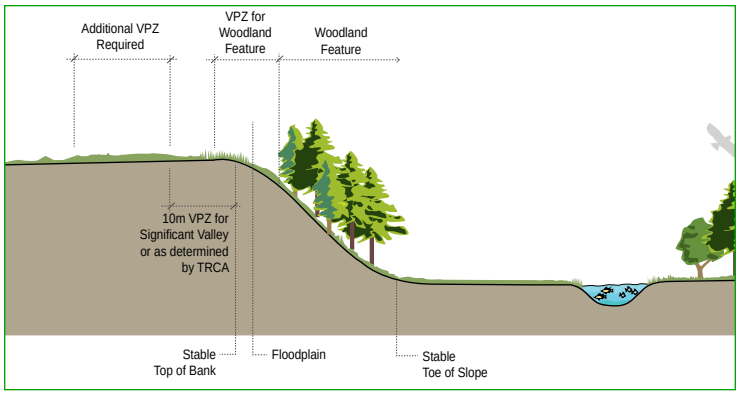
Description (3A): *Natural heritage features* are located below the *stable toe of slope* but the *vegetation protection zones* extend above the *stable toe of slope*.



Description (3B): *Natural heritage features* and the *vegetation protection zones* both extend above the *stable toe of slope* but below the *stable top of bank*.



Description (3C): *Natural heritage features* are located above the *stable toe of slope* but below the *stable top of bank*. The *vegetation protection zones* extend beyond the *stable top of bank*.

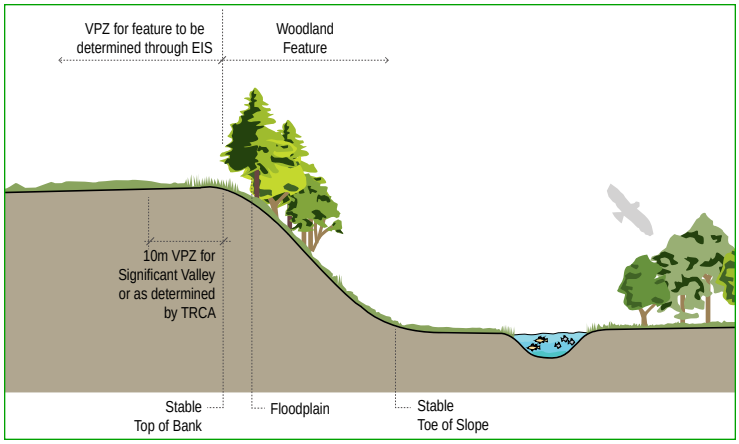


Vegetation Protection Zone: A *vegetation protection zone* that is located on a slope (e.g., a valley wall) will generally not be as effective as a buffer which is relatively level (e.g., on a tableland). In general, the steeper the slope and the greater amount of a *VPZ* that is on the slope, the less effective it will be, recognizing that there are many factors that will affect this. In such cases the minimum 10m *VPZ* to the significant valleyland may not provide sufficient protection. To compensate for the reduced function of the *VPZ* to the feature, additional *vegetation protection zone* for the *significant valleyland*, beyond the *stable top of bank*, is warranted. Because of the wide range of possible scenarios, this amount of additional *VPZ* must be established through an environmental impact study or equivalent study. Where the valley slope is ill-defined and very shallow, the effect of the slope on the function of the *VPZ* will probably be minimal and the additional *VPZ* required can be minor. However, where the valley slope is pronounced, and/or there are other factors that may compromise the effectiveness of the *VPZ*, it is recommended that the environmental impact study evaluate additional *vegetation protection zone* of at least 30 m from the *physical top of bank*, consistent with the approach taken in the Oak Ridges Moraine Conservation Plan. In the latter situation, and where the *stable top of bank* plus 10 m is greater than 30 m from the *physical top of bank*, additional *vegetation protection zone* requirements may be reduced where substantiated by an analysis in an environmental impact study.

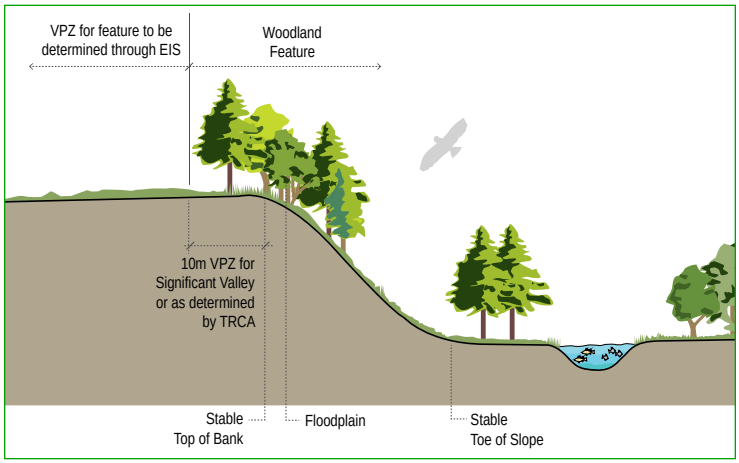
Scenario 4

NATURAL HERITAGE FEATURES ARE LOCATED COINCIDENT OR EXTEND BEYOND THE STABLE TOP OF BANK

Description (4A): *Natural heritage features* are coincident with the *stable top of bank*.



Description (4B): *Natural heritage features* extend beyond the stable top of bank

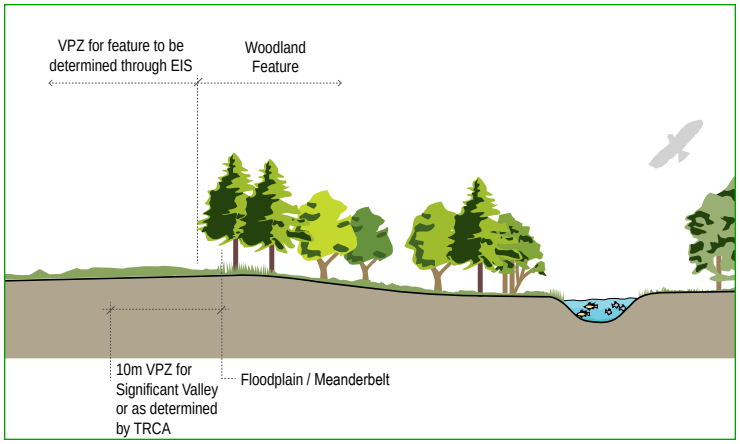


Vegetation Protection Zone: The *vegetation protection zone* is determined through an EIS based on the requirement for the feature (e.g., 10 or 30 m for *significant woodlands*). No additional *vegetation protection zones* to the *significant valleylands* are required, however, because the feature is partially on a slope, the minimum *vegetation protection zone* for the feature may not be sufficient.

Scenario 5

ILL-DEFINED OR UNCONFINED VALLEY SYSTEMS

Description (5): *Natural heritage features* located within an ill-defined or unconfined valley system



Vegetation Protection Zone: In instances where a valley system does not have a distinguishable valley slope or *physical top of bank*, the limit of the *valleyland* would be defined by the greater of the *floodplain* or meanderbelt. Regardless of the significance of the *valleylands*, the *vegetation protection zone* for the *valleyland* would be 10 m or greater as determined by TRCA to address erosion hazards and protection of contiguous vegetation. The City does not require any additional *vegetation protection zone* in this scenario.

The *vegetation protection zone* for other *natural heritage features* would be determined through an EIS based on the policies of the Official Plan 2014 and other applicable policies or regulations.

Appendix D: Potential impacts resulting from proposed development or site alteration

Impacts from development and *site alteration* may be temporary through construction or may be more permanent as a result of a new use introduced on lands adjacent to a protected feature. This appendix provides a list of the common potential impacts associated with development and site alteration and is intended as a tool for professionals undertaking an Environmental Impact Study and for municipal staff who review Environmental Impact Studies or similar reports.

The list is not exhaustive and identifies only the most common impacts associated with development and site alteration, and can serve to assist in determining whether an impact analysis has considered all of the potential impacts that might occur. As impacts are inter-related, there is unavoidable overlap. For example, removal of a *woodland* edge is a direct impact that may change *woodland* humidity, air movement, light penetration, soil moisture, etc., which in turn creates a secondary impact by potentially changing decomposition cycles and soil microfauna, which may affect populations of ground-feeding birds and small mammals. The ecological relationships among these ecosystem components needs to be understood, at least in principle, for impacts to be properly documented. Similarly, some impacts occur at more than one scale (e.g., site and landscape) and are thus listed more than once below.

Some of the impacts noted below can be mitigated, but still need to be addressed in an EIS. Others, (e.g., increased predation from cats), probably cannot be mitigated and such impacts need to be assessed when evaluating the overall balance of planning considerations (economic development, providing housing and employment opportunities, etc.).

The list of potential impacts is divided into three categories based on duration and source:

- Construction impacts (short term)
- Direct impacts (short term)
- Indirect impacts (long term)

Construction Impacts (Short Term)

- erosion and sedimentation resulting from removal of groundcover;
- compaction of sub-soil and related reduction in infiltration capacity of soils;
- construction-generated dust which may settle on vegetation affecting photosynthesis and reproduction;
- increased noise levels which may affect wildlife;
- temporary changes to surface drainage which may affect *woodlands* or *wetlands* adjacent to the site;
- temporary disruption of wildlife movement;
- impact to rooting zones and limbs that project into construction sites;
- compaction and disturbances from storage of construction material and soil stockpiles adjacent to features;
- contamination from fuel spills and vehicle maintenance;
- lowering of groundwater from temporary de-watering;
- temporary construction access; and,
- deviation from timing windows for protected species breeding periods.

Direct Impacts (Long Term)

Landscape Scale: generally related to increased fragmentation of remnant natural features

- complete loss of some species ability to move among remnant *natural heritage features;*
- reduction in the ability of some species to move among remnant *natural heritage features;*
- isolation of *watersheds* and/or *subwatersheds* that had formerly been connected;
- increased road mortality;
- effect on metapopulations such as the reduction or complete inability for some species to re-populate marginal habitat after stochastic local extinction events, when core populations are removed or an existing ecological connection is compromised;
- reduction in the genetic health and long-term viability of populations resulting from isolation; and,
- cumulative impacts at the landscape scale from repeated site-level impacts.

Site Scale

- partial or complete removal of *natural heritage features* (*woodland, wetland, valleyland*);
- removal of individual *trees;*
- encroachment on *natural heritage feature* without its removal (e.g., lots adjacent to or extending into *valleyland*);
- removal of a surface drainage feature, including

ephemeral and intermittent watercourses and headwater drainage features;
- alteration and/or re-alignment of a surface drainage feature, including ephemeral and intermittent watercourses;
- reduction or complete loss of *significant wildlife habitat* (this could be associated with the partial or complete removal of a feature or supporting habitat, or a result of indirect impacts to habitat from changes in conditions (light, noise. etc.), increased predation pressure, increased human presence, etc.);
- reduction or complete loss of a Species at Risk (for same reasons as above);
- reduction or complete loss of species with special habitat needs[1]. This could be a result of direct removal of habitat or indirect impacts, and include:
    - area-sensitive bird species
    - conservative plant species (coefficient of conservatism, CC) of 7 or above[2]
    - frogs that require vernal pools for breeding
    - ambystomid salamanders
    - colonial bird species (e.g. herons)
    - "rare" species of plants and wildlife (rankings of S1-3 from NHIC database)
    - "rare" vegetation types (rankings of S1-3 from NHIC database);
- loss of common species of plants or wildlife; despite being common, this still represents a reduction in biodiversity;
- increased incidence in bird strikes on new buildings;
- increase in road mortality especially where roads are in close proximity to *wetlands* containing reptile and/or amphibian populations;
- reduction in infiltration resulting from increase in hard surfacing and/or reduction in vegetation cover;
- changes in water balance required to sustain features;
- increased heat island effects from reduced *woodland* cover;
- increased salinity in watercourses from run-off of de-icing agents;
- changes in temperature regime in surface water;
- changes in detritus inputs to watercourses;
- changes to flow regimes in watercourses (e.g., peaky run-off events);
- changes to water quality in watercourses resulting from urban run-off; and,
- changes in aquatic diversity including invertebrates and fish, resulting from changes in water quality and/or quantity.

Indirect Impacts (Long Term)

- increased human presence (this may affect wildlife that is intolerant of or sensitive to human presence);
- increased populations of meso-predators that benefit from human presence (e.g. raccoons), but which impact other species populations;
- increased predation from cats, this is generally down-played, but cat predation is a major impact on ground-nesting and ground-feeding birds, as well as small mammals, reptiles and amphibians;
- gradual degradation of *woodland* habitat from the inter-related changes in wind and light penetration, soil moisture, decomposition cycles, etc.;
- encroachment into *natural heritage features* including "yard creep", dumping of garden waste, garden structures (benches, composters, garden sheds. etc.);
- swimming pool drainage into features, especially *valleylands*, resulting in erosion and contamination;
- increased light from artificial sources;
- increase in non-native invasive species;
- increase in unsanctioned uses including: trails, "party spots", BMX courses, mountain bike use, etc.;
- unconfined snow storage that may drain toward *natural heritage features;*
- potential for invasive species spread through back-lotted properties;
- potential for uncontrolled access into the Greenway System through back-lotted properties; and,
- infrastructure, grading or trails proposed within the minimum required *vegetation protection zone*, thus compromising its function.

1 These may not meet the criteria for identifying Significant Wildlife Habitat, but their reduction or loss would none-the-less be an impact.

2 see Floristic Quality Index (FQI)

Appendix E: **Significant Wildlife Habitat Checklist**

Source: Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E, MNRF, 2015

Process to identify Significant Wildlife Habitat in the City of Markham

(1) Pre-consultation with City and TRCA staff to determine whether SWH analysis is required. The City has adopted MNRF's Significant Wildlife Habitat Criteria Schedules to identify SWH (with minor updates to reflect species that are subject to protection under the Endangered Species Act. The City has not mapped Significant Wildlife Habitat and relies on development proponents to ensure that SWH has been adequately identified and protected in accordance with the Provincial Policy Statement.

(2) If SWH analysis is required, candidate SWH should be identified based on the habitat criteria provided below and provided in the EIS. Typically, this requires that the vegetation on the property be evaluated based on ELC to the community series at a minimum. Other habitat observations may be required, such as the presence of annual spring flooding, but surveys of species are not required at this stage. SWH can be considered confirmed at this stage if the entire habitat is to be protected.

(3) If candidate SWH is present but alternatives to complete protection are proposed, field studies should be carried out to determine whether the 'defining criteria' have been met.

(4) Areas determined to meet the 'defining criteria' for SWH will be required to be delineated and confirmed through the environmental impact study. The EIS will include an evaluation of potential impacts to the SWH (applicants may wish to refer to the Significant Wildlife Habitat Mitigation Support Tool, MNRF, 2014) and recommend mitigation techniques such as vegetation protection zones to ensure there are no negative impacts to the feature.

(5) The submitted EIS should include a completed version of this SWH checklist identifying both candidate SWH and confirmed SWH along with justification.

Significant Wildlife Habitat Type	Wildlife Species	**Candidate Significant Wildlife** Habitat Criteria (Applicant to confirm habitat presence or absence)	**Defining Criteria**	Conclusion (Confirmed, candidate or Absence of SWH type)
Seasonal Concentration Areas				
Waterfowl Stopover and Staging Area: Terrestrial	American Black Duck Northern Pintail Gadwall Blue-winged Teal Green-winged Teal American Wigeon Northern Shoveler Tundra Swan	CUM1 or CUT1 plus evidence of annual spring flooding from melt water or run-off within these eco-sites.	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • Any mixed species aggregations of 100 or more individuals required. • The flooded field ecosite habitat plus a 100-300m radius, dependent on local site conditions and adjacent land use is the significant wildlife habitat. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • SWH MIST Index #7 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Waterfowl Stopover and Staging Area: Aquatic	Canada Goose; Cackling Goose; Snow Goose; American Black Duck; Northern Pintail; Northern Shoveler; American Wigeon; Gadwall; Green-winged Teal; Blue-winged Teal; Hooded Merganser; Common Merganser; Lesser Scaup; Greater Scaup; Long-tailed Duck; Surf Scoter; White-winged Scoter; Black Scoter; Ring-necked duck; Common Goldeneye; Bufflehead; Redhead; Ruddy Duck; Red-breasted Merganser; Brant; Canvasback;	MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, SWD1, SWD2, SWD3, SWD4, SWD5, SWD6, SWD7	Studies carried out and verified presence of: • Aggregations of 100 or more of listed species for 7 days, results in > 700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH • The combined area of the ELC ecosites and a 100m radius area is the SWH • Wetland area and shorelines associated with sites identified within the SWH Technical Guide Appendix K (MNR, 2000) are significant wildlife habitat. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • SWH MIST Index #7 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Shorebird Migratory Stopover Area	Greater Yellowlegs; Lesser Yellowlegs; Marbled Godwit; Hudsonian Godwit; Black-bellied Plover; American Golden Plover; Semipalmated Plover; Solitary Sandpiper; Spotted Sandpiper; Semipalmated; Sandpiper; Pectoral Sandpiper; White-rumped Sandpiper; Baird's Sandpiper; Least Sandpiper; Purple Sandpiper; Stilt Sandpiper; Short-billed Dowitcher; Red-necked Phalarope; Whimbrel; Ruddy Turnstone; Sanderling; Dunlin	BBO1, BBO2, BBS1, BBS2, SDO1, SDS2, SDT1, MAM1, MAM2, MAM3, MAM4, MAM5	Studies confirming: • Presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period) • Whimbrel stop briefly (100 Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #8 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____

Raptor Wintering Area	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl <u>Special Concern:</u> Short-eared Owl Bald Eagle	Combination of at least one upland and one forest eco-site generally greater than 20 hectares. Forest: FOD, FOM, FOC Upland: CUM, CUT, CUS, CUW	Studies confirm the use of these habitats by: • One or more Short-eared Owls or; One of more Bald Eagles or; At least 10 individuals and two of the listed hawk/owl species • To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #10 and #11 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____
Bat Hibernacula	Big Brown Bat Tri-coloured Bat	CCR1, CCR2, CCA1, CCA2 Buildings are not considered to be SWH.	• All sites with confirmed hibernating bats are SWH. • The area includes 200m radius around the entrance of the hibernaculum for most development types and 1000m for wind farms. • Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects". • SWH MIST Index #1 provides development effects and mitigation measures.	Not known to occur in Markham
Bat Maternity Colonies	Big Brown Bat Silver-haired Bat	FOD, FOM, SWD, SWM with greater than 10 large trees (>25cm dbh) per hectare.	• Maternity Colonies with confirmed use by; • >10 Big Brown Bats • >5 Adult Female Silverhaired Bats • The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects". • SWH MIST Index #12 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____
Turtle Wintering Areas	Midland Painted Turtle <u>Special Concern:</u> Northern Map Turtle Snapping Turtle	Snapping Turtle and Midland Painted Turtles: ELC Classes: SW, MA, OA, SA ELC Community Series: FEO, BOO Northern Map Turtle: Open water areas such as deeper rivers, streams, and lakes with current.	• Presence of 5 over-wintering Midland Painted Turtles is significant. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deepwater pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May). Congregation of turtles is more common where wintering areas are limited and therefore significant. • SWH MIST Index #28 provides development effects and mitigation measures for turtle wintering habitat.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Reptile Hibernaculum	Eastern Gartersnake Northern Watersnake Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake <u>Special Concern:</u> Milksnake Eastern Ribbonsnake	Any eco-site other than very wet ones. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator.	Studies confirming: • Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. Near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct) • Note: If there are Special Concern Species present, then site is SWH • Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e. strong hibernation site fidelity). Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30 m radius area is the SWH • SWH MIST Index #13 provides development effects and mitigation measures for snake hibernacula.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____

Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)	Cliff Swallow Northern Roughwinged Swallow (this species can be semi-colonial and can be found using abandoned holes dug by Bank Swallows)	Eroding banks, sandy hills, borrow pits, steep slopes, sand piles, cliff faces, bridge abutments, silos, and barns found in the following ecosites: CUM1, CUT1, CUS1, BLO1, VLS1, BLT1, CLO1, CLS1, CLT1	Studies confirming: • Presence of 1 or more nesting sites with 8 or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50m radius habitat area from the peripheral nests • Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #4 provides development effects and mitigation measures	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)	Great Blue Heron Black-crowned Night Heron Great Egret Green Heron	SWM2, SWM3, SWM5, SWM6, SWD1, SWD2, SWD3, SWD4, SWD5, SWD6, SWD7, FET1	Studies confirming: • Presence of 2 or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH • Confirmation of active heronries is to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells • SWH MIST Index #5 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____
Colonially - Nesting Bird Breeding Habitat (Ground)	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	Rocky island or peninsula within a lake or large river. Close proximity to watercourses in open fields or pastures with scattered trees or shrubs.	Studies confirming: • Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern. • Presence of 5 or more pairs for Brewer's Blackbird. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. • The edge of the colony and a minimum 150m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #6 provides development effects and mitigation measures.	Not known to occur in Markham
Migratory Butterfly Stopover Area	Painted Lady Red Admiral <u>Special Concern:</u> Monarch	Combination of at least one field and one forest communities of a minimum 10 ha. Field: CUM, CUT, CUS Forest, FOC, FOD, FOM, CUP Generally, stopover areas will have a history of butterfly observations.	Studies confirm: • The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct). MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day, significant variation can occur between years and multiple years of sampling should occur. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Landbird Migratory Stopover Areas	All migratory songbirds. Canadian Wildlife Service Ontario: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1 All migrant raptors species: Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors)	Woodlots within 5 km of Lake Ontario.	Studies confirm: • Use of the habitat by >200 birds/day and with >35 spp with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (Mar to May) and fall (Aug to Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats:Guidelines for Wind Power Projects" • SWH MIST Index #9 provides development effects and mitigation measures.	Not applicable to Markham
Deer Winter Congregation Areas	White-tailed Deer	Woodlots greater than 50 hectare: FOC, FOM, FOD, SWC, SWM, SWD.	Studies confirm: • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. • Use of the woodlot by whitetailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF • Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques, ground or road surveys. or a pellet count deer density survey. • SWH MIST Index #2 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____

Rare Vegetation Communities or Specialized Habitat for Wildlife				
Cliffs and Talus Slopes	n/a	n/a	• Confirm any ELC Vegetation Type for Cliffs or Talus Slopes • SWH MIST Index #21 provides development effects and mitigation measures.	Not known to occur in Markham
Sand Barrens	n/a	n/a	• Confirm any ELC Vegetation Type for Sand Barrens • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWH MIST Index #20 provides development effects and mitigation measures.	Not known to occur in Markham
Alvar	n/a	ALO1, ALS1, ALT1, FOC1, FOC2, CUM2, CUS2, CUT2-1, CUW2	• Field studies that identify four of the five Alvar Indicator Species (Carex crawei, Panicum philadelphicum, Eleocharis compressa. Scutellaria parvula, Trichostema brachiatum) at a Candidate Alvar site is Significant. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses • SWH MIST Index #17 provides development effects and mitigation measures.	Not known to occur in Markham
Old Growth Forest	n/a	FOD, FOC, FOM, SWD, SWC, SWM	Field Studies will determine: • If dominant trees species of the are >140 years old, then the area containing these trees is Significant Wildlife Habitat • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present) • The area of forest ecosites combined or an eco-element within an ecosite that contain the old growth characteristics is the SWH. • Determine ELC vegetation types for the forest forest area containing the old growth characteristics • SWH MIST Index #23 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Savannah	n/a	TPS1, TPS2, TPW1, TPW2, CUS2. Remnant sites such as railway right of ways are not considered to be SWH.	Field studies confirm one or more of the Savannah indicator species listed in SWH Technical Guide Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 7E should be used. • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWH MIST Index #18 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____
Tallgrass Prairie	n/a	TPO1, TPO2. Remnant sites such as railway right of ways are not considered to be SWH.	Field studies confirm one or more of the Prairie indicator species listed in SWH Technical Gudie, Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 7E should be used • Area of the ELC Ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotic sp.). • SWH MIST Index #19 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____
Other Rare Vegetation Communities	n/a	Provincially rare S1, S2, S3 vegetation communities.	Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on NHIC S-ranks. • Vegetation Communities ranked S1 - S3 are considered SWH. • Area of the ELC Vegetation Type polygon is the SWH. • SWH MIST Index #37 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____

Waterfowl Nesting Area	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	Upland habitats adjacent to wetland ELC ecosites are considered candidate SWH: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SWT1, SWT2, SWD1, SWD2, SWD3, SWD4.	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or; • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is Considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m from the wetland and will provide enough habitat for waterfowl to successfully nest. • SWH MIST Index #25 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Osprey <u>Special Concern:</u> Bald Eagle	Forest communities (FOD, FOM, FOC, SWD, SWM, SWC) located directly adjacent to rivers, lakes, ponds, and wetlands.	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is important. • For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800m is dependent on sight lines from the nest to the development and inclusion of perching and foraging habitat • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant. • Observational studies to determine nest site use, perching sites and foraging areas need to be done from early March to mid-August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #26 provides development effects and mitigation measures	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Woodland Raptor Nesting Habitat	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	Natural or conifer plantation/ woodland/forest stands greater than 30 hectares with greater than 4 hectares of interior habitat. All forested ELC ecosites.	Studies confirm: • Presence of 1 or more active nests from species list is considered significant. • Red-shouldered Hawk and Northern Goshawk – A 400m radius around the nest or 28 ha area of habitat is the SWH. (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest) • Barred Owl – A 200m radius around the nest is the SWH. • Broad-winged Hawk and Coopers Hawk,– A 100m radius around the nest is the SWH. • Sharp-Shinned Hawk – A 50m radius around the nest is the SWH. • Conduct field investigations from early March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • SWH MIST Index #27 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Turtle Nesting Areas	Midland Painted Turtle <u>Special Concern Species:</u> Northern Map Turtle Snapping Turtle	Exposed mineral soils (sand or gravel areas) adjacent (<100m) or within the following ELC ecosites: MAS1, MAS2, MAS3, SAS1, SAM1, SAF1, BOO1, FEO1	Studies confirm: • Presence of 5 or more nesting Midland Painted Turtles • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____

Seeps and Springs	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	Forested ecosites within headwater areas of a stream where groundwater comes to the surface.	Field Studies confirm: • Presence of a site with 2 or more seeps/springs should be considered SWH. • The area of an ELC forest ecosite or an ecoelement within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat. • SWH MIST Index #30 provides development effects and mitigation measures	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____
Amphibian Woodland Breeding Habitat	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	Wetland, pond, or woodland pool (including vernal pools) greater than 500 m2 within 120 metres of a woodland. FOC, FOM, FOD, SWC, SWM, SWD	Studies confirm; • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog species with Call Level Codes of 3. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the wetland area plus a 230m radius of woodland area. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • SWH MIST Index #14 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Amphibian Wetland Breeding Habitat	Eastern Newt; American Toad; Spotted Salamander; Four-toed Salamander; Blue-spotted Salamander; Gray Treefrog; Western Chorus Frog; Northern Leopard Frog; Pickerel Frog; Green Frog; Mink Frog; American Bullfrog	Wetlands greater than 500 m2 supporting high species diversity: ELC Community classes – SW, MA, FE, BO, OA, SA	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3. or; Wetland with confirmed breeding Bullfrogs are significant. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined below in “Wildlife Movement Corridors”. • SWH MIST Index #15 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Woodland Area-Sensitive Bird Breeding Habitat	Yellow-bellied Sapsucker; Red-breasted Nuthatch; Veery; Blue-headed Vireo; Northern Parula; Black-throated Green Warbler; Blackburnian Warbler; Black-throated Blue Warbler; Ovenbird; Scarlet Tanager; Winter Wren; Pileated Woodpecker; <u>Special Concern:</u> Canada Warbler	Woodlands greater than 30 hectares: FOC, FOM, FOD, SWC, SWM, SWD	Studies confirm: • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. • Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH. • Conduct field investigations in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWH MIST Index #34 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
<u>Habitat for Species of Conservation Concern (Not Including Endangered or Threatened Species)</u>				
Marsh Bird Breeding Habitat	American Bittern; Virginia Rail; Sora; Common Gallinule; American Coot; Pied-billed Grebe; Marsh Wren; Sedge Wren; Common Loon; Green Heron; Trumpeter Swan <u>Special Concern:</u> Black Tern; Yellow Rail	MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, SAS1, SAM1, SAF1, FEO1, BOO1. For Green Heron, SW, MA, and CUM1 sites	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species. • Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH. • Area of the ELC ecosite is the SWH. • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects” • SWH MIST Index #35 provides development effects and mitigation measures	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____

Open Country Bird Breeding Habitat	Upland Sandpiper Vesper Sparrow Northern Harrier Savannah Sparrow <u>Special Concern:</u> Short-eared Owl Grasshopper Sparrow	Grassland areas greater than 30 hectares (including natural and cultural fields and meadows). Active agricultural fields are excluded from SWH consideration.	Field Studies confirm: • Presence of nesting or breeding of 2 or more of the listed species. • A field with 1 or more breeding Short-eared Owls or Grasshopper Sparrows is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #32 provides development effects and mitigation measures	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Shrub/Early Successional Bird Breeding Habitat	<u>Indicator Spp:</u> Brown Thrasher; Clay-coloured Sparrow <u>Common Spp.</u> Field Sparrow; Black-billed Cuckoo; Eastern Towhee; Willow Flycatcher	Early successional habitat greater than 10 hectares: CUT1, CUT2, CUS1, CUS2, CUW1, CUW2.	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species. • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects" • SWH MIST Index #33 Provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Terrestrial Crayfish	Chimney or Digger Crayfish; (Fallicambarus fodiens) Devil Crayfish or Meadow Crayfish; (Cambarus Diogenes)	MAM1, MAM2, MAM3, MAM4, MAM5, MAM6, MAS1, MAS2, MAS3, SWD, SWT, SWM	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites • Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult • SWH MIST Index #36 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
Special Concern and Rare Wildlife Species	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre (NHIC).	Complete ELC to ecosite level to confirm whether any rare vegetation communities exist.	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. • SWH MIST Index #37 provides development effects and mitigation measures.	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____
<u>Wildlife Movement Corridors</u>				
Amphibian Movement Corridors	Eastern Newt; American Toad; Spotted Salamander; Four-toed Salamander; Blue-spotted Salamander; Gray Treefrog; Western Chorus Frog; Northern Leopard Frog; Pickerel Frog; Green Frog; Mink Frog; American Bullfrog	Required where Amphibian Breeding Habitat (Wetland) is confirmed.	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant • Corridors should have at least 15m of vegetation on both sides of waterway or be up to 200m wide of woodland habitat and with gaps <20m. • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat. • SWH MIST Index #40 provides development effects and mitigation measures	____ Confirmed ___ Candidate ___ Absent Analysis: _____ _____ _____ _____

Appendix F: Flora and Fauna Inventory and Survey Protocols

Flora and Fauna Inventory

A comprehensive list of flora and fauna observed on the subject lands shall be included in the EIS including the status of each species at a local, provincial and national level. A list of vegetation communities should also be provided with their local and provincial ranks if applicable. Global ranks should be provided for any species that are regarded as globally rare (G1 to G3).

Table 1: Species/Vegetation Community Rankings

Local / Regional	
TRCA	L-Ranks (vegetation communities, flora and fauna
MNRF, Aurora District	Distribution and Status of the Vascular Plants of the Greater Toronto Area (flora)
Provincial / Sub-National	
MNRF (NHIC)	S-Ranks (vegetation communities, flora and fauna)
Government of Ontario (ESA; Following Evaluation by COSSARO)	Species at Risk in Ontario listings (flora and fauna)
National	
COSEWIC	Federal Species at Risk Evaluations (flora and fauna)
Government of Canada (SARA, Schedule 1)	Federal Species at Risk listings (flora and fauna)
MNRF (NHIC)	N-Ranks (flora and fauna)
Global	
MNRF (NHIC)	G-Ranks (flora and fauna)

Survey Protocols

The following table provides a summary of the most commonly utilized methodologies for completing assessments of the natural environment. These methodologies set out the timing, weather conditions and level of effort required to sufficiently characterize natural heritage features and functions.

The need and scope for field work will vary based on the development proposal and the sensitivity of the natural heritage feature. Field work may also be required based on historical records of Species at Risk in the vicinity of the subject area. This will be confirmed through the pre-consultation process and submission of EIS Terms of Reference. An Endangered Species Act screening request will need to be submitted to MNRF to determine if any surveys are required for Species at Risk. Deviations from the accepted field protocols will be reviewed by the City in consultation with TRCA and MNRF as applicable. In certain situations, field surveys may be required for assessment of other wildlife groups (e.g., mammals, snakes and salamanders) to confirm presence/absence of Species at Risk or to confirm candidate Significant Wildlife Habitat. Steps for assessment of Significant Wildlife Habitat is provided in Appendix 'E'.

Appropriate mapping shall be provided in the EIS to indicate:

- Area covered by wildlife surveys including survey locations for birds and amphibians, location of reptile cover boards, location of any traps utilized, etc.; and,
- Locations of all significant plant and animal species (with consideration for species subject to confidentiality protocols).

Table 2: Summary of Survey Protocols

Type of Survey	Methodology	Contact
Vegetation Communities	Ecological Land Classification for Southern Ontario	TRCA
Birds	Forest Bird Monitoring Protocols Ontario Breeding Bird Atlas Protocol Marsh Birds Monitoring Protocol Species-specific protocols for: • Bobolink/Eastern Meadowlark; • Least Bittern/King Rail; • Whippoorwill/Common Nighthawk (nocturnal surveys); • Owl	TRCA TRCA TRCA MNRF
Amphibians	Marsh Monitoring Program Sampling protocol for Determining Presence of Jefferson Salamanders	TRCA MNRF
Snakes	Survey Protocol for Ontario Species at Risk Snakes	MNRF
Turtles	Survey Protocol for Blanding's Turtle	MNRF
Headwater Drainage Features	Evaluation, Classification and Management of Headwater Drainage Features Guidelines	TRCA
Fisheries and Stream Assessments	Ontario Stream Assessment Protocol	TRCA
Bats	Recommended Survey Method for Species at Risk Bats within Treed Habitat	MNRF

Appendix G: Definitions

The following definitions are to be used in the interpretation and preparation of the EIS and are found in the City's Official Plan 2014, as amended.

Adjacent lands means those lands contiguous to a *natural heritage or hydrologic feature* where it is likely that development or *site alteration* can reasonably be expected to have a negative impact on the feature. The extent of the *adjacent lands* may be recommended by the Province or based on municipal approaches that achieve the same objective. Generally *adjacent lands* are considered to be within 120m from any part of the feature or as defined in the Official Plan. With respect to *cultural heritage resources*, *adjacent lands* means those lands wihtin 60 metres of a *cultural heritage resource*.

Biodiversity means the variability among living organisms from all sources, including among other things, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.

Ecological features means land, water and biotic features that contribute to *ecological integrity*.

Ecological function means the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include biological, physical and socio-economic interactions.

Ecological integrity, including hydrological integrity, means the condition of ecosystems in which (a) the structure, composition and function of the ecosystems are unimpaired by stresses from human activity, (b) natural ecological processes are intact and self-sustaining, and (c) the ecosystems evolve naturally.

Endangered species means a species that is listed or categorized as an "Endangered Species" on the Ministry of Natural Resources and Forestry Official Species At Risk in Ontario List, as updated and amended from time to time.

Erosion hazard means the loss of land due to human or natural processes that poses a threat to life and property. The *erosion hazard* limit is determined using considerations that include the 100-year erosion rate (the average annual rate of recession extended over a 100-year span), an allowance for slope stability, and an erosion/erosion access allowance.

Fish habitat means spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes.

Flooding hazard means the inundation of areas adjacent to a river or stream and small inland lake systems, where the floods resulting from the rainfall actually experienced during the Hurricane Hazel storm (1954) occurred or could have occurred over watersheds in the general area. The *flooding hazard* also includes high points of land in the area of inundation not subject to flooding.

Floodplain (river stream, and small inland lake systems) means the area, usually low lands adjoining a watercourse, that has been or may be subject to flooding hazards.

Flood vulnerable areas means a flood vulnerable community or site that as hazardous lands, requires special development and flood risk management policies to support the coninued viability of existing uses while preventing increased risks to public health and safety as a result of devleopment and *site alteration*.

Groundwater recharge means the replenishment of subsurface water (a) resulting from natural processes, such as the infiltration of rainfall and snowmelt and the seepage of surface water from lakes, streams and *wetlands*, and (b) resulting from human intervention, such as the use of stormwater management systems.

Habitat of endangered and threatened species means:

a) with respect to a species listed on the Species at Risk in Ontario List as endangered or threatened species for which a regulation made under Clause 55(1)(a) of the Endangered Species Act, 2007, is in force, the area prescribed by the regulation as the habitat of the species; or

b) with respect to any other species listed on the Species at Risk in Ontario List as an endangered or threatened species, an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding, as approved by the Ministry of Natural Resources and Forestry; and

places in the areas described in a) or b), whichever is applicable, that are used by members of the species as dens, nests, hibernacula or other residences.

Hazardous lands means property or lands that could be unsafe for development due to naturally occurring processes. Along river, stream and small inland lake systems, this means the land, including that covered by water, to the furthest landward limit of the flooding hazard or *erosion hazard* limits.

Hazardous sites means property or lands that could be unsafe for development and *site alteration* due to naturally occurring hazards. These may include unstable soils (sensitive marine clays [leda], organic soils) or unstable bedrock (karst topography).

Highly vulnerable aquifer under the Clean Water Act, is an aquifer that can be easily changed or affected by contamination from both human activities and natural processes as a result of (a) its intrinsic susceptibility, as a function of the thickness and permeability of overlaying layers, or (b) by preferential pathways to the aquifer.

Intermittent stream means a stream-related watercourse that contains water or is dry at times of the year that are more or less predictable, generally flowing during wet seasons of the year but not the entire year, and where the water table is above the stream bottom during parts of the year.

Key hydrologic feature is described in Section 3.1.2 of this Plan and includes evaluated *wetlands*, lakes and their littoral zones, *permanent streams* and *intermittent streams*, and *seepage areas and springs*.

Key natural heritage feature is described in Section 3.1.2 of this Plan and includes the *habitat of endangered and threatened species*, and habitat of *special concern species*, *fish habitat*, *wetlands*, Life Science Areas of Natural and Scientific Interest, *significant valleylands*, *significant woodlands*, *significant wildlife habitat*, *provincially rare species*, and sand barrens, savannahs and tallgrass prairies.

Landform features means distinctive physical attributes of land such as slope, shape, elevation and relief.

Natural heritage and hydrologic features means *key natural heritage features*, *key hydrologic features*, *valleylands* and *woodlands* and their functions.

Natural self-sustaining vegetation means vegetation dominated by native plant species that can grow and persist without direct human management, protection, or tending.

Permanent Stream means a stream which continually flows in an average year.

Provincially rare species means a species that is assigned S1, S2, S3 by the Provincial Natural Heritage Information Centre, including those additional species as defined in the Oak Ridges Moraine Technical Papers.

Provincially significant wetlands means an area identified as provincially significant by the Ministry of Natural Resources and Forestry using evaluation procedures established by the Province, as amended from time to time.

Redevelopment means the creation of new uits, uses or lots on previously developed lands in existing communities, including *brownfield sites*.

Regulatory flood standard means the flooding hazard limit resulting from the rainfall actually experienced during a major storm such as the Hurricane Hazel storm (1954) or the one hundred year flood; and a flood greater than either of the above, that was actually experienced in a particular watershed or portion thereof as a result of ice jams and that has been approved as the standard for that specific area by the Minister of Natural Resources; except where the use of the one hundred year flood or the actually experienced event has been approved by the Minister of Natural Resources as the standard for a specific watershed (where the history of flooding supports the lowering of the standard).

Seepage areas and springs are sites of emergence of groundwater where the water table is present at the ground surface. Seepage areas are areas where groundwater emerges from the ground over a diffuse area. Springs are points of natural, concentrated discharge of groundwater. For the purpose of this definition, seepage areas and springs include altered features but not features created and maintained by artificial means.

Significant groundwater recharge area means an area where an aquifer is replenished from:

a) natural processes, such as the infiltration of rainfall and snowmelt and the seepage of surface water from lakes, streams and *wetlands*; and
b) human interventions, such as the use of storm water management systems; and
c) whose recharge rate exceeds a threshold specified in the Clean Water Act.

Significant local groundwater recharge area means an area that sustains aquifer water levels,

groundwater flow patterns, aquatic habitat and *key hydrologic features*.

Significant valleylands includes *valleylands* which are ecologically important in terms of features, functions, representation or amount, and contribute to the quality and diversity of an identifiable geographic area or natural heritage system as determined using guidelines/procedures developed by the Province.

Significant wildlife habitat means areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle; and areas that are important to migratory or non-migratory species. *Significant wildlife habitat* includes those areas that are ecologically important in terms of features, functions, representation or amount, and contribute to the quality and diversity of an identifiable geographic area or natural heritage system.

Significant woodlands are defined in the York Region Official Plan and mean *woodlands* that meet any one of the following criteria:

a) is 0.5 hectares or larger and:
   i. Directly supports globally or provincially rare plants, animals or communities as assigned by the Natural Heritage Information Centre; or
   ii. Directly support threatened or endangered species;
   iii. Is within 30 metres of a *provincially significant wetland* or *wetland*, waterbody, *permanent stream* or *intermittent stream*;
b) is 2 hectares or larger and:
   i. is located outside the urban area and is within 100 metres of a Life Science Area of Natural and Scientific Interest, a *wetland*, *significant valleyland*, or fish habitat; or
   ii. is located within the Regional Greenlands System;
c) is 4 hectares or larger;
d) on the Oak Ridges Moraine the woodland will be evaluated for significance based on the requirements of the Oak Ridges Moraine Conservation Plan and associated technical papers;
e) on land in the Greenbelt Natural Heritage System, the woodland will be evaluated for significance based on the requirements of the Greenbelt Plan and associated technical papers.

Site alteration means activities, such as grading, excavation and the placement of fill that would change the landform and natural vegetative characteristics of a site. *Site alteration* in the Oak Ridges Moraine Conservation Plan Area does not include the construction of facilities for transportation, infrastructure and utilities uses by a public body, the reconstruction, repair or maintenance of a drain approved under the Drainage Act and in existence on November 15, 2001, or the carrying out of agricultural practices on land that was being used for agricultural uses on November 15, 2001. *Site alteration* in the Greenbelt does not include the construction of facilities for transportation, infrastructure and utilities uses by a public body; activities or works under the Drainage Act; or the carrying out of agricultural practices on land that was being used for agricultural uses on the date the Plan came into effect.

Subwatershed means an area of land that is drained by a tributary or some defined portion of a stream.

Subwatershed plan means a water management plan prepared by a municipality within the geographical boundary of a *subwatershed* to identify management responses to improve watershed conditions and to mitigate impacts of land use changes and stressors that impact or could likely impact the current condition as the result of urbanization. *Subwatershed plans* address water quality, water quantity, aquatic habitat, fluvial geomorphology and terrestrial natural heritage.

Threatened species means a species that is listed or categorized as a "Threatened Species" on the Ministry of Natural Resources and Forestry Official Species At Risk in Ontario List, as updated and amended from time to time.

Tree means any species of woody perennial plant, including its root system, that has reached or can reach a height of at least 4.5 metres at physiological maturity, provided that where multiple stems grow from the same root system, the number of trees shall be the number of stems that can be counted at a point of measurement 1.37 metres from the ground.

Tree canopy means the layer of leaves, branches and stems of *trees* that cover the ground when viewed from above.

Urban forest means all wooded areas and individual *trees*, as well as the soil that sustains them that grow on private and public property within Markham.

Valleylands means a natural area occurring in a valley

or other landform depression that has water flowing through or standing for some period of the year. For the purposes of this Plan they include well or ill defined depressional features associated with a river or stream, whether or not they contain a watercourse in which a flow of water regularly or continuously occurs.

Vegetation protection zone means a buffer surrounding a *natural heritage or hydrologic feature*. These areas protect the feature and its functions from the impacts of land use changes and associated activities that will occur before, during and after construction, and where possible, restore or enhance the features and its functions.

Watershed means an area that is drained by a river and its tributaries.

Watershed plan means a plan providing a broad assessment of the natural environment and the interconnections between features extending beyond lot boundaries and municipal boundaries and shall be utilized as a guide for more site-specific studies such as *subwatershed plans*, drainage plans and environmental impact studies.

Wetlands means lands that are seasonally or permanently covered by shallow water or have the water table close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of *wetlands* are swamps, marshes, bogs and fens. Periodically soaked or wet lands being used for agricultural purposes, which no longer exhibit wetland characteristics, are not considered to be *wetlands* for the purposes of this definition.

Woodland means an area of land of at least 0.2 hectares and includes at least:

a) 1,000 *trees* of any size, per hectare;
b) 750 *trees* measuring over 5 centimetres diameter at breast height, per hectare;
c) 500 *trees* measuring over 12 centimetres diameter at breast height, per hectare; or,
d) 250 *trees* measuring over 20 centimetres diameter at breast height, per hectare,

but does not include a cultivated fruit or nut orchard, a plantation established and used for the purpose of producing Christmas trees or nursery stock. For the purposes of defining a *woodland*, treed areas separated by more than 20 metres will be considered a separate *woodland*. When determining a *woodland*, continuous agricultural hedgerows and woodland fingers or narrow *woodland* patches will be considered part of the *woodland* if they have a minimum average width of at least 40 metres and narrower sections have a length to width ratio of 3:1 or less. Undeveloped clearings with *woodland* patches are generally included within a *woodland* if the total area of each clearing is no greater than 0.2 hectares. In areas covered by Provincial Plan policies, *woodland* includes treed areas as further described by the Ministry of Natural Resources. For the purposes of determining densities for *woodlands* outside of the Provincial Plan areas, the following species are excluded: staghorn sumac, European buckthorn, common lilac.

Appendix H: List of Policy Documents, Legislation and Background Environmental Studies

Policy Documents

- City of Markham Official Plan 2014, as amended and Secondary Plans, as may be applicable;
- Region of York Official Plan 2010, as amended;
- Provincial Plans and policies: 2014 Provincial Policy Statement, 2017 Oak Ridges Moraine Conservation Plan, 2017 Greenbelt Plan, and 2017 Growth Plan for the Greater Golden Horseshoe; and,
- The Living City Policies for Planning and Development in the Watersheds of the Toronto and Region Conservation Authority, (TRCA, 2014).

Provincial and Federal Legislation

- Conservation Authorities Act (Sec. 28 regulation);
- Endangered Species Act;
- Fisheries Act;
- Species at Risk Act; and,
- Clean Water Act.

Guidance Documents

- Markham Bird Friendly Guidelines (Markham, 2014);
- Rouge North Implementation Manual (Rouge Park 2003);
- Natural Heritage Reference Manual (MNRF, 2010);
- Significant Wildlife Habitat Technical Guide (MNRF, 2000);
- Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E and 7E (MNRF, 2015);
- Oak Ridges Moraine Conservation Plan Technical Papers 1 - 17 (MMAH, n.d.);
- Greenbelt Plan: Technical Definitions and Criteria for Key Natural Heritage Features in the Natural Heritage System of the Protected Countryside Area (MMAH, 2012);
- Evaluation, Classification and Management of Headwater Drainage Features Guidelines (TRCA, 2014);
- Erosion and Sediment Control Guideline for Urban Construction (Greater Golden Horseshoe Area CAs, 2006);
- TRCA Stormwater Management Criteria Document including LIDs and feature-based water balance (TRCA, 2012);
- TRCA Water Balance Risk Evaluation (TRCA, 2017); and,
- How Much Habitat is Enough, 3rd Edition (Environment Canada, 2013).

Background Environmental Studies and Reports

1. Watershed Plans and Fisheries Management Plans
   a) Highland Creek Watershed - State of the Watershed Report (TRCA, 1997);
   b) Duffins Creek Watershed - Watershed Plan (TRCA, 2003) and Fisheries Management Plan (TRCA, 2004);
   c) Rouge River Watershed - Watershed Plan (TRCA, 2007) and Implementation Guide (TRCA, 2008);
   d) Don River Watershed - Watershed Plan (TRCA, 2009); and,
   e) Petticoat Creek Watershed - Watershed Action Plan (TRCA, 2012).
2. Subwatershed studies
3. Master Environmental Servicing Plans
4. CTC Source Protection Plan
5. Geotechnical, feature-based water balance, and/or fluvial geomorphic reports, where applicable
6. Rouge North Management Plan (Rouge Park, 2001)